Implicit measurement of psychopathic traits as predictors of impulsivity and fearlessness

by

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Abstract

Psychopathy is associated with duplicity, deception and manipulation. Thus, self-reports of psychopathic traits and those relying on the judgments of others may be somewhat unreliable. As an alternative to self-report measures, this thesis explored the potential of implicit measures, experimental tasks designed to tap into implicit processes, to index the psychopathic personality self-concept. Using the triarchic model of psychopathy as the conceptualisation of psychopathy, three novel Implicit Association Tests (IATs) were developed, one for each triarchic domain of psychopathy (Boldness, Meanness and Disinhibition). Priming tasks were also developed, using the same stimuli used in the IATs. Of the two tasks, only the IATs showed internal consistency and discriminant validity. Corresponding with dual-system models of cognition, the thesis next explored whether an implicit measure of psychopathy might be better at predicting more automatic or spontaneous psychopathic behaviours than a self-report equivalent measure. As the IATs had consistency and validity, these were used as the implicit measures of psychopathy. Behavioural tasks (Affect Misattribution Procedures, go/no-go task, Stroop tasks, attentional blink paradigm) were developed to use alongside the IATs. These intended to invoke more automatic or spontaneous behaviours associated with psychopathy. While limited predictive utility emerged for the IATs with these tasks, interesting findings emerged. The boldness-IAT was positively associated with threat ratings of threatening images, indicating that implicitly, bold individuals experience greater levels of threat. The disinhibition-IAT was variable in its relation to triarchic Disinhibition, possibly indicating that some disinhibited individuals may not implicitly view themselves as such. Furthermore, both the Stroop and go/no-go tasks, which index response inhibition, were associated with triarchic Disinhibition. Therefore, this thesis offers several contributions to the literature. It demonstrates the IAT's potential in indexing the psychopathic self-concept and indicates that the implicit psychopathic self-concepts of Disinhibition and Boldness may differ from that represented by self-report measures.

Declarations and Statements

DECLARATION

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed [redacted] (candidate)

Date 26th June 2024

STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used, the extent and nature of the correction is clearly marked in a footnote(s).

Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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STATEMENT 2

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title to be made available to outside organisations.

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Date 26th June 2024

STATEMENT 3

All research conducted within this thesis obtained appropriate ethical approval from Swansea University. All ethical procedures were followed throughout the research.

Signed  (candidate)

Date 26th June 2024

Contents

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Chapter 3: My supervisors and I jointly conceptualised the study and developed the methodology. Together we created the stimuli for the IATs, along with definitions for personality thermometers. I was responsible for software (programming and testing of the tasks and experiments, monitoring of software during data collection). I annotated and scrubbed the raw data and scored questionnaires and tasks. I undertook all formal analysis presented within the chapter.

The following students were involved in provision of some resources (participant documentation such as information/consent/debrief forms), setting up the ethical application on the internal ethics software system, and data collection as part of their MSc projects: *Catrin Hancock, Holly Rees, Joshua Rabosa, Laurinda Dodoo, Francisca Aiyejuro, Heather Gilmour, Georga De-Freitas-Ludlow, Connor Goodall, Katiana Marrero-Lapinell*, and *Linny Jacob.*

> ***CRediT statement:*** **Jennifer Pink**: Conceptualization, Methodology, Resources, Software, Investigation, Formal Analysis, Data Curation. **Nicola Gray**: Supervision, Conceptualization, Methodology, Resources. **Catrin Hancock**: Resources, Investigation. **Holly Rees**: Resources, Investigation. **Joshua Rabosa**: Resources, Investigation. **Laurinda Dodoo**: Resources, Investigation. **Francisca Aiyejuro**: Resources, Investigation. **Heather Gilmour**: Resources, Investigation. **Georga De-Freitas-Ludlow**: Resources, Investigation. **Connor Goodall**: Resources, Investigation. **Katiana Marrero-Lapinell**: Resources, Investigation. **Linny Jacob**: Resources, Investigation.

Chapter 5, Chapter 6 (study 2): The Affect Misattribution Procedures and go/no-go task used in this chapter were conceptualised jointly with my supervisors and together we developed the methodology. I sourced and selected resources (stimuli for the procedures) and was solely responsible for software (programming and testing of the tasks and experiments, monitoring of software during data collection). I annotated and scrubbed the raw data. I scored questionnaires and tasks and undertook all formal analysis presented within the chapter.

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Abbreviations

Abbreviation	Meaning
AAP	Affect Attribution Procedure
AB	Attentional Blink
ACC	Anterior Cingulate Cortex
ADHD	Attention Deficit Hyperactivity Disorder
A-Level	Advanced Level
AS-Level	Advanced Subsidiary Level
AMP	Affect Misattribution Procedure
ANOVA	Analysis of Variance
BIDR-16	Balanced Inventory of Desirable Responding Short-Form
CI	Confidence Interval
DII	Dickman's Impulsivity Inventory
DTP	Doctoral Training Partnership
EAB	Emotional Attentional Blink Task
EPQ	Eysenck's Personality Questionnaire
EPT	Evaluative Priming Task
ERP	Event Related Potential
ERF	Emotion Report Form
ESRC	Economic and Social Research Council
GSCE	General Secondary Certificate of Education
HEXACO	Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, and Openness to Experience
HNC	Higher National Certificate
IAPS	International Affective Picture System
IAT	Implicit Association Test
IQR	Interquartile Range
LSRP	Levenson Self-Report Psychopathy Scale
MCSDS	Marlowe-Crowne Social Desirability Scale
ms	Milliseconds
NEO-PI-R	NEO Personality Inventory
O-Level	Ordinary Level
OSPAN	Operation Span Task

Abbreviation	Meaning
P3	Event Related Potential “P3”
PCL	Psychopathy Checklist
PCL-R	Psychopathy Checklist-Revised
PCL-SV	Psychopathy Checklist-Screening Version
PFC	Prefrontal Cortex
PIM	Positive Impression Management Scale
PPI-R	Psychopathic Personality Inventory-Revised
PSA	Prosocialness Scale for Adults
PT	Personality Thermometer
RIM	Reflective Impulsive Model
RMH	Response Modulation Hypothesis
RPQ	Reactive-Proactive Aggression Questionnaire
RSVP	Rapid Serial Visual Presentation
RT	Reaction Time
Sc-IAT	Single Category Implicit Association Test
SD	Standard Deviation
SDS-17	Social Desirability Scale
SEM	Standard Error of Measurement
SOA	Stimulus Onset Asynchrony
sqrt	Square Root
SPSS	Statistical Package for the Social Sciences
SRP	Self-Report Psychopathy Scale
T1	Target 1
T2	Target 2
TriPM	Triarchic Psychopathy Measure
UK	United Kingdom
UPPS	UPPS Impulsive Behavior Scale
UPPS-P	UPPS-P Impulsive Behavior Scale
US	United States (of America)
WAIS-IV	Wechsler Adult Intelligence Scale
WAS	Welsh Anxiety Scale

Dissemination of Research

Publications

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Chapter 1: Models and Mechanisms in Psychopathy

The construct of psychopathy has been variously described and defined over centuries, with the current conceptualisation of the disorder originating during the last hundred years (Patrick et al., 2009). Many of these historical ideas and perspectives about psychopathy have heavily influenced current-day models and continue to contribute towards debates about which models are most relevant, representative, and appropriate (Cooke et al., 2005; Hare & Neumann, 2008; Hervé, 2017; Patrick & Drislane, 2014). Thus, this chapter starts by revisiting some of the earlier conceptualisations before looking in detail at present-day models of psychopathy. It then discusses the prevalence of psychopathy across different populations before presenting prominent perspectives about the underpinning mechanisms of the disorder.

Conceptualisations of Psychopathy: From Pinel to Present Day

One of the first to attempt to define the precursor to the modern-day concept of psychopathy was Pinel (1806, cited in Kavka, 1949). Pinel considered psychopathy to be one of five "mental derangements", labelling it as "manie sans délire" meaning mania, or insanity, without delirium (Andrade, 2008; Hervé, 2017). Drawing upon case studies, Pinel described a number of individuals displaying a range of cruel, antisocial behaviours and emotional instability marked by outbursts of rage, blaming others, and impulsivity (Pinel, 1806, cited in Kavka, 1949). Following this, Rush (1812, cited in Hervé, 2017) defined a condition called "moral derangement", where outwardly functional and intellectually capable individuals again displayed impulsive and deceitful behaviours but showed no remorse or shame for the consequences of their actions. Varying attempts to define the disorder now known as psychopathy prevailed, with clinicians such as Prichard (1835), Koch (1888), Kraepelin (1907) and Partridge (1930) proposing further definitions and sometimes, diverging symptoms (Cleckley, 1950; Hervé, 2017); however, these offered little consensus, disagreed in their form/subtype, and gave rise to frustration that there was a lack of a clear and evidenced definition of psychopathy:

"The vagueness and plasticity of the term (psychopathic personality) as officially used indeed allows it to be stretched in practice to cover nearly any type of abnormal behavior imaginable"

Cleckley (1950, p. 328).

To address this dissensus surrounding psychopathy and the issue that many conceptualisations lacked evidence, Cleckley (1950) drew upon his extensive clinical experience with psychiatric inpatients to create a profile of psychopathy. Cleckley's profile comprises 16 characteristics or indicators, within three broad areas (Patrick et al., 2009). Firstly, Cleckley's four characteristics of intelligence and social charm, a low likelihood of suicide, an absence of nervousness and an absence of delusions/irrational thoughts reflect what Patrick et al. (2009, p. 915) term "positive adjustment indicators". A further six of Cleckley's characteristics (lacking in remorse or shame, lack of affective reactivity, inability to love and egocentricity, deceit and disingenuousness, poor insight, and affective poverty) represent issues with emotional responsivity and connectedness to others (Patrick et al., 2009). The final six of Cleckley's indicators represent deviant behaviours (being unreliable, engaging in impersonal and meaningless sex, impulsive and reckless behaviour when drinking alcohol, engaging in unsocial acts, displaying poor judgment, and not learning from experiences, failing to follow a clear life plan) (Patrick et al., 2009). Thus, Cleckley considered the psychopath as someone who outwardly appears well-adjusted while failing to experience typical emotions and connections and behaves in an impulsive and untrustworthy manner. However, it is important to note that while Cleckley's conceptualisation of the psychopath aimed to address a lack of consensus, his profile emerged from a clinical synopsis of common characteristics rather than following an empirical process which examined the validity and respective importance of each (Hare & Neumann, 2008).

However, soon after Cleckley's definition was published, an alternative conceptualisation of the psychopath arose as a much more sinister, predatory criminal (Patrick et al., 2009). The emergence of this more malignant and dangerous definition of psychopathy appears partly related to

McCord and McCord's (1964, cited in Andrade, 2008) writings on psychopathy. Like Cleckley, they considered psychopaths emotionally superficial, lacking empathy, guilt and remorse. However, the McCords also portrayed the psychopath as highly exploitative and maladaptive, engaging in aggressive and violent behaviours (Andrade, 2008; Hervé, 2017). Thus, somewhat in contrast to the well-meaning yet emotionally stunted and dishonest psychopath described by Cleckley, an alternative version emerged of the psychopath as a vicious, aggressive, and cold individual (1964, cited in Patrick et al., 2009, p. 916). However, as with Cleckley's criteria, the McCord and McCord conceptualisation of the psychopath does not appear to have been derived from substantial empirical evidence and validation.

Current models of psychopathy have drawn differentially from these and other conceptualisations of the disorder. Thus, while Cleckley is widely considered responsible for providing the foundation for psychopathy as defined in the present (Patrick et al., 2009), present-day models diverge to varying degrees from this.

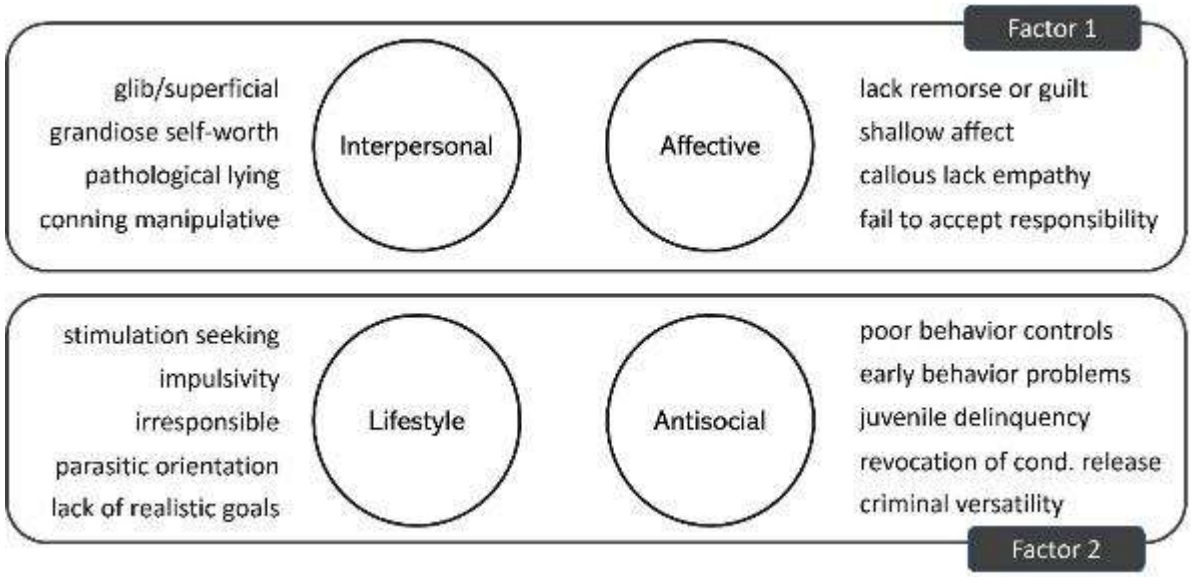
Present-Day Models of Psychopathy

2-Factor, 4-Facet Model of Psychopathy

Perhaps the most well-known conceptualisation of psychopathy is represented by Hare's Psychopathy Checklist-Revised (PCL-R; Hare, 1991). The PCL-R, and its predecessor, the Psychopathy Checklist (PCL; Harpur et al., 1988), integrated many of Cleckley's observations into a checklist representing the "prototypical" psychopath (Coid & Yang, 2008, p. 773). However, it did not merely reflect Cleckley's definition; it also incorporated some of the criminal behaviours associated with psychopathy identified by McCord and McCord and other clinicians and researchers, including Karpman (Hare & Neumann, 2008). At the time of the PCL inception, there were no commonly accepted, reliable measures for psychopathy (Hare & Neumann, 2008). Thus, the concept of psychopathy was difficult to accurately research in a systematic way. As such, the PCL was conceived to provide a standardised tool to diagnose and identify the disorder.

In its present form, the PCL-R proposes that psychopathy is underpinned by two "factors". One factor represents the manipulative interpersonal behaviours and emotional attenuation associated with psychopathy; this is called "Factor 1" and comprises two "facets" interpersonal (Facet 1) and affective (Facet 2) (Hare & Neumann, 2008). The second factor, or "Factor 2", represents persistent antisocial and impulsive behaviours; this is also parsed into two facets of lifestyle (Facet 3) and antisocial (Facet 4) (Hare & Neumann, 2008). The PCL-R includes two other items: promiscuous sexual behaviour and many short-term relationships. These items are not associated with either factor but are included when calculating an overall PCL-R score (Hare & Neumann, 2008). Each of the 20 items is scored on a 3-point scale (0-2), where scores are determined by an individual's case history and a semi-structured clinical interview (Hare & Neumann, 2008). The maximum PCL-R score is 40, with psychopathy diagnosis typically being set at 30 or above (Hare & Neumann, 2008). Figure 1.1 illustrates the various features of each Factor and Facet within the PCL-R.

Figure 1.1: Psychopathy Checklist-Revised structure of two Factors and four Facets: adapted from (Hare & Neumann, 2008)



The PCL-R is the dominant tool used in psychopathy and is considered the "gold standard" within forensic and clinical settings (Boduszek & Debowska, 2016). There is also a self-report version

of the measure, the Self-Report Psychopathy Scale (SRP-4; Paulhus et al., 2016), which is popular in research and youth versions are available (De Brito et al., 2021). Nevertheless, while widely adopted, criticisms have been levied at the PCL-R regarding several of its inclusions and exclusions. Firstly, the PCL-R's content has been critiqued for diverging from the original work of Cleckley in several ways. It has been criticised for including antisocial behaviours and, thus, considering criminality and criminal actions to be a fundamental feature of the disorder, which somewhat jars with the psychopath described and defined by Cleckley (Cooke et al., 2005). Secondly, Patrick et al. (2009) have highlighted that the PCL-R omits some of the aspects of psychopathy associated with positive adjustment, such as a lack of anxiety and immunity to suicide, which were core psychopathic characteristics noted by Cleckley. Another shortcoming levied at the PCL-R is that it represents low anxiety but does not include anxiety associated with unsocial behaviours (Skeem & Cooke, 2010). While each of these criticisms seems valid, given Cleckley's prominent work, all have been challenged (Hare & Neumann, 2008). These divergences from the Cleckley psychopath have been disputed, given that when PCL-R scores are compared with the psychopathic characteristics defined by Cleckley, the two constructs are significantly and highly correlated (Hare & Neumann, 2008); in these comparisons, the Cleckley criteria are rated in the same manner as the PCL-R, using a scale of 0-2 depending on the extent to which a rater considers each of the criteria applies (e.g., Kennealey et al., 2007). The criticisms of Cooke et al. (2005) that including antisocial behaviours within the PCL-R is invalid have also been argued against, as many of Cleckley's case studies evidence antisocial (and some criminal) behaviours (Hare & Neumann, 2008).

Thus, while the PCL-R is the primary psychopathy measure of choice for clinicians and many researchers, it raises several questions regarding its inclusion of items which only apply in forensic cases and its exclusion of some of the positive aspects of psychopathy, which Cleckley highlighted. Moreover, there are practical issues with application of the PCL-R as it requires past records of an individual's behaviour and offences, specialist training and can be lengthy to administer. These concerns, alongside a drive to integrate biobehavioural evidence of psychopathic traits, have

contributed to the development of another prominent model of psychopathy, which will be reviewed next.

Triarchic Model of Psychopathy

Contrasting with Hare's 2-Factor, 4-Facet model of psychopathy, the triarchic model proposes that three phenotypic domains underpin the disorder (Patrick et al., 2009): Meanness, Boldness, and Disinhibition. Triarchic Meanness encompasses callousness, a lack of empathy, cruelty, exploitation, predation and antagonism (Patrick et al., 2009). The domain of Boldness reflects confidence, social dominance, resilience, composure under pressure and an ability to endure danger (Patrick et al., 2009). Disinhibition reflects the impulsive aspects of psychopathy, including a failure to plan, a lack of foresight, irresponsible decision-making, unreliability and a focus on gaining instant gratification (Patrick et al., 2009). This model is reflected in a self-report measure called the Triarchic Psychopathy Measure (TriPM; Patrick, 2010) which comprises of 58-items. The Boldness and Meanness subscales have 19 items, while the Disinhibition subscale has 20 items. Participants respond to a series of statements using a scale (*false, mostly false, mostly true, true*). Each questionnaire item is scored between 0 and 3; higher scores indicate higher levels of that psychopathic domain.

The triarchic psychopathy model aimed to resolve the varying conceptualisations of the disorder that had emerged over the previous century, providing a single model which could be reconciled with the wide range of manifestations evident across the literature, including the PCL-R model (Patrick et al., 2009). The three domains, each to varying degrees, appear to account for Cleckley and Hare's competing conceptualisations of psychopathy. Taking first the Cleckley psychopath, this is well represented by the two triarchic domains of Boldness and Disinhibition (Patrick & Drislane, 2014; Sleep, Weiss, et al., 2019). Together these represent a confident and assertive character who has the propensity to engage in impulsive and hostile behaviours. Considering next both the PCL-R and McCord & McCord's conceptions of the psychopath, these

constructs of psychopathy are largely represented by the triarchic domains of Meanness and Disinhibition (Patrick & Drislane, 2014; Sleep, Weiss, et al., 2019). Together, these two domains reflect an exploitative, cruel and predatory individual who lacks empathy and engages in hostile and impulsive actions.

The content of the triarchic domains also deals with criticisms levied against the PCL-R. By incorporating features of positive adjustment within the Boldness domain, the triarchic model accounts for these traits, identified in Cleckley's original work (Patrick & Drislane, 2014; Patrick et al., 2009). Moreover, by including Boldness and its corresponding traits within a model of psychopathy, unlike the PCL-R, the triarchic model also accounts for the successful psychopath, a charming, intrepid enterprising individual who is unwavering and persuasive (Patrick et al., 2009). The triarchic model also does not place the same importance upon criminal activity being a core aspect of psychopathy as the PCL-R does; this reconciles with alternate views that offending behaviours are not central to the disorder and may be secondary manifestations (Cooke et al., 2005; Skeem & Cooke, 2010). Lastly, and importantly, the fearlessness which is captured within the items of the Boldness domain supports Lykken's (1957) proposal that psychopathy is associated with either a diminished capacity to experience fear, or that fear and withdrawal responses are not activated unless a high activation threshold is met (Brook et al., 2013; Sleep, Weiss, et al., 2019). Diminished fear associated with the disorder is well-established in the evidence base (Patrick et al., 2009).

Furthermore, in addition to aiming to reconcile the various conceptualisations of psychopathy within a single model, the domains of the triarchic model also appear to hold particular associations with neurophysiological indicators (Patrick & Drislane, 2014). This is a noteworthy attribute of the triarchic model; it is becoming increasingly important for research to identify the neurobiology which underpins or contributes to psychopathological traits and integrate this knowledge within assessment tools and definitions (Nelson et al., 2016). Considering first Disinhibition, in addition to issues with the self-regulation of emotions, Disinhibition is also marked

by problems with behavioural restraint and, in particular, impulse control (Patrick & Drislane, 2014; Patrick et al., 2009). Evidence from neurobehavioural studies using executive control tasks to index response inhibition suggests that one particular pattern of neural activity might be a useful marker in identifying trait disinhibition (Delfin et al., 2020). Those with higher levels of Disinhibition experience a reduced amplitude of a particular event related potential, P3, which occurs approximately 300ms after a stimulus onset (Delfin et al., 2020; Patrick & Drislane, 2014). Furthermore, evidence has emerged of a reduced amplitude of a particular subcomponent of the P3 potential, the "NoGo P3", in disinhibition (Delfin et al., 2020). This component is elicited in tasks where participants must infrequently withhold a response (Delfin et al., 2020). Drislane and Patrick (2014) also highlight that neurophysiological evidence from the amygdala corresponds with a diminished sensitivity to threat, which is associated with the triarchic Boldness domain. In a threatening situation, typically, there is an involuntary physiological startle response, which is considered to index the reactivity of the brain's defence system (Nelson et al., 2016; Patrick & Drislane, 2014); however, evidence finds that those who are lower in threat sensitivity or fear (as captured within triarchic Boldness), experience a diminished response of this kind (Nelson et al., 2016; Patrick & Drislane, 2014). While this offers good neurobiological support for Boldness and Disinhibition, there appears to be less biobehavioural evidence linking to triarchic Meanness, which is a point for further exploration (Drislane & Patrick, 2014).

Thus, while the PCL-R is, and may continue to be, the most used tool in diagnosis and research, the triarchic conceptualisation of psychopathy offers an integrative model. It reconciles some of the debates around which traits and behaviours should be included and/or omitted and accounts for a multitude of phenotypic manifestations. Moreover, two of its distinct three domains link with neurobiological evidence, essential for conceptualisations of psychopathologies.

However, while the triarchic model offers a broader and more encompassing definition of psychopathy than that of the PCL-R, in contrast to the criticisms of omissions faced by the PCL-R, by

being broader, the triarchic model has been criticised for being over-inclusive. In fact, Boldness, Meanness and Disinhibition have all been variously debated as to whether they should be included, and there is still significant disagreement in the field as to what psychopathy comprises (Crego & Widiger, 2022). While some (e.g., Lilienfeld et al., 2016) argue that Boldness is a core feature in psychopathy, others, such as Sleep, Weiss, et al. (2019), disagree. They suggest that gaining social acceptance and endorsement, associated with Boldness traits, could be equally achieved via other factors such as wealth and attractiveness (Sleep, Weiss, et al., 2019). The centrality of Disinhibition in psychopathy, particularly antisocial behaviour, has been questioned by Cooke et al. (2004), who have instead suggested it is consequential rather than symptomatic of the disorder (Cooke et al., 2004; Crego & Widiger, 2022). Lastly, as extreme cruelty and meanness are not part of the Cleckley psychopathic profile, the Meanness domain's relevance within the triarchic model has also been questioned (Crego & Widiger, 2022). Thus, the lack of consensus endures.

Prevalence of Psychopathy

Forensic Populations

Regardless of a comprehensive agreement on what psychopathy comprises, there is a general consensus that in its various forms, it is a highly problematic disorder due to the prolific levels of offending with which it is associated, and the nature of offences committed by those with psychopathy. The annual cost to the criminal justice system of the disorder has been estimated at US $460 billion (Reidy et al., 2015). In offending populations, the prevalence of psychopathy is estimated at between 15% and 25% (De Brito et al., 2021; Reidy et al., 2015), although rates appear to be lower in female samples, between 10 and 12% (Sanz-García et al., 2021). The majority of these studies use the PCL-R to index psychopathy (e.g., Guay et al., 2018). Those with psychopathy engage in some of the most violent offences, resulting in higher levels of injury and death (Reidy et al., 2015). Moreover, the association between psychopathy and homicide is stronger in murders of sexual, sadistic or multiple nature (Fox & DeLisi, 2019).

Psychopathy in the Workplace

Beyond offending populations, the deleterious nature of psychopathy is also linked with engendering an adverse and harmful work environment as well as corporate offending. As such, in the workplace, psychopathy can bring considerable organisational and individual costs. Some of the most recent collapses of high-profile corporate institutions have been, in part, resultant of fraud and corruption committed by CEOs, financiers, and bankers who displayed a range of psychopathic behaviours (Sheehy et al., 2021). Some data suggest that over 40% of businesses succumb to significant fraud (Babiak et al., 2010); research with financial auditors found that 69% reported experiencing clients with psychopathic traits within firms they audited, and 43% of those firms experienced client fraud (Klarskov Jeppesen & Leder, 2016). Babiak et al. (2010) found that the levels of psychopathic traits, measured using the PCL-R were significantly higher in a corporate organisational sample than is typically found in community samples. In their meta-analysis of studies using a range of psychopathy measures, Sanz-García et al. (2021) reported a prevalence of 12.9% in in individuals holding organisational management roles, including senior executives, advertising, supply chain and procurement professionals.

Compared to the psychopathy prevalence rate typically found in community samples, which is discussed below, the elevated prevalence rate in corporate samples may be an artefact of recruitment strategies as recruiters for executive job roles appear to be actively recruiting individuals with Factor 1 traits (Hill & Scott, 2019). Many of the traits associated with “sub-clinical” psychopathy appear advantageous in the corporate workplace, and those individuals are particularly adept at portraying a veneer of normalcy (Sheehy et al., 2021). A lack of conscience for others, ruthlessness, the ability to charm and seduce, and a greedy focus on financial gain are all traits which can be attractive in an organisational leadership role (Sheehy et al., 2021). However, in addition to bringing an elevated risk for corruption and fraud, where higher levels of psychopathy are found in those with supervisory/management roles, evidence suggests that their direct reports experience lower levels

of employee job satisfaction and well-being (Mathieu et al., 2014). Moreover, being managed by those with psychopathic traits leads to a greater desire of employees wishing to leave their current roles (Mathieu & Babiak, 2016). Thus, beyond the vast financial impact of psychopathy within the corporate environment, there is a likely cost to businesses for increased recruitment costs through higher staff turnover and staff sickness due to lower well-being.

Psychopathy in the General Population

Compared to offending and corporate management samples, levels of psychopathy in the general population appears much lower. Coid et al. (2009) identified a prevalence rate of 0.6% in a household population sample. However, more recent analysis suggests that the prevalence in community samples may, in fact, be greater; Sanz-García et al. (2021)'s recent meta-analysis gave a general population estimate of 4.5%. This disparity may arise from the application of different measures to measure psychopathy. Coid et al., (2009) used the Psychopathy Checklist: Screening Version (PCL-SV; Hart et al., 1995) which requires an interview and historical information. Contrastingly, most other community studies, many of which feature in Sanz-García et al. (2021)'s meta-analysis, have used self-report instruments to index psychopathic traits. Some (e.g., Gordts et al., 2017; Salekin et al., 2001) have used the self-report version of the PCL-R (Self Report Psychopathy Scale; Paulhus et al., 2016). Other research (e.g., Fritzon et al., 2017; Love & Holder, 2014; Spencer & Byrne, 2016) has used alternative self-report measures including the Levenson Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995) and the Psychopathic Personality Inventory-Revised (PPI-R; Lilienfeld & Widows, 2005) have used.

As with the gender comparison in offending populations, the prevalence of psychopathy in men is significantly higher. Coid et al. (2009) identified a ratio of 4:1 (men: women), while Sanz-García et al. (2021) found that the rate varied between genders, with the prevalence in men (7.9%) being more than double that of women (2.9%). While there are disparities between studies, these may relate to a range of psychopathy measures being used across research and gender differences

between samples (Sanz-García et al., 2021). Nonetheless, psychopathy in communities and the general population is at a lower rate than within forensic and corporate environments.

The Mechanisms of Psychopathy

Emotional Deficit Hypotheses

There are several prominent hypotheses regarding the underlying mechanisms responsible for psychopathy. Two of these propose an emotional deficit of varying degrees, while the third proposes an attentional deficit. The first emotional deficit hypothesis stems from Cleckley's work and postulates global issues in emotional functioning (Brook et al., 2013). This theory proposes that those with psychopathy have typical cognition and are rational; however, they fail to experience emotion which leads to a failure to comprehend the ramifications upon the self and others of their actions (Brook et al., 2013). Contrasting with this hypothesis is the second type of emotional deficit perspective: a specific emotional deficit. This suggests that the deficiency in emotional processing is only focal and limited to particular emotional experiences (Brook et al., 2013). Lykken's (1957) prominent low fear hypothesis, previously mentioned, is one such focal deficit theory; in this, Lykken proposes that at the heart of psychopathy is a reduced ability to experience fear or that higher levels of fear are required in order to activate withdrawal mechanisms (Brook et al., 2013). As Brook et al. (2013) outline, the emotional deficits associated with psychopathy are theorised to be caused by impairment in amygdala functioning. Evidence offers some support for this, finding reduced amygdala activation in psychopathy; however, as Larson et al. (2013) note, other studies find enhanced amygdala activation in response to emotional stimuli.

Attentional Deficit Hypothesis

A competing theory regarding the mechanisms responsible for psychopathy proposes an attentional deficit which curtails the processing of emotion and other important information (Baskin-Sommers et al., 2013). This hypothesis is known as the response modulation hypothesis (RMH;

Baskin-Sommers et al., 2011). Unlike Cleckley and Lykken's hypotheses on psychopathy, the RMH proposes that the apparent emotional deficits evident in the disorder are not related to a failure to experience emotion per se. Rather, in those with psychopathy, attention moderates whether an emotional response is generated (Hamilton & Newman, 2018). When psychopaths are required to attend to emotional stimuli, the RMH posits that they can perform in a comparable manner to those low in psychopathy in a variety of situations. However, when they are not required to pay attention, they fail to process the emotional content of stimuli. Hence, there is a lack of emotional response as a result. Supportive evidence for this theory comes from those with psychopathy displaying typical startle responses (e.g., Baskin-Sommers et al., 2013) and typical amygdala activation in response to processing threat-relevant information (Larson et al., 2013).

Psychopathy and the Thesis: The Triarchic Model

The PCL-R model is the most well-known and has its basis within some the historical conceptualisations of the disorder. However, it faces criticism for its overfocus on criminality and offending behaviours (Cooke et al., 2005), its failure to include some of the positive adjustment aspects associated with the disorder (Patrick et al., 2009) and its exclusion of anxiety associated with antisociality (Skeem & Cooke, 2010). Contrastingly, the more recent triarchic model, which integrates neurobiological indicators for psychopathy and deals with many of the points levied at the PCL-R, is considered by some to be over-inclusive in a number of areas (Crego & Widiger, 2020; Sleep, Weiss, et al., 2019; Cooke et al, 2004). Thus, both these (and other) models have their supporters and opponents. As such, the debate on which model of psychopathy best represents the disorder prevails and will continue to endure for the foreseeable future.

This thesis has selected the triarchic model of psychopathy (Patrick et al., 2009) measured by the Triarchic Psychopathy Measure (TriPM; Patrick, 2010) as the basis for indexing the disorder for several reasons. It has been chosen in preference to the PCL-R firstly because, this thesis is an exploration of psychopathy within community samples. As such, there are practical issues with

administering the PCL-R as it requires clinical interview and extensive background information about each individual in order to generate a psychopathy score. One alternative might be to use a self-report version of the PCL-R; however, while this overcomes issues of practicality, it does not address the criticisms related to the content of the PCL-R as a conceptualisation of psychopathy. Furthermore, while the PCL-R model is well-defended by many (e.g., see Hare & Neumann, 2008), ultimately measures based upon it may indeed prove to be too restrictive and place too much weight on criminality, a point of particular salience to community samples. As the concept of psychopathy itself is still in debate, it seems prudent to be over-inclusive than under-inclusive. Lastly, the PCL-R does not integrate the broader literature on neuropsychology to the extent that the TriPM does. It is important that assessment tools and models integrate neurobiological contributors.

The experimental methods explored within this thesis, which will be introduced and discussed in later chapters, could be equally applied to the PCL-R model of psychopathy and other related models for the disorder. As such, while differing perspectives on the exact nature of the disorder are in abundance, the principals employed herein should be useful for psychopathy as a whole, rather than solely in relation to the triarchic model.

Summary

This chapter has provided a brief history of the conceptualisation of psychopathy and illustrated how differing perspectives on the disorder have influenced current-day models and measures. It has outlined the prominent model in the field, the PCL-R, and discussed the more recent triarchic model, which has taken an integrative approach to psychopathy, aiming to consolidate perspectives within a single multi-dimensional model in conjunction with making links between its domains to neurophysiological indicators. The chapter has illustrated the importance of gaining a greater understanding of psychopathy by reviewing the prevalence of psychopathy across forensic, corporate, and general populations and the many ways in which psychopathic behaviours can be detrimental across environments. The proposed mechanisms which give rise to the traits and

behaviours associated with psychopathy have also been briefly discussed. The chapter has concluded by setting out the justification for using the triarchic model as the model of psychopathy for this thesis. The next chapter will consider issues with using self-report measures in psychopathy, such as the TriPM, and the potential to overcome these issues by using experimental paradigms.

Chapter 2: Implicit Cognition and Psychopathy

Issues in Self-reported Psychopathy

Self-report measures are widely used to index personality traits, attitudes, experiences, and behaviours (De Cuyper et al., 2017; Purol et al., 2022). However, such self-report measures rely on honest responding which cannot be presumed (Hildebrand et al., 2018). There may be motivations for participants to respond in a way which distorts the assessment, known as *faking good*, creating an overly positive description of the self; this might occur, for example, when applying for a job (Walker et al., 2022). Faking good may also occur in forensic settings as offenders might want to mask the existence of particular traits in order to portray an amiable and pleasant self to prison workers and parole board members (Birkeland et al., 2006; Hildebrand et al., 2018). Alternatively, respondents might present a less favourable version of themselves, known as *faking bad* or *malingering*, for example, to gain a medical diagnosis which offers financial gain (Walker et al., 2022).

The honesty required in self-report measures presents a unique problem when these tools are used to gauge psychopathic traits, as exploitation, deception, and manipulation are core interpersonal behaviours associated with the psychopathic disorder (Patrick et al., 2009). These dishonest and duplicitous traits are clearly at odds with behaving in a truthful manner, which may also influence the accuracy of self-reported psychopathy gained through questionnaire methods. Surprisingly, there appears to be little experimental evidence that those with psychopathy lie, with the majority of evidence originating from studies which have used self-report measures of lying (Rassin et al., 2023). However, deceit is an intrinsic aspect of psychopathy and evidence does suggest that those with higher levels of psychopathic traits have the propensity to lie for personal gain (Rassin et al., 2023).

Because of their self-report nature, personality assessments of this kind are malleable. Studies that have instructed participants to impression manage positively or negatively on five-factor personality measures have found that such explicit personality tools are fakeable (Walker et al.,

2022). Similarly, self-report psychopathy measures are open to faking good and faking bad; a recent meta-analysis of dark triad self-report measures, which includes psychopathy along with narcissism and Machiavellianism, found that self-reported primary and secondary psychopathy traits can be significantly distorted in both directions (Walker et al., 2022). Notably, not all studies have found evidence of response distortion in studies which have used self-report psychopathy measures (e.g., Ray et al., 2013; Watts et al., 2016). Nonetheless, it appears possible to fake-good and fake-bad on self-report measures, and given the dishonest nature of psychopathy, this is a potential shortcoming in considering them as reliable tools to index psychopathic traits.

Additionally, certain psychopathological traits within psychopathy are associated with engaging in both positive and negative self-presentation strategies. Across personality psychopathology, these are common strategies and include presenting the self as hostile, charming, or callous (Hart et al., 2020), all of which feature within the psychopathic construct. These presentations are "assertive" when there is a desire to portray a particular identity and "defensive" when responding to a threat to one's own identity (Hart et al., 2020). The psychopathological traits of antagonism and disinhibition, both aspects of psychopathy, are associated with engaging with assertive and defensive strategies of this kind. Antagonism appears related to enhanced use of both forms of self-preservation tactics, while disinhibition appears related to reduced apologising (defensive) and a reduced desire to be a role model for others (assertive) (Hart et al., 2020). Therefore, as psychopathy is intrinsically linked to self-presentation tendencies, it seems plausible that these may naturally emerge when being asked to self-report traits, perhaps compounding any motives to fake-good or fake-bad.

Self-report measures also rely on accurate responses, which creates a second concern with the reliability of these measures to accurately capture personality traits, especially psychopathic traits (De Cuyper et al., 2017; Hildebrand et al., 2018). In broader personality research, self and other ratings of personality traits differ, often with people rating themselves as higher on less

positive traits than others do (Allik et al., 2010). While this may reflect intentional response distortion, it could relate to individuals lacking insight into their own personality traits (Sleep, Lamkin, et al., 2022). A lack of introspective awareness may be especially relevant in psychopathy as researchers and clinicians have had a long-held perception that those with personality disorders do not have insight into their own traits, motivations and attitudes (Sleep, Lamkin, et al., 2019; Stanton et al., 2019; Watts et al., 2016). For example, a grandiose sense of self is a feature of psychopathy; however, it may lead to self-reports which are genuinely given but overly positive and inaccurate (Watts et al., 2016). Thus, difficulties with insight might further compound the potential for (unintentional) response distortion in self-reported psychopathy.

Yet, recent findings suggest that those with psychopathy may, in fact, have insight into some of their maladaptive and aversive interpersonal traits. Using the Short Dark Tetrad self-report measure, which indexes psychopathy alongside sadism, Machiavellianism and narcissism, Neumann et al. (2022) found that those even with lower levels of psychopathy self-reported their interpersonal maladjustments relating to family relationships and the extent that others disliked them. Having insight into one's own psychopathic traits may still, though, compound issues of response distortion as some with psychopathic traits actively and positively endorse them. Sleep et al. (2022) found that participants with antagonism described occupational benefits of being antagonistic, along with perceived professional advantages of being more objective, having greater control and failing to experience guilt, while those with disinhibition considered their spontaneity and impulsivity to be positive aspects of their personality. Holding positive views of a psychopathological personality trait, such as these appears to correlate with levels of that trait within the individual (Miller et al., 2018). Therefore, the greater the level of the trait, the more favourably it is viewed by the individual. Furthermore, some individuals not only view psychopathological traits as positive, but also report wanting higher levels of these traits (Sleep et al., 2022). As such, the evidence appears to counter the view that those with psychopathic traits may lack insight and, thus, may be able to accurately self-report some aspects of their personality and behaviours. Although, as some with these traits

consider them advantageous and desirable, they may distort responses to self-present as more antagonistic or disinhibited than they are. This might account for the findings of Kelley et al. (2018), where a moderate agreement was found between informant and individual ratings of boldness and meanness domains of triarchic psychopathy, but self-reported levels of disinhibition were significantly higher than those given by informants (*d* = .38). Given that some psychopathic traits, such as being in control, experiencing a lack of guilt and having objectivity are seen as advantageous within certain professional corporate roles, applicants for these roles may be more inclined to fake-bad on these aspects to secure lucrative positions (Hill & Scott, 2019; Sheehy et al., 2021). Therefore, while psychopathy may not be related to issues of insight, the positivity with which some with psychopathic traits view these traits may, in some scenarios, contribute towards intentional faking bad.

As briefly discussed in Chapter 1, the PCL-R (Hare, 1991), which is not a self-report measure, is often used to index psychopathy in clinical and forensic settings; yet while this does not rely on self-assessment, the PCL-R may also be fallible. In personality disorder assessment more widely, the agreement between self and clinician/therapist ratings appears to range from as low as *r* = .16 to *r* = .61 (median *r* = .41) (Samuel et al., 2018). Studies find that clients generally self-report higher trait levels than clinicians (Samuel et al., 2018; Sleep, Lamkin, et al., 2019; Stanton et al., 2019). Likewise, differences have emerged between clinician ratings of psychopathy using the PCL-R and self-reported psychopathy captured by the SRP-4 (Paulhus et al., 2016). In an offending sample who were asked to complete the SRP-4 with genuine responses, scores on SRP-4 Factor 2 scales were associated as expected with PCL-R Factor 2, but SRP-4 Factor 1 scales were more strongly correlated with PCL-R Factor 2 (Kelsey et al., 2015). Perhaps this disparity arose from positive impression management, or alternatively from a lack of insight to some degree. Alternatively, it may be due to difficulties for clinicians in accurately indexing certain traits associated with psychopathy. The subjective or emotional experiences of an individual might be challenging for a clinician to identify, thus impacting the accuracy of such an approach to indexing psychopathy (Stanton et al., 2019). Therefore, as both

self-report and clinician-rated measures for indexing personality disorders and psychopathy appear wanting to varying degrees, it may be fruitful to consider alternative approaches to complement these.

Implicit and Explicit Cognition

Models of Cognition

The psychological processes involved in completing self-report measures are thought to rely on conscious, deliberate and controlled cognitive processing, which underpins intentional behaviours (De Cuyper et al., 2017; Richetin & Richardson, 2008). However, many dominant cognitive models (e.g., Gawronski & Bodenhausen, 2006; Greenwald & Banaji, 1995; Strack & Deutsch, 2004) have proposed that there is a second information processing system (Payne & Gawronski, 2010; Richetin & Richardson, 2008). These dual-process models propose that in addition to a deliberate and controlled *explicit* system, the second, *implicit* information processing system, performs in a different manner; it is automatic and spontaneous and likely contributes to impulsive and uncontrolled actions (Richetin & Richardson, 2008). These dualist models vary in how the two cognitive processes or systems respectively contribute to actions, but all propose that behaviour arises as a joint outcome of both an explicit deliberative system and an automatic implicit system (Perugini et al., 2010; Richetin & Richardson, 2008). One such example of these dual-process models is Strack and Deutsch's (2004) reflective-impulsive model (RIM). The RIM is described by Payne and Gawronski (2010, p. 9) as the "most influential" as it sets out how dual-process models operate, rather than merely theorising about which processes, for example, conscious or unconscious, underpin cognition. Strack and Deutsch's (2004) RIM proposes a *reflective* system and an *impulsive* system. The impulsive system contains associations between stimuli, formed over many pairings and repetitions, while the reflective system includes truth assessments and propositional representations (Deutsch & Strack, 2010). Self-report questionnaires, considered to be direct measures, are thought to engage processes within the reflective system to a much greater degree than the impulsive system

(Deutsch & Strack, 2010). This distinction between propositional and associative information processing features in other notable dualist models of cognition, such as that of Gawronski and Bodenhausen (2006) (Schnabel & Asendorpf, 2010).

The Implicit and Explicit Self-concept

The distinction made in dualist models of cognition between associative and propositional processes is especially pertinent when considering the degree to which self-report measures can accurately and fully access and reflect the self-concept (Schnabel & Asendorpf, 2010). In cognitive psychology, the self-concept is thought to represent a network of associations between the self and a range of attributes, including personality traits, behaviours, ideals and goals (De Cuyper et al., 2017; Schnabel & Asendorpf, 2010). Corresponding with the dual-process models briefly outlined above, a distinction can be made between the implicit and explicit self-concept, which respectively relate to associative and propositional information processes (Schnabel & Asendorpf, 2010). The implicit self-concept (e.g., *me – unfriendly*) is thought to arise through repeated automatic activations of the self-concept alongside a series of automatic behavioural responses (Back, Schmukle, et al., 2009). These impulsive responses comprise perceptual situational cues or features (e.g. being with other people), a tendency which is impulsive and motivational (e.g. withdrawal), and a spontaneous behavioural response (e.g. frowning) which together activate the trait (e.g. *unfriendly*) (Back, Schmukle, et al., 2009; De Cuyper et al., 2017). The more frequently this sequence of automatic responses occurs, the greater the association developed between the self and the particular trait (Back, Schmukle, et al., 2009). These associations are automatically and quickly triggered whenever either concept is activated (Schnabel & Asendorpf, 2010). Contrastingly, the explicit personality self-concept relates to propositional processes which are slow, conscious and deliberate (Schnabel & Asendorpf, 2010). Unlike associations, propositions are relational (e.g., *I am unfriendly*), where the *am* represents the relation between the self and the attribute (Schnabel & Asendorpf, 2010). Relational propositions are subject to conscious consideration as to their validity (Schnabel & Asendorpf, 2010). When using

self-report instruments to gauge personality traits or affective evaluations of the self, the respondent might apply some conscious and intentional rationale to their response and adjust accordingly (Schnabel & Asendorpf, 2010). This could be in order to present a particular version of the self (e.g. *if I report that I am unfriendly, I will not secure this job*), or it might be due to a lack of logical fit with the association (e.g. *I cannot be that unfriendly as I have several friends*) (De Cuyper et al., 2017; Schnabel & Asendorpf, 2010). Thus, the explicit self-concept appears driven by reasoning and reflects propositional representations, while the implicit self-concept is automatically activated and reflects associations between the self and traits (Schnabel & Asendorpf, 2010).

Given this distinction between the implicit and explicit self-concept, measures reliant upon intentional and deliberate responses to index personality traits are unlikely to reflect the reality of internal representations about the self-concept (Schmukle et al., 2008). Regarding psychopathy, as previously mentioned, self-report measures are fakeable (e.g., Walker et al., 2022), and there are many legitimate motivations for faking good or faking bad on direct measures of psychopathic traits (Birkeland et al., 2006; Hildebrand et al., 2018; Hill & Scott, 2019; Sheehy et al., 2021). However, even without intentional response distortion, certain aspects of the self-concept may be predominantly unavailable for introspection (Asendorpf et al., 2002). In particular, representations of affect may be more implicit than others (Carlston, 2010), which is salient to psychopathy as many key theories of psychopathy propose affective underpinnings. Moreover, given that these underpinnings relate to a lack, rather than a presence, of affect (e.g., less fear, less empathy), individuals may not recognise or have insight into an absence of affect. Thus, the self-concept which emerges through self-report appears unlikely to be accurate or complete.

Indirect Measures

To understand personality more fully and predict behaviours related to personality traits, there is a need to look beyond self-report methods to access the implicit self-concept (De Cuyper et al., 2017). This need has led to the development of *indirect* measures (De Cuyper et al., 2017).

These measures attempt to index an individual's attributes by inferring these from experimental tasks (De Cuyper et al., 2017). As Gawronski and Hahn (2019) set out, indirect measures aim to limit the ability to control responses and place no reliance on introspection. Thus, addressing key issues of intentional responding and the need for awareness of thoughts or intentions previously discussed in relation to direct, self-report measures.

Implicitness and Indirect Measures

Indirect measures are often referred to as "implicit", while self-report measures are often called "explicit" measures (Gawronski & Hahn, 2019). However, these are not interchangeable terms. Importantly, "indirect" and "direct" refers to the tasks themselves and relates to their structural properties (Gawronski & Hahn, 2019). Self-assessments are considered "direct" measures because the existence of an attitude or personality trait is inferred from self-reports (Gawronski & Hahn, 2019). Contrastingly, indirect measures are ones with no reliance on self-assessment (Gawronski & Hahn, 2019). Instead, an individual's attributes are inferred from performance on a task. For example, a categorisation task such as the Implicit Association Test (Greenwald et al., 1998), discussed in more detail on p.51, might be used to infer attitudes towards people of different genders based on categorisation reaction times. Thus, there is functional difference between direct and indirect measures.

Importantly though, direct measures are not considered to be accessing a wholly different representation to that accessed by indirect measures. Instead, direct measures are thought to transform a measured construct through the propositional or reflective processes outlined above, being influenced by reasoning if there is motivation to do so (Deutsch & Strack, 2010; Moors et al., 2010). Thus, indirect tasks have the potential to provide measures that tap into aspects of the self that cannot, or only partially, be accessed through introspection. Deutsch and Strack (2010) argue, therefore, that it seems viable to presume that direct and indirect measures partially assess different psychological constructs.

The notion of what "implicit" means in relation to indirect measures can be perplexing because the term has also been used to describe different aspects of a measure across the literature (Gawronski & Hahn, 2019). Some researchers have termed a measure "implicit" in relation to an aspect of the task procedure itself, such as participants having a lack of awareness about what is being measured (Gawronski & Hahn, 2019; Moors et al., 2010). Others have used "implicit" to describe the construct being accessed, for example memory representations which is likely unavailable to consciousness (Gawronski & Hahn, 2019). Despite differing usage of the term, there now seems to be a consensus that the *implicitness* of a measure does not refer to the procedure itself but to how the outcome arose or the processes that contributed to the outcome (Moors et al., 2010). As Gawronski and Hahn (2019) set out, for a measure to be considered implicit, whatever is being measured (e.g., an attitude or a personality trait) is influencing responses in either an unintentional, uncontrollable or unconscious way, or without great dependence on cognitive resources. Together these forms of response influence are referred to as "automatic", a concept which is elaborated upon below. Thus, the mental content being measured by an implicit measure exerts an influence over performance in an "automatic" manner (De Houwer et al., 2009; Gawronski & Hahn, 2019; Moors et al., 2010).

"Automaticity" in Implicit Measures

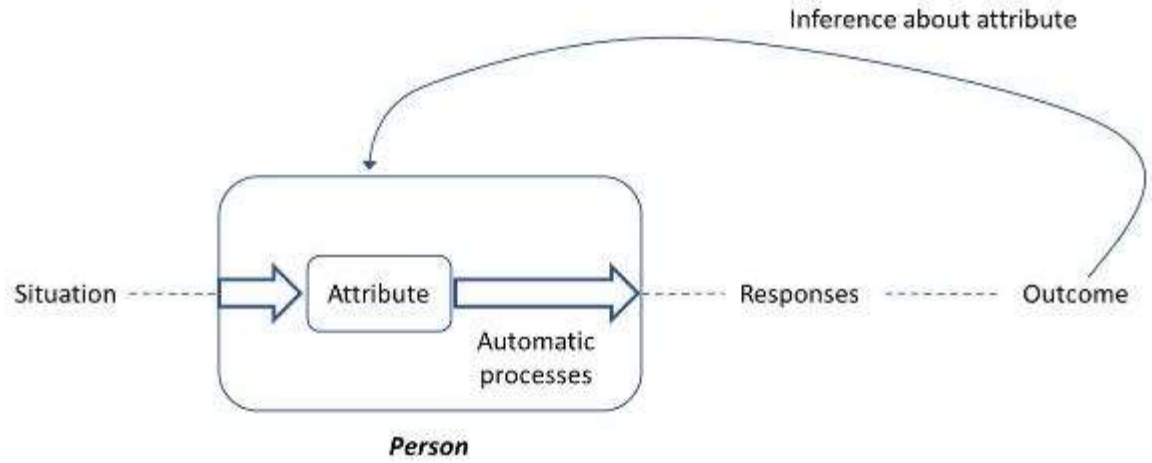
The notion of "automaticity" is central to implicit measures. For a measure to qualify as implicit, the processes which underlie the measurement outcome or effect should be "automatic" (Moors et al., 2010). As mentioned above, in terms of implicit measures, "automaticity" relates to four central features (Bargh, 1994; De Houwer et al., 2009; Gawronski, 2022; Gawronski & Hahn, 2019; Moors et al., 2010): unintentionality, uncontrollability, unconsciousness, and efficiency. Unintentionality refers to the extent that a task elicits an attitude or judgment (for example), when an individual has no intention to reveal or express this (Gawronski & Hahn, 2019). For instance, if an implicit measure of gender attitudes reveals sexist attitudes without participants having a

corresponding goal or intention to make such a revelation it would be considered to have unintentionality. However, this is distinct to uncontrollability. The former lacks a goal to start a process, while the latter is concerned with an individual having a goal to either change or stop a process (Gawronski, 2022). Thus, uncontrollability in an implicit measure of gender attitudes would involve the emergence of sexist attitudes despite an individual's attempts to hide, or control, such attitudes (Gawronski & Hahn, 2019). Uncontrollability also occurs in tasks where participants are instructed to avoid being influenced by stimuli but are unable to do so (Gawronski, 2022).

Efficiency relates to the extent that a process places minimal demands on attentional capacity (De Houwer et al., 2009; Moors et al., 2010; Gawronski, 2022). Moors et al. (2010) set out that attention has two components: direction and quantity. The latter is of relevance in implicit measures, where efficient tasks place little demand on attentional capacity (Moors et al., 2010). The last of the four facets of automaticity in implicit measures is unconsciousness. This relates to a relative absence of awareness about the stimulus, process or outcome of the process (De Houwer et al., 2009; Gawronski, 2022). Considering these features of unconsciousness one by one, when stimuli are presented only briefly (subliminally) , it may be insufficient for conscious processing to occur, but sufficient to generate a response (Hoffman & Wilson, 2010). The process itself may be considered unconscious if participants are aware of what they are perceiving but not the extent of the influence upon them (Hoffman & Wilson, 2010). Lastly, the outcome of the process could be considered unconscious if individuals are unaware of the influence that a perceived stimulus has upon their judgments or behaviours (Gawronski, 2022).

Figure 2.1 sets out a representation of an implicit measure, as defined by De Houwer and Moors (2010). An individual is subject to a situation (task) and makes a series of responses, which are mediated by an attribute (e.g., personality trait, attitude). The responses given on the task are examined, and inferences are made from these responses about the individual's attribute.

Figure 2.1: Diagrammatic representation of an implicit measure, reproduced from De Houwer and Moors (2010, p. 177)



Potential of Implicit Measures

Of particular importance in implicit measures, and especially for this thesis, is that they have the potential to reveal traits which may be masked with direct measures, and provide new insights into behaviour (De Houwer et al., 2009). Through the principles of automaticity, implicit measures seek to elicit attitudes, traits, or other mental content in ways which navigate issues of intention, control or introspective ability. Minimising response control can counter social desirability, thus revealing traits which are less desirable (Hofmann et al., 2005). Navigating limited introspective ability would allow access to representations which are not typically available to explicit self-report (Hofmann et al., 2005). Moreover, there is a shared view that implicit measures assess psychological constructs which differ to some degree to those assessed by self-report methods (Deutsch & Strack, 2010). These factors can all influence behaviour, which is evidenced by implicit measures sometimes offering incremental predictive validity over and above that which emerges from direct, self-report methods (De Houwer et al., 2009). Therefore, implicit measures may elicit unfiltered or unaware representations which lead to particular behaviours, where neither is revealed to a similar degree using direct, self-report assessments. Critically, theorists and researchers in the field generally agree that implicit measures of the self-concept, stereotypes and attitudes are valid; that is, that the outcomes are causally produced by the relevant attribute being measured (De Houwer et al.,

2009; Deutsch & Strack, 2010). This is important when considering their suitability in psychopathy, where these factors relate to psychopathic traits and behaviours.

Types of Indirect Measures

The nature of indirect tasks varies, with most employing response compatibility, while others employ stimulus incompatibility or misattribution (Gawronski, 2022). Many tasks have measurement outcomes which could be considered implicit (Gawronski & Hahn, 2019). As such, it would not be feasible to describe them all within this thesis. However, those which are most popular, or which might prove useful as tools to index the psychopathic self-concept will be briefly described and discussed next.

Implicit Association Test

The Implicit Association Test (IAT; Greenwald et al., 1998) is the most prominently used indirect measure (Buttrick et al., 2020). This is a dual-classification task utilising response compatibility (Gawronski, 2022). The IAT combines bipolar concepts (e.g., *violence* and *peace*) with bipolar attributes (e.g., *bad* and *good*) (Gawronski, 2022; Snowden et al., 2004; Teige-Mocigemba et al., 2010). Participants must categorise concept and attribute exemplars as quickly and accurately as they can on a keyboard, using one of two response keys. When congruent concepts and attributes share the same response key (e.g., typically *peace* – *good* and *violence* – *bad*), categorisation is faster and more accurate than when they are incongruent (e.g., typically *peace* – *bad*, *violence* – *good*) (Snowden et al., 2004). The difference in response times and accuracy is thought to be due to automatic response interference when incongruent concepts share the same response key (Gawronski et al., 2011). Implicit Association Tests have been used widely in efforts to index, amongst many others, shame, self-esteem, suicidal thoughts and behaviours, sexual preference and a range of stereotypes (Brown et al., 2009; Nunes et al., 2007; Rüsch et al., 2007; Scheunemann et al., 2023; Snowden et al., 2021; Snowden & Gray, 2013; Snowden et al., 2008; Wells et al., 2020).

Crucially for the area of interest here, psychopathic personality traits, IATs have also been used to index the self-concept and personality traits (Asendorpf et al., 2002; Back, Schmukle, et al., 2009; Grumm & von Collani, 2007; Kolnes et al., 2021; Purol et al., 2022; Vecchione et al., 2017; Vianello et al., 2013). In self-concept personality IATs, the test assesses the strength of association between concepts or categories (e.g., *extraversion* vs *introversion*) and the personality self-concept (e.g., *self* vs *others*) (De Cuyper et al., 2017). For example, if an individual's personality self-concept is more extroverted than introverted, responses to combinations of *extraversion + self* and *introversion + others* would be congruent and fast, while responses to combinations of *extraversion + others* and *introversion + self* would be incongruent and slower.

IAT variants such as the Single Category IAT (Sc-IAT; Karpinski & Steinman, 2006) have also been developed which have aimed to overcome one of the key criticisms levied at the task: its comparative nature (Gawronski, 2022; Teachman et al., 2019). The comparative aspect of the IAT is potentially problematic as the task may not be suitable to address questions about a single concept or attribute (Gawronski, 2022). For example, the violence-IAT described above can index relative valence or preference for violence over peace (or vice-versa) but not for either in isolation. Sc-IAT variants overcome this issue because they only have one concept (e.g. *violence*) and two attributes (e.g., *bad* and *good*). Thus, they are able to gain an absolute, rather than relative concept evaluation. However, their psychometric properties are less than robust with unsatisfactory reliability emerging in many instances (Teachman et al., 2019; Teige-Mocigemba et al., 2010). Contrastingly, while being comparative, the classic IAT demonstrates satisfactory reliability estimates, with internal consistencies ranging between 0.70 and 0.90 (Nosek et al., 2007)

Scores on explicit self-report measures and self-concept personality IATs, as well as IATs more generally, are typically only weakly or moderately associated. A meta-analysis of clinical, stereotypical, self-esteem and attitudinal IATs by Hoffman et al. (2005) reported a mean correlation .24 between self-report measures and IAT scores. This is similar in magnitude to an implicit-explicit

correlation of .20, from a meta-analysis of 125 personality trait IATs (De Cuyper et al., 2017). If implicit and explicit measures are tapping into largely different aspects of the personality, this may account in some instances for these small correlations. However, it is important to note that often classic personality research yields small effect sizes in the order of .20 to .30 when using self-reported measures to predict behaviours (e.g., Back, Schmukle et al., 2009; Greenwald, Poehlman, et al., 2009; Paunonen, 2003). Thus, the magnitude of association between implicit and explicit measures of personality is similar to the magnitude of association between explicit measures of personality and behaviour.

Evaluative Priming Task

Another approach to assess implicit associations involves using priming (Teachman et al., 2019). In the *evaluative priming task* (EPT; Fazio et al., 1995), also known as *affective priming*, each trial comprises a prime stimulus presented before a target stimulus which requires a categorisation response as quickly as possible, typically as either positive or negative (Koppehele-Gossel et al., 2020; Teachman et al., 2019). Fazio et al. (1986) demonstrated that quickly and accurately categorising target adjective words (e.g., *appealing* or *awful*) as either positive or negative was hindered or facilitated by an *attitude object* word (e.g., *party* or *death*) presented beforehand as the prime. When an object prime is viewed, it is thought to elicit an automatic evaluation (e.g., *party* – *fun*). If this evaluation is congruent with the evaluation of the target adjective (e.g., typically *party = fun* : *fun* = *appealing*), responses to categorising the target are quicker, and accuracy is higher. Conversely, when the attitude object's evaluation is incongruent with the target adjective (e.g., typically *death = awful* : *awful* ≠ *appealing*), response time is lengthened, and more frequent errors are made. Similarly to the IAT, the error rates and speed of response in categorisation tasks such as the EPT are used to infer a range of cognitions from automatically activated attitudes to stereotypes and aspects of the self (Koppehele-Gossel et al., 2020). While the IAT is proposed to operate at a

category level capturing a general trait or emotion (e.g., *bold*), contrastingly, priming tasks operate at the exemplar level (e.g., *fearless,* which is one aspect of being *bold*) (De Houwer, 2003).

Evaluative or affective priming tasks have been used in attempts to index a range of sensitive areas, including homophobic, racist and sexist attitudes, self-esteem, and attitudes towards food, smoking and exercise (Back, Krause, et al., 2009; Bluemke et al., 2010; Glock et al., 2012; Kunstman & Plant, 2008; Lamote et al., 2004; Meier et al., 2006; Rudman & Kilianski, 2000; Towles-Schwen & Fazio, 2003). There are several positives to using priming paradigms of this kind as indirect measures (Teachman et al., 2019). Almost any object can be represented with the EPT, and both subliminal and supraliminal prime presentations have been successful (Gawronski, 2022; Teachman et al., 2019). Furthermore, unlike the IAT, separate priming effects can be calculated for both positive and negative associations (Teachman et al., 2019). Yet, despite its promise and relevance, in comparison to the IAT, the EPT has been little adopted in the field of implicit research; a recent analysis of approaches to scoring in evaluative priming tasks identified only 150 published studies up to 2020 (Koppehele-Gossel et al., 2020). Moreover, unlike the IAT, the EPT appears not well-explored as a potential indirect measure to assess the personality self-concept. This task might be of particular interest to psychopathy as this and some other psychopathological disorders feature elements of uncontrolled or automatic behaviours; therefore, the EPT may be well suited to index these disorders as it is underpinned by processing of this kind (Teachman et al., 2010). However, one of the key criticisms of EPT may explain both the comparatively scant number of studies generally published as well as a lack of studies using it to explore the personality self-concept; unfortunately, this particular implicit task demonstrates poor reliability and typically generates small effect sizes, issues that are historic (see, e.g. Asendorpf et al., 2002) and still unresolved (Koppehele-Gossel et al., 2020).

Indirect Measures and Predicting Behaviour

One of the key arguments made by supporters of the IAT and other indirect measures is that they are not only predictive of outcomes or behaviours, but are predictive to a greater degree than

that achieved using direct self-report measures, at least in some circumstances (Buttrick et al., 2020). Meta-analytic research offers evidence that indirect measures do have predictive validity; Greenwald, Poehlman, et al. (2009) found a mean predictive effect of .27 across 122 IAT studies, with self-concepts being one of the more promising criterion domains (Perugini et al., 2010). In a more recent analysis of self-concept personality IATs based on McCrae and Costa's (1987) five-factor model, the mean predictive effect of observed behaviours was comparable at .25 compared with .13 for self-reported behaviours (De Cuyper et al., 2017). Despite claims of high Type-1 error rates resulting from measurement error (e.g., Westfall & Yarkoni, 2016), recent work using structural equation modelling demonstrates that the IAT offers incremental predictive validity in over 58% of instances (Buttrick et al., 2020). Moreover, there is evidence that indirect measures have greater utility than direct measures, in predicting some real-world behaviours. For example, performance on a suicide-IAT predicts suicide attempts in the following six months better than typical measures used in clinical settings, such as historical suicidal behaviour and clinical and patient predictions (Nock et al., 2010). These are findings recently replicated by Tello et al. (2020). In aggression research, an aggression-IAT completed with a sample of ice-hockey players demonstrated predictive validity for aggression (evidenced by objective, aggressive behaviours recorded during matches) over and above self-reported aggression (Banse et al., 2015). Thus, in some instances indirect measures appear to be more predictive, and hence potentially useful as tools to indicate the likelihood of future behaviours.

The ability to predict future behaviours of those with psychopathy is an attractive proposition, given the levels of offending and reoffending with which it is associated, and the violent nature of those offences (Fox & DeLisi, 2019; Reidy et al., 2015). Similarly, within the workplace, it would be advantageous to be able to predict engagement in fraudulent activities or bullying management styles which are associated with psychopathic traits, due to the cost and disruption that both can bring to organisations (Mathieu et al., 2014; Sheehy et al., 2021). Therefore, the creation of an indirect measure which indexes the psychopathic self-concept has wide-ranging

potential utility. It would build on research which has indexed the self-concept and broader personality traits, applying the same tools to index the psychopathic self-concept. An implicit measure for psychopathy might overcome some of the issues associated with self-report measures, as well as offering insight into the more automatic aspects of the psychopathic personality which drive particular behaviours.

Criticisms of the IAT and Indirect Measures

It is crucial to highlight that the IAT, and other implicit methods, have faced critique in various areas and from many within and beyond psychology (e.g., Corneille & Hütter, 2020; Lazarevic et al., 2021; Oswald et al., 2013). While demonstrating good internal consistency, the IAT has been criticised for its lack of test-retest reliability, and poor discriminant validity (Brownstein et al., 2019; Schimmack, 2021). Concerns have arisen about whether the IAT can be faked, and the degree to which it can predict behaviours (Oswald et al., 2013; Teachman et al., 2019). Moreover, broader questions have arisen regarding what indeed indirect methods measure (Brownstein et al., 2019; Corneille & Hütter, 2020; Hughes et al., 2022; Lazarevic et al., 2021; Schimmack, 2021). These concerns are valid and should be considered and debated to progress the understanding of implicit cognition. However, as Teachman et al. (2019) highlight, some points of critique are less problematic than others, depending on the context of the IAT. For example, criticisms have been made about the extent to which IATs measure cultural views rather than individual differences (Teachman et al., 2019). Teachman et al. suggest that this is less of a concern when using indirect tools to explore the self-concept as compared to, for example, racial bias.

Perhaps one alternative is to consider indirect measures as potential adjunctive or complementary tools to traditional self-report or clinician-rated assessments, rather than replacements (Purol et al., 2022). Indirect measures may have more or less relevance, depending on the scenario. In situations where there is no risk to an individual of declaring negative personality traits, self-report measures may not be problematic. However, where it may be important to present

a more positive view of the self, such as in the workplace or in offending settings where sentencing decisions may depend on such responses, there may be strong advantages to using implicit measures to try to overcome positive impression management. Furthermore, as set out earlier, implicit techniques may partially assess different psychological constructs and access some aspects of the self-concept which are unavailable through self-report methods. These arguments will be returned to in greater depth throughout the following chapters of this thesis.

Psychopathy and Indirect Measures

Psychopathy and the IAT

To date, IAT studies have explored the relationship between psychopathy or psychopathic traits and implicit attitudes towards violence (Blumenthal et al., 2019; Brugman et al., 2016; Gray et al., 2003; Međedović, 2017; Snowden et al., 2004; Zwets et al., 2015), aggression or transgression (Suter et al., 2014) and morality (Marsh et al., 2011). Others have used this paradigm to explore psychopathy and implicit self-esteem (Habersaat et al., 2018) and even psychopathy's association with negative creativity (Kapoor, 2015). Hence, these studies have looked at explicit measures of psychopathy and their relationship to other concepts represented using implicit methods.

To date, only two studies appear to have tried to measure psychopathy, or certain psychopathic traits, using implicit techniques. Florez et al. (2017) designed two IATs which were intended to index aspects of psychopathy: a morality IAT and an emotional IAT. The emotional IAT had participants categorise happy and sad pictures from the International Affective Picture System (IAPS; Lang et al., 2008) as depicting *sadness* or *joy*, and an attribute dimension of *positive* and *negative*. Such an IAT was designed to index the extent to which individuals associate sadness and joy with valence. The morality IAT used images of moral and immoral acts, and required participants categorise in this manner as well as make an attribution as either *positive* or *negative*. This IAT was designed to index the extent to which participants regarded immoral acts as bad. In a sample of

mainly male offenders (86 men, 14 women), no associations emerged between the IAT scores and factor or facet scores on the Psychopathy Checklist-Revised (PCL-R; Hare, 1991).

Nentjes et al. (2017) created two single category IATs (Sc-IAT; Karpinski & Steinman, 2006) one for guilt and another for dominance. The authors chose these concepts as both feature in conceptualisations of psychopathy. A lack of guilt is associated with psychopathy, and guilt is thought to be a protective factor against antisocial behaviours, while dominance which is a feature of TriPM Boldness, appears related to affective and interpersonal (Factor 1) psychopathy (Nentjes et al., 2017). Unlike Florez et al. (2017) who used images for their target categories, Nentjes et al. (2017) used words relating to the self, such as first and last name, date of birth and home address. The respective attribute categories were dominant/submissive and guilty/not guilty, and words were used to reflect these categories. In a sample which included 85 offenders and a control group of 26 non-offenders, presumably male although no gender was reported, there was no association between IAT scores on either Sc-IAT and PCL-R scores. The details of the method used in the Nentjes et al. paper are scant. As such, it is difficult to be certain what occurred. However, neither study yielded an IAT or Sc-IAT which was associated with PCL-R assessed psychopathy.

There are several plausible explanations why these two studies might find no association between their IATs and PCL-R rated psychopathy. Florez et al.'s (2017) IATs focused only on the emotional attenuation and antisociality associated with the disorder while the Sc-IATs of Nentjes et al. (2017) aimed to index guilt and dominance. While each of these are aspects of dysfunctional cognitions and behaviours undoubtedly associated with psychopathy, the construct, as previously discussed is multifaceted and comprises a much broader array of attitudes and cognitions, resulting in a multitude of phenotypes (Patrick et al., 2009). Each facet of the PCL-R comprises multiple traits and behaviours (see Chapter 1). Performance on an IAT which reflects only one trait (such as a lack of guilt) may not necessarily be associated with PCL-R affective facet scores as it reflects multiple traits which participants may or may not possess. Thus, crucially there might be poor structural fit

between these IATs and the PCL-R facet or factor scores as while the IATs might assess constructs included within the PCL-R facet, they are not sufficiently extensive to be conceptually comparable. It is also plausible that these IATs did not index the relevant aspects of the self-concept that they intended. As Nentjes et al. (2017) themselves acknowledge, their dominance Sc-IAT might have failed to access self-dominance associations. This might be related to insufficiently focused exemplar selections which appear to in part reflect psychopathy traits (e.g., *leader*, *power*), but also ones which may represent other constructs sometimes associated with psychopathy such as sadism (e.g., submissive exemplars included *humiliated*, *slave*). Furthermore, both guilt and morality may be situation specific affective states rather than traits and as such, may fluctuate (Nentjes et al., 2017). More understanding is needed about how affective states can impact on indirect measures such as the IAT (Teachman et al., 2010). Additionally, comparing IAT scores against PCL-R scores, which are clinician-rated, might be another contributor towards the lack of association between the two, given that third parties, such as clinicians, may not easily be able to identify, and thus accurately rate, the subjective or emotional experiences of an individual (Stanton et al., 2019). An indirect measure of the self-concept captured by an IAT might not relate particularly well to trait ratings given by a 3rd party, further compounded by any self-presentation strategies which might have emerged during clinical interview. Therefore, while the IATs from both Florez et al. (2017) and Nentjes et al. (2017) were not associated with direct measures of psychopathy, there are a range of plausible explanations why, that can prove useful in guiding subsequent attempts to develop indirect measures of the psychopathic self-concept.

Psychopathy and Priming-based Tasks

As previously mentioned, studies which have used the EPT as a basis to index the personality self-concept are scarce, and no studies could be identified which used this task to index any aspect of the psychopathic self-concept. Perhaps this might arise from the EPT being developed as a tool to primarily evaluate attitudes towards other individuals, objects, behaviours or towards the self. The

standard EPT, as previously discussed, presents an attitude object (e.g., *party*) as a prime, then a target for classifying as positive or negative. For the EPT to be used as a tool to index the personality self-concept, its design requires a shift to using personality trait adjectives as the primes and stimuli which represent the self as the target stimuli. It is possible that a self-concept EPT which employs similar design principles to self-concept IATs, might prove useful to index the psychopathic self-concept.

The Aims of the Thesis

The aim of this PhD is to explore the utility of indirect measures to index the psychopathic self-concept, and to explore whether they have incremental predictive validity for behaviours associated with psychopathy when compared to that predicted by direct self-report measures of psychopathy.

As discussed in Chapter 1, the TriPM (Patrick, 2010) will form the basis for the IATs, which aim to index implicit psychopathic traits across each of the three domains of triarchic psychopathy: Boldness, Meanness and Disinhibition. Priming tasks, again aiming to index implicit triarchic psychopathic traits, will also be developed. These two implicit tasks have been chosen to be investigated in tandem as they are thought to operate at different processing levels which might prove of interest when attempting to index a multi-faceted personality construct such as psychopathy. Thus, the two types of task may differ in their ability to index general traits and emotions or specific symptoms of psychopathy. For example, the IAT may be able to detect a global level of psychopathy, while priming may be able to distinguish between antisociality, manipulation or other specific traits that are considered markers for the disorder. Given the multitude of emotions and behaviours that can manifest in psychopathy, priming as an implicit method may offer a more refined method to index particular aspects of each than an IAT. Therefore, it is productive to examine whether either task is a better choice as a measure to pursue to index implicit personality.

Once these tasks have been developed, their internal reliability, and concurrent and discriminant validity will be calculated. If they meet required levels on these, they will be used alongside experimental tasks which index behavioural correlates of psychopathy including impulsivity, fearlessness and a lack of emotional responding. The association between the indirect measure(s) of psychopathy and these behavioural correlates will be explored and compared with associations between self-reported psychopathy and self-report measures of behavioural correlates of psychopathy.

Chapter 3: Developing three IATs to index Triarchic Psychopathy

This chapter describes the development of three Implicit Association Tests (IAT; Greenwald et al., 1998), which aimed to index the psychopathic self-concept conceptualised within the triarchic model of psychopathy (Patrick et al., 2009). First, it outlines the preparatory work undertaken in generating exemplars for use in the IATs and creating additional direct measures of psychopathy, along with the selection of germane direct measures of external correlates to use alongside the IATs to assess their predictive utility. The chapter then describes the study method and presents its findings. Lastly, it discusses the findings in relation the extant literature and sets out the next steps in the thesis.

As outlined in Chapter 2, previous attempts have been made to create IATs which index psychopathic traits. In both the studies by Florez et al. (2017) and Nentjes et al. (2017), no associations were found between the IATs they had created and direct measures of psychopathy. While these IATs were designed to index certain cognitions and behaviours associated with psychopathic traits, there are undoubtedly shortcomings in the completeness of the conceptual correspondence between these IATs and the direct measures of psychopathy used within the studies, which may have contributed to the null findings reported by Florez et al. (2017) and Nentjes et al. (2017). Furthermore, while Nentjes et al. (2017) used Single Category IATs (Sc-IAT; Karpinski & Steinman, 2006) rather than the classic comparative IAT of Greenwald et al. (1998) to avoid issues of comparison between the self and others, there is less evidence of the psychometric properties of IAT variants (Teachman et al., 2019). Issues of this kind emerged in Nentjes et al. (2017) *guilt* IAT with reported internal consistency of $r = .65$ in the first administration, dropping to $r = .36$ in the second administration. To address these shortcomings, a classic IAT design was chosen for this study, and the exemplars used within them aimed to have a high conceptual correspondence to the direct measure of psychopathy to be administered alongside them: the Triarchic Psychopathy Measure (TriPM; Patrick, 2010).

Preparatory Work

Psychopathic and Non-Psychopathic IAT Exemplars

To achieve a good degree of conceptual correspondence where each IAT reflected the content of the relevant TriPM domain and thus was sufficiently related (Hofmann et al., 2005; Payne et al., 2008), words rather than images were chosen to represent psychopathic traits in the IATs. This allowed exemplars to be included that were taken directly from the TriPM, enhancing the level of indirect-direct correspondence. First, the 58-item TriPM was examined to identify single personality trait words which could be used as IAT exemplars. Table 3.1 details the traits identified and from which TriPM domain they originated; this is an indicative list of example items, as some traits are represented in more than one item.

Table 3.1: Single trait words extracted from examples taken from the Triarchic Psychopathy Measure (Patrick, 2010)

Triarchic Domain	TriPM Item	Item	Trait Word
Boldness	1	I'm *optimistic* more often than not	Optimistic
	13	I'm a born *leader*	Leader
	19	I have a knack for *influencing* people	Influential
Meanness	26	I *taunt* people just to stir things up	Taunting
	33	I am *sensitive* to the feelings of others (R)	Sensitive
	42	I sometimes *insult* people on purpose to get a reaction from them	Insulting
Disinhibition	9	My *impulsive* decisions have caused problems with loved ones	Impulsive
	56	I have had problems at work because I was *irresponsible*	Irresponsible

Following this, the items in the TriPM were re-examined to identify further traits represented in complex propositions by more than one word. When these were identified, they were verified

against the detailed descriptions of the triarchic domains given by Patrick et al. (2009). Some of the traits identified in this re-examination reflected words already identified in the previous process (e.g., *I often act on immediate needs* was already represented by the exemplar *Impulsive* which was taken from item 9). However, through this process, additional traits emerged. Table 3.2 details the supplementary traits extracted in this way.

Table 3.2: Traits represented by more than one word extracted from examples taken from the Triarchic Psychopathy Measure (Patrick, 2010)

Triarchic Domain	TriPM Item	Item	Trait(s) Represented
Boldness	22	I function well in new situations, even when unprepared	Confident
	28	I'm afraid of far fewer things than most people	Brave
	32	I can get over things that would traumatise others	Resilient
Meanness	20	It doesn't bother me to see someone else in pain	Callous / Uncaring
	40	I've injured people to see them in pain	Sadistic
Disinhibition	21	I have good control over myself (R)	Restrained / Predictable
	24	I have taken money from someone's purse or wallet without asking	Antisocial
	30	I keep appointments I make (R)	Reliable

As illustrated in Tables 3.1 and Table 3.2, in addition to capturing psychopathic traits, the TriPM also includes reverse-scored items which represent non-psychopathic traits (e.g., controlled/brave); these are denoted within the tables by (R). Thus, these processes yielded psychopathic and non-psychopathic trait words for use as IAT stimuli.

While the minimum recommended number of exemplars per concept or attribute is 3 (Greenwald et al., 2021), additional triarchic psychopathic and non-psychopathic words were selected to supplement those directly distilled from the TriPM so that there was a total of six stimuli each for psychopathic traits and non-psychopathic traits for each of the three IATs. This quantity of exemplars was selected primarily to allow for each of the three domains to be represented in a

sufficiently extensive manner, given their multifaceted nature. However, it also enabled sufficient trials without excessive repetition. These supplementary word stimuli were bipolar examples of those extracted (e.g., *leader – follower, optimistic – pessimistic*). Thus, each item in the IAT stimuli list either represented a trait word extracted from the TriPM or a trait in diametric opposition to that.

The item selection was completed by Jennifer Pink and validated by her primary supervisor Nicola Gray. An agreement was required from both researchers to include each of the stimuli within the IATs. The category labels were also jointly agreed upon; these were based on a close examination of detailed descriptions of the three triarchic domains (Patrick et al., 2009), and they aimed to represent their respective exemplars using uncomplicated language. The final list is set out below in Table 3.3, with category labels shown in capital letters.

It is important to highlight that a key concern when designing personality self-concept IATs is whether any of the adjectives used to reflect personality traits hold negative or positive connotations, and thus might lead to a confound where this a valence decision becomes the basis of categorisation (Grumm & von Collani, 2007; Steffens & Schulze König, 2006). This is especially relevant for the IATs created here as the nature of many psychopathic traits is such that they might be viewed as unfavourable. Recent recommendations in IAT research suggest selecting trait categories and exemplars of comparable valence (Greenwald et al., 2021). However, the practicalities of achieving this in psychopathy research are somewhat challenging and might lead to divergence from the to-be-measured construct. Thus, while efforts were made to select stimuli for each IAT that were both positive and negative for psychopathic and non-psychopathic traits, this was not feasible. However, given the positivity with which some who have psychopathological traits view those traits (Miller et al., 2018; Sleep et al., 2022), it is possible that this may not be such an issue with psychopathic self-concept IATs. Moreover, if the IATs show discriminant validity, discussed shortly, and scores are only associated with their counterpart TriPM scale, this would suggest that

recoding on a valence basis has not occurred, as otherwise it might be expected that the same levels of correlation might emerge for each IAT with the explicit scales.

Table 3.3: Final IAT stimuli representing psychopathic and non-psychopathic traits. Category labels shown in capital letters.

Triarchic Domain	**Psychopathic Trait Stimuli**	**Non-Psychopathic Trait Stimuli**
Boldness	BOLD	WARY
	Leader	Follower
	Influential	Ineffective
	Brave	Timid
	Resilient	Vulnerable
	Confident	Insecure
	Optimistic	Pessimistic
Meanness	CRUEL	KIND
	Sadistic	Kind-hearted
	Insulting	Gentle
	Taunting	Considerate
	Callous	Empathic
	Insensitive	Sympathetic
	Uncaring	Caring
Disinhibition	RECKLESS	SENSIBLE
	Impulsive	Cautious
	Unpredictable	Predictable
	Daredevil	Restrained
	Antisocial	Prosocial
	Irresponsible	Responsible
	Unreliable	Reliable

Self-concept IAT Exemplars

In line with Nentjes et al. (2017), idiographic stimuli (e.g., first name, birth date) were used in preference to nomothetic stimuli (e.g., *I* or *mine*) to index the self-concept (Bluemke & Friese, 2012). Idiographic stimuli impart information specific to the individual, and hence, they are thought to invoke mental representations linked to the self-concept (Bluemke & Friese, 2012). Evidence suggests that IATs using idiographic stimuli yield greater correlations with corresponding explicit measures when compared to those using nomothetic pronouns (Hofmann et al., 2005), and this approach has proved effective in other IAT studies (Bluemke & Friese, 2012; Gray et al., 2021; Hofmann et al., 2005).

Category labels of *Me* and *Not Me* were selected, replicating those used in a self-esteem IAT by Gray et al. (2021). These labels were selected in preference to *Self* and *Other* as the use of the latter may increase variance in the evaluation of the contrast category (Jusepeitis & Rothermund, 2022), one of the justifications given by Nentjes et al. (2017) for using Sc-IATs. These category labels have been successfully used in self-concept IATs and can be especially useful in populations where comparative contrasts might pose issues with comprehension (Gray et al., 2021; Greenwald et al., 2021). This latter point is important; should psychopathic IATs of this nature have potential utility in clinical or forensic populations, they need to be easily understood as recent UK data suggests that over half of prisoners have literacy levels below that expected of an average 11-year-old (UK Government, 2021).

The list of personal information to be gathered from participants for idiographic *me* stimuli is displayed in Table 3.4. Corresponding options from which to choose a set of six *not me* stimuli are also shown in Table 3.4. Gender-neutral names were given as first name *not me* options, to ensure gender was not a confound in the *not me* list. For *not me* star sign options, Cancer was explicitly not included; this was to ensure there were no additional idiosyncratic associations with any of the target concepts, such as *wary* or *cruel,* per recommendations from Greenwald et al. (2021)

Table 3.4: List of *Me* stimuli to be given by participants as exemplars and corresponding *Not Me* stimuli options to be given to participants to choose one from

Me Stimuli	**Not Me Stimuli options**
First name	Charlie
	Robin
	Jules
	Lesley
Star sign	Virgo
	Libra
	Leo
	Scorpio
Birth date (e.g. 15th January)	10th May
	3rd June
	12th July
	23rd November
Place of birth (town)	Dublin
	Dundee
	London
	Hull
Nationality	German
	Turkish
	Spanish
	French
Occupation	Lawyer
	Doctor
	Accountant
	Chef

Personality Thermometers

While the TriPM was the primary direct measure of psychopathy for this study, simple personality "thermometers" were also developed to use as additional explicit measures of psychopathic traits. IATs capture a relative judgment between two opposing concepts (Hofmann et

al., 2005), for example, between *cruel* and *kind*. While the psychopathic and non-psychopathic exemplars selected for use in the IAT should have good conceptual correspondence to the TriPM as they have been carefully distilled from the self-report measure, mirroring the bipolar and relative nature of the IAT in a direct measure may provide a fairer test of the implicit-explicit relationship (Payne et al., 2008). This assertion is supported by evidence that suggests that a relative explicit measure may be more strongly associated with an IAT score than an absolute explicit measure (Hofmann et al., 2005).

Visual analog rating scales of this kind have been used in other domains, including to rate anxiety, depression, pain and quality of life (de Boer et al., 2004; Hawker et al., 2011; Lingjærde & Føreland, 1998; Williams et al., 2010). They are simple to administer (Hawker et al., 2011), demonstrate construct validity and good to excellent test-retest reliability (de Boer et al., 2004; Lingjærde & Føreland, 1998; Williams et al., 2010), and have proven reliable when administered in an online research environment (Liu & Wang, 2015). Studies have used thermometers of this kind in personality research and demonstrated strong correlations with other explicit measures (Olson et al., 2007; Snowden & Gray, 2013).

However, rather than create a single scale for each of the three triarchic domains with its two ends representing opposing concepts, two scales for each domain were created. Thus, there was a *bold* and a *wary* thermometer for the Boldness domain. There were *cruel* and *kind* thermometers for the Meanness domain: for the Disinhibition domain, there were *reckless* and *sensible* thermometers. Administering two thermometers allowed for participants who might consider themselves, e.g., partly *cruel* and partly *kind*. Such an evaluation might be challenging on a single visual analog scale. To maximise the structural fit between the IATs and the thermometers, category labels used on each thermometer were identical to those used in the IATs (Table 3.3). Using closely matched test structures in this manner is thought to enhance the explicit-implicit association (Payne et al., 2008). A description for each thermometer (Table 3.5) was created by integrating the

IAT stimuli trait words alongside the detailed descriptions of the triarchic domains given by Patrick et al. (2009). As with the IAT stimuli words, Jennifer Pink and Nicola Gray created and jointly validated the descriptions. Each thermometer used a scale from 0 (*not at all*) – 100 (*extremely*).

Table 3.5: Descriptions for each of the six personality thermometers created to use alongside the IATs

Thermometer	Description
Bold	People who are bold remain calm and focused in threatening or pressurised situations. They are confident and self-assured when faced with unfamiliar or novel scenarios or situations. Moreover, they are socially dominant and show leadership qualities, often influencing others, are resilient emotionally and can recover quickly from stressful events. They are self-assured, bold, brave, courageous, optimistic and assertive, have excellent social skills and can get what they want through charm, confidence, and assertiveness.
Wary	People who are wary or timid are uneasy and nervous about new, threatening, or pressurised situations. They are cautious, anxious, worried, or lacking in confidence in unfamiliar or novel scenarios or situations and tend to avoid these. In addition, they are emotionally sensitive and vulnerable, and take a long time to recover from upsetting or stressful events. They are often lacking in self-confidence and are socially cautious, timid, apprehensive, and unassuming. They are quiet in social situations and often lack self-assurance, are pessimistic and insecure, preferring to stay in the background rather than assert themselves or lead a group.
Cruel	People who are cruel and mean are cold hearted and uncaring. These people are unkind, sadistic, insulting and taunting in order to get what they want and have their needs met, without thinking about the impact on others. They have poor empathy towards others, are scornful, callous, and insensitive, and lack close bonds or attachments to many other people. They are unfeeling and exploitative, using people for their own gain, and seek empowerment through cruelty.
Kind	People who are kind are warm, empathic, and care about others. They are friendly, generous, and kind-hearted. These people are gentle and considerate and often put other people's needs before their own. They feel strong attachment and positive emotion towards others, being caring, sympathetic, and

	understanding of other people's needs and emotions. They are generous, helpful, and supportive of other people. They get pleasure and reward from acts of kindness.
Reckless	People who are reckless, fail to plan ahead, are impulsive, and show impaired regulation of emotion and urges. They act before thinking, are often unpredictable in their behaviour, have problems in the control of impulses, and are seen by others as daredevils. They often insist on immediate gratification. They focus on immediate gain or pleasure, rather than on longer term consequences or plans and are often unreliable. They show difficulties in holding back urges or restraining their behaviour and frequently engage in anti-social or irresponsible behaviour.
Sensible	People who are sensible are cautious, careful, and restrained in their behaviour and think things through before acting or making decisions. They regulate their emotions well and are able to curb their urges. Their behaviour is usually predictable and restrained. They think about potential problems or dangers before acting, carefully weigh things up, and take a measured decision. They focus on long-term outcomes instead of immediate gains. They show good restraint in their behaviour and show pro-social, reliable, and responsible behaviour.

Measures of External Validity

Beyond examining the concurrent and discriminant validity of the IATs, it is essential to establish their predictive validity by considering them alongside direct measures of relevant correlates (Perugini et al., 2010). For any measure, direct or indirect, its utility in predicting consequences or outcomes is of utmost importance (Perugini et al., 2010). Thus, to examine the extent that the IATs are useful in predicting behaviours associated with psychopathic traits, germane measures which capture external correlates of psychopathy should be selected to administer alongside the IATs.

Aggression

Aggression of varying forms is described within the behavioural manifestations of triarchic meanness and triarchic disinhibition but not triarchic boldness (Patrick et al., 2009). Raine et al.

(2006) proposed that there are two distinct forms of aggression. Proactive aggression is pre-meditated, purposeful and organised, where there is some instrumental gain from engaging in the aggression (Raine et al., 2006; Weidacker et al., 2017). Contrastingly, reactive aggression is considered to be impulsive and unplanned, arising from a highly emotional state (Raine et al., 2006; Weidacker et al., 2017). Meanness is marked by proactive and premeditated forms of aggression, while Disinhibition is marked by reactive aggression (Patrick et al., 2009). As such, taking measures of aggression alongside the three IATs may be a viable correlate with which to examine their predictive validity.

Research has explored the links between triarchic domains and aggression of varying forms and precipitants. In community and offending populations, evidence supports that triarchic Disinhibition is indeed associated with reactive (Donnellan & Burt, 2016; Gray et al., 2019; Pink et al., 2022) and impulsive aggression (Fernandez et al., 2019; Paiva et al., 2020). Also, in line with Patrick et al. (2009), associations have emerged between triarchic Meanness and proactive aggression (Donnellan & Burt, 2016; Pink et al., 2022) and premeditated aggression (Fernandez et al., 2019; Paiva et al., 2020). However, Disinhibition has also been found to correlate with premeditated (Fernandez et al., 2019) and proactive forms of aggression (Donnellan & Burt, 2016; Gray et al., 2019; Pink et al., 2022), while Meanness has also been associated with reactive aggression in some (Donnellan & Burt, 2016) but not all studies (Gray et al., 2019). Recent work has also revealed a negative association between triarchic Meanness and impulsive aggression (Paiva et al., 2020). As mentioned, Boldness is not explicitly linked with aggression in Patrick et al.'s (2009) descriptions of the triarchic domains. Despite this, some research has identified an association with proactive aggression (e.g., Gray et al., 2019), while other studies have not, or have identified a negative relationship between Boldness and impulsive aggression (Paiva et al., 2020; Pink et al., 2022). Often, although not always (Pink et al., 2022), all three triarchic domains associate with physical aggression (Fanti et al., 2016; Fernandez et al., 2019; Paiva et al., 2020), while verbal aggression is associated with Boldness in some studies (Fanti et al., 2016; Paiva et al., 2020) but also Meanness (Paiva et al.,

2020) and Disinhibition (Fernandez et al., 2019; Paiva et al., 2020). Thus, while the associations between triarchic domains and forms of aggression are not always consistent, on balance, triarchic Disinhibition and Meanness appear related to aggression of various forms, with Meanness to a lesser degree. Therefore, to the index predictive validity of the IATs, a prominent direct measure of aggression was included which has been used in several of the studies discussed above (Donnellan & Burt, 2016; Gray et al., 2019; Pink et al., 2022): the Reactive-Proactive Aggression Questionnaire (RPQ; Raine et al., 2006).

Prosocialness

As a lack of empathy is another feature of the psychopathic personality, with key theories proposing an underpinning emotional deficit (Brook et al., 2013), a measure of prosocial behaviour might provide an additional measure of external validity as those with psychopathic traits may not wish to engage in such behaviours as they benefit others (White, 2014). In particular, a lack of prosocial behaviours may be associated with triarchic Meanness, given that it encompasses callousness, cruelty towards others and predatory and exploitative behaviours (Patrick et al., 2009). Evidence supports this assertion; Gatner et al. (2016) found a strong negative association between triarchic Meanness and scores on the Prosocialness Scale for Adults (PSA; Caprara et al., 2005). Interestingly, there appear to be nuances in the type of prosocial behaviour those with callous and manipulative traits, which are associated with triarchic Meanness, are willing to engage in; White (2014) found that these traits are associated with lower levels of anonymous prosocial behaviour but higher levels of public prosocial behaviours. Aside from triarchic Meanness and its related traits, triarchic Boldness may also hold a particular association with prosocial behaviour; Gatner et al. (2016) identified a positive relationship between the two, where increased Boldness was associated with increased prosocial behaviours. Thus, as a further direct measure to evaluate the predictive validity of the IATs, a measure of prosocialness, the PSA, was also included in the study.

Immunity to Socially Desirable Responding

As mentioned in Chapter 2, one of the key issues with using self-report measures is their susceptibility to socially desirable responding; this is of particular salience when indexing psychopathic traits that include manipulation and deception (Lilienfeld & Fowler, 2006). While data appear to conflict regarding the extent to which those with psychopathic traits over or underreport them (Knack et al., 2021), self-report psychopathy measures appear susceptible to socially desirable responding (Kelsey et al., 2015; Verschuere et al., 2014). Thus, the study included a validated measure of social desirability to assess whether the IATs were also vulnerable to such issues. While several social desirability scales have been published, the Marlowe-Crowne Social Desirability Scale (MCSDS; Crowne & Marlowe, 1960) has historically been the most common choice of researchers (Hart et al., 2015). However, due to some of the items being outdated and questions being raised over the measure's reliability, alternative measures for social desirability may be preferable (Hart et al., 2015; Stöber, 2001). The measure selected for this study was the Social Desirability Scale (SDS-17; Stöber, 2001). The SDS-17 is based on the MCSDS, but its contents were updated to reflect more current concepts. In recent studies with offending and community populations, the SDS-17 has shown strong test-retest reliability, adequate to good internal consistency and is correlated between .72 and .78 with scores on the MCSDS (Blake et al., 2006; Tatman & Kreamer, 2014). Moreover, it appears to index impression management to a greater degree than self-deception (Blake et al., 2006), which is of primary concern with self-report measures.

Study Aims and Hypotheses

The study aimed to develop three IATs to index the psychopathic self-concept, each one conceptually correspondent to one of the three domains of triarchic psychopathy. The IATs were given to a large sample ($N > 1000$) to investigate their psychometric properties. The TriPM and psychopathy personality thermometers were administered to examine the concurrent and discriminant validity of the IATs. Direct measures of aggression and prosocial behaviours were administered to explore the predictive validity of the IATs. Socially desirable responding was

captured by another direct measure, which was used to examine the extent to which the indirect and direct measures were susceptible to impression management.

Several hypotheses were made. Firstly, it was hypothesised that the three IATs would have high internal consistency. Secondly, it was predicted that IAT scores would only be associated only with their respective TriPM domain scores and not the other scales, or only to the extent that the TriPM domain scores are associated. Thirdly, it was predicted that the IAT scores (e.g., meanness-IAT score) would be positively associated with the psychopathic trait thermometer (e.g., cruel thermometer), which relates to their domain, and negatively associated with the non-psychopathic trait thermometer related to their domain (e.g., kind thermometer). Fourthly, it was hypothesised that the reactive and proactive scale scores on the RPQ would both be positively associated with the meanness-IAT and disinhibition-IAT scores. Fifthly, it was predicted that scores on the boldness-IAT would only be associated with the RPQ proactive scale score. It was also hypothesised that the prosocialness score would be negatively associated with the meanness-IAT score and positively with the boldness-IAT score. Lastly, it was predicted that the direct measures would be associated with the measure of social desirability but that the indirect IATs would not.

Method

Participants

Power Analysis

To minimise participant demand, a between-subjects design was employed, with each participant completing one of the three IATs. Based upon an implicit-explicit correlation of $r = 0.20$ (see De Cuyper et al., 2017) and standard conditions ($\alpha = .05$, 80% power), a sample of $n = 150$ participants per condition was required. However, to allow for discounted datasets due to missing responses, the target sample per condition was increased to $n = 160$. Furthermore, to allow

comparison of any gender differences between male and female participants, the total sample size for the study was *N* = 960 (160 participants per condition x 3 conditions x 2 genders).

Participant Sample

An online, community-based adult sample was recruited via social media, including Facebook and Twitter. As reaction times may become slower and more variable with older age (Der & Deary, 2006; Dykiert et al., 2012) the study was advertised as suitable for participants aged 18-55. Furthermore, as some of the concepts and traits within the direct and indirect measures were complex, only those fluent in English could participate. Community participants could enter a prize draw to win one of four £25 shopping vouchers, and any participants from the psychology department of Swansea University were given participation credits.

Across the three conditions, 1371 participants commenced the study. Following removals (detailed in the Results section), the final study sample comprised 1068 participants: 548 female, 511 male, 5 other gender, and 4 preferred not to say. Participants reported their ethnicity by selecting from the UK Government's agreed list of ethnic groups (Office for National Statistics, 2021). Using their consolidated 5-category grouping, 59.4% of participants self-reported their ethnicity as While, 13.7% as Black, 12.7% as Asian, 4.7% as Mixed, and 1.3% preferred not to say. In addition to reporting ethnicity, participants were asked to give their highest educational qualification. 42.9% of participants reporting holding an undergraduate degree, while 21.9% had postgraduate-level qualifications; A total of 24.1% held A-Level/A-Level equivalent qualifications, 5.8% held GCSE/O-Level qualifications, 4.5% held non-UK/other qualifications, 1.6% had undertaken an apprenticeship, and 1% reported having no qualifications.

Swansea University granted ethical permission for the study (Ref. 2021-5034-4155). Data collection took place during spring and summer of 2021. A complete copy of the ethical application is included in Appendix A.

Materials

Explicit Psychopathy

Triarchic Psychopathy Measure. The 58-item Triarchic Psychopathy Measure (TriPM; Patrick, 2010) indexes triarchic psychopathy. The disinhibition subscale comprises 20 items, while the meanness and boldness subscales each comprise 19 items. Participants respond to each item on a Likert scale (0 = *true*, 1 = *mostly true*, 2 = *mostly false* and 3 = *false*). Higher scores indicate greater levels of each psychopathy domain.

Personality Thermometers. Participants completed the two personality thermometers relevant to the condition to which they were randomly allocated. Those allocated to the boldness condition completed the *bold* and *wary* thermometers. Participants allocated to the meanness condition completed the *cruel* and *kind* thermometers. Disinhibition participants completed the *reckless* and *sensible* thermometers.

Explicit External Correlates.

Reactive and Proactive Aggression. The 23-item Reactive Proactive Questionnaire (RPQ; Raine et al., 2006) indexes self-reported levels of reactive and proactive aggression. Eleven items measure reactive aggression, and 12 items measure proactive aggression. Using a Likert scale (0 = *never*, 1 = *sometimes*, 2 = *often*), participants indicate the frequency that they engage in the different forms of aggressive behaviours included within the measure. Higher scores on each subscale indicate higher levels of reactive and proactive aggression.

Prosocialness Scale for Adults. The 16-item Prosocialness Scale for Adults (PSA; Caprara et al., 2005) indexes self-reported levels of prosocial behaviour. Participants indicate how true each of the 16 prosocial behaviour items is of them using a 5-point Likert scale (1 = *never/almost never true*, 2 = *occasionally true*, 3 = *sometimes true*, 4 = *often true*, 5 = *almost always/always true*). Higher scores on the PSA indicate greater levels of prosocialness.

Social Desirability Scale. The 17-item Social Desirability Scale (SDS; Stöber, 2001) assesses levels of socially desirable responding. While it comprises 17 items, only 16 are used in the analysis (item 4 is discounted per Stöber, 2001). Participants respond to the scale's statements with either a *true* or *false* response. Items are scored as either 0 or 1, with higher scores indicating greater levels of socially desirable responding.

Attention Checks. To identify careless responders, attention check questions were included in each measure. These appeared midway through each measure and were labelled "This is an attention check question". Participants were then asked to select a specified point within the Likert scale for that measure. Such attention checks are commonplace in current research and do not affect scale validity (Kung et al., 2018). Data was removed for participants who failed attention checks (see Results section).

Implicit Psychopathy.

The three IATs followed the same structure as that set out by Greenwald et al. (1998). Each IAT consisted of six blocks which are described next. Table 3.6 provides an illustrative schematic representation of the meanness-IAT (*cruel – kind*).

Block 1 was the "attribute discrimination" block (Greenwald et al., 1998). In this block, participants were asked to classify the six psychopathic and six non-psychopathic trait exemplar words accordingly. Onscreen prompts provided information on which key to press to categorise a word as either psychopathic (L) or non-psychopathic (A). Participants were given feedback onscreen regarding whether they had categorised the trait correctly or incorrectly; they could move to the next trial only when each word had been categorised correctly. It is important to check this as exemplar stimuli must be easy to sort (Greenwald et al., 2021). The twelve exemplars were presented in a randomised order.

As per Greenwald et al. (1998), Block 2 consisted of “initial combined” practice trials in readiness for Block 3. This block allowed participants to practice sorting trait exemplars and the personal information they had provided as either, e.g., *reckless* or *sensible* and *me* or *not me,* respectively. This block consisted of 12 trials: a sample of six trait and six idiographic exemplars. As in the previous block, non-psychopathic words were categorised with the A-key and non-psychopathic words with the L-key. Participants also used the A-key to indicate *me* words and the L-key to indicate *not me* words. Thus, this response key combination (non-psychopathic + me, psychopathic + not me) should have been congruent and hence, fast and easy for participants with low levels of the psychopathic traits represented within their particular triarchic IAT. As with Block 1, onscreen feedback was provided, and participants were able to proceed to the next trial once they had provided the correct response.

Block 3 was an extended version of Block 2: the data collection "initial combined block" (Greenwald et al., 1998). Concept and attribute pairings were identical. However, all 24 stimuli (6 psychopathic traits, 6 non-psychopathic traits, 6 me exemplars, 6 not me exemplars) were presented twice to generate 48 trials. Prompts remained on screen throughout, although no feedback was given on this block to minimise the intertrial interval period (Greenwald et al., 2021), and participants could progress to the next trial regardless of whether they correctly or incorrectly categorised an exemplar. Instructions were given to respond as quickly and accurately as possible.

Block 4 was the reversed "attribute discrimination" block (Greenwald et al., 1998). It was identical to Block 1, with one adjustment; the key responses for psychopathic and non-psychopathic traits were reversed. Therefore, when a psychopathic trait appeared on screen, participants needed to press the A-key, and when a non-psychopathic trait appeared, an L-key response was required. As with Block 1, Block 4 prepared participants for the following two blocks, where they needed to sort trait and idiographic exemplars but with the response key combinations changed. Again, onscreen

feedback was given, and participants could not move to the next trial until each exemplar had been categorised correctly.

Block 5 was the "reversed combined task" (Greenwald et al., 1998), a short practice for Block 6. As with Block 2, the key positions for *me* and *not me* were maintained, but *me* responses now shared the same response key as *psychopathy* (A-key), and *not me* was paired with *non-psychopathy* (L-key). Thus, for those with low levels of the psychopathic traits represented within their particular triarchic IAT, this response key combination (psychopathic + me, non-psychopathic + not me) should have been incongruent and, therefore, slower and more difficult to respond to.

Block 6 was the data collection "reversed combined task" (Greenwald et al., 1998), which mirrored Block 3, but with key responses per Block 5. Each stimulus was presented twice (48 trials). No feedback was given, and participants could progress to the next trial with correct or incorrect responses.

The onscreen font colours were varied for trait and idiographic exemplars to enhance the target-attribute distinction (Greenwald et al., 2021). Psychopathic and non-psychopathic exemplars and category prompts were displayed in blue text, and idiographic *me* and *not me* exemplars and category prompts were shown in green text. A fixation cross preceded each trial for 500ms.

Table 3.6. Example schematic representation of the meanness implicit association test (IAT) used here, based upon Greenwald et al. (1998)

	Block 1		**Block 2**		**Block 3**		**Block 4**		**Block 5**		**Block 6**	
Task	**Attribute discrimination**		**Initial combined task (practice)**		**Initial combined task (data collection)**		**Reversed attribute discrimination**		**Reversed combined task (practice)**		**Reversed combined task (data collection)**	
Response Key	A	L	A	L	A	L	A	L	A	L	A	L
Task instructions	KIND	CRUEL	ME or KIND	NOT ME or CRUEL	ME or KIND	NOT ME or CRUEL	CRUEL	KIND	ME or CRUEL	NOT ME or KIND	ME or CRUEL	NOT ME or KIND
Sample stimuli	Empathic Gentle	Sadistic Insulting	First name Birthdate Empathic Gentle	German Chef Sadistic Insulting	First name Birthdate Empathic Gentle	German Chef Sadistic Insulting	Sadistic Insulting	Empathic Gentle	First name Birthdate Sadistic Insulting	German Chef Empathic Gentle	First name Birthdate Sadistic Insulting	German Chef Empathic Gentle

Procedure

The study was created and delivered online using Gorilla Experiment Builder (www.gorilla.sc; Anwyl-Irvine et al., 2019). Participants accessed the experiment via a link provided on the social media adverts. Information was provided about the study, and participants were informed of their right to exit at any point without penalty. If participants consented, they provided basic demographic information (age, gender, ethnicity, highest educational achievement). Any participants who indicated they were non-fluent in English were automatically exited from the study and thanked for their time.

Idiographic data were collected first, and participants selected appropriate exemplars for *not me* that had no personal relevance to use within the IAT. The software randomly allocated each participant to one of the three conditions (boldness, meanness, disinhibition), and they completed the two personality thermometers for their particular psychopathy domain. They completed the IAT and a second task not discussed here, presented in random order. Next, participants completed the TriPM, RPQ, SDS and PSA in that order. Participants were given an online debrief and thanked for their time. If they wished, they could provide their email address for an opportunity to enter the prize draw or claim psychology pool participation credits.

Data Analysis

Greenwald et al. (2003) standardised procedures were used to score the three IATs, transforming reaction times into single D-scores. Where a trial was incorrectly categorised by a participant, a 600 ms penalty was added to the reaction time. Any out-of-range trials (<300 ms or >3000 ms) were excluded from the D-score analysis and calculation. To calculate the D-score, the difference in mean RT between the congruent and incongruent trials was divided by the pooled standard deviation. This procedure generated positive D-scores for higher levels of association between psychopathic traits and the self and negative D-scores for lower levels of association.

Where items were missing from any of the questionnaires, scores were prorated using a mean subscale score. However, any subscales with 25% or more missing items were excluded from the analysis.

Split-half correlations with Spearman-Brown corrections were completed to assess the reliability of the IATs. Tests of association were planned to explore the hypotheses. Analysis was completed using SPSS V26.0.

Results

Data Cleansing

From the initial sample of 1371 participants, once those under 18 or over 55 were removed from the analysis, along with any participants who indicated they were not fluent in English, 1296 participants remained. Data from a further 148 people were removed as they failed one or more attention checks, and another 80 participants were removed as they failed to achieve 70% or greater accuracy on the IAT; this target accuracy level was set to ensure the removal of any respondents who moved through the IAT pressing keys without engaging in the task. The final remaining sample was *N* = 1068 (boldness *n* = 334, meanness *n* = 376, disinhibition *n* = 358).[1]

Visual inspections of histograms for normality indicated that the distributions for most variables were suitable for parametric analysis (Tabachnick & Fidell, 2007). However, as the Proactive scale of the RPQ was strongly negatively skewed, non-parametric analyses were used for this variable.

Explicit Measures

[1] As participants with higher levels of Disinhibition might have failed to complete all items on the questionnaires accurately, the analysis was also run including participants who failed attention checks. This analysis generated a very similar pattern of results with similar magnitudes to those given in this chapter.

The descriptive statistics for the direct psychopathy and external correlate measures are given in Table 3.7. The mean scores and internal reliabilities of each TriPM domain were comparable to those reported in studies with non-forensic samples (e.g., Kimonis et al., 2020; Pink et al., 2022; Sellbom & Phillips, 2013). In addition, RPQ reactive and proactive aggression scores in this sample were similar to those previously reported with non-forensic samples (e.g., Snowden et al., 2021) and also showed similarly high internal reliability. The SDS demonstrated good reliability, and the sample scores were comparable to those reported by Stöber (2001). The PSA also had high internal reliability, and the mean item level score was comparable with data reported by Caprara et al. (2005) and Gatner et al. (2016).

Table 3.7. Descriptive statistics for direct measures, for all participants, and by gender (men and women only)

	Group	**Reported range**	**Mean (SD)**	**(α) [95% CI]**
Age	All	18 - 55	27.56 (8.72)	
	Men	18 - 55	28.36 (8.71)	
	Women	18 - 55	26.83 (8.68)	
Tri-PM Boldness	All	0 – 52.78	30.30 (8.84)	.85 [.84, .86]
	Men	6.33 – 52.78	32.97 (8.15)	.83 [.81, .85]
	Women	0 – 50.00	27.86 (8.75)	.85 [.83, .87]
Tri-PM Meanness	All	0 – 51	12.34 (8.29)	.88 [.87, .89]
	Men	0 - 51	14.97 (8.37)	.87 [.85, .88]
	Women	0 - 48	9.88 (7.47)	.88 [.86, .89]
Tri-PM Disinhibition	All	0 – 57	14.75 (8.00)	.85 [.83, .86]
	Men	0 – 57	15.90 (8.52)	.85 [.83, .87]
	Women	0 - 50	13.61 (7.25)	.83 [.81, .85]
PT Bold	All	0 - 100	61.08 (22.86)	
	Men	10 - 100	67.02 (20.42)	
	Women	0 - 100	55.23 (23.76)	
PT Wary	All	0 - 100	44.49 (26.30)	
	Men	0 - 95	40.30 (25.49)	

	Group	Reported range	Mean (SD)	(α) [95% CI]
	Women	0 - 100	47.84 (26.37)	
PT Cruel	All	0 - 100	15.14 (21.88)	
	Men	0 - 100	18.01 (22.70)	
	Women	0 - 100	12.60 (21.06)	
PT Kind	All	0 - 100	77.10 (19.06)	
	Men	1 - 100	74.66 (19.71)	
	Women	0 - 100	79.37 (18.34)	
PT Reckless	All	0 - 100	26.80 (23.39)	
	Men	0 – 100	30.73 (24.84)	
	Women	0 - 100	22.89 (21.15)	
PT Sensible	All	0 - 100	72.67 (18.99)	
	Men	0 - 100	72.20 (19.29)	
	Women	0 - 100	73.25 (18.68)	
RPQ Reactive	All	0 – 22	7.53 (3.90)	.82 [.81, .84]
	Men	0 - 22	8.06 (4.21)	.84 [.82, .86]
	Women	0 - 20	7.03 (3.52)	.80 [.78, .83]
RPQ Proactive[2]	All	0 – 22	1.00 (0.00, 2.00)	.81
	Men	0 - 22	1.00 (0.00, 3.00)	.83
	Women	0 - 16	1.00 (0.00, 2.00)	.74
SDS	All	0 – 16	10.45 (3.13)	.72 [.70, .75]
	Men	1 - 16	10.51 (3.12)	.72 [.68, .75]
	Women	0 - 16	10.40 (3.15)	.73 [.70, .76]
PSA*	All	0 – 5	3.86 (0.66)*	.91 [.90, .92]
	Men	0 – 5	3.71 (0.68)*	.91 [.89, .92]
	Women	0 – 5	3.99 (0.62)*	.90 [.89, .91]

* For consistency with other studies, the range, mean, and SD reported is at item-level (out of 5), rather than for the total score, which ranges from 0 – 80. Tri-PM = Triarchic Psychopathy Measure, PT = Personality Thermometer, RPQ = Reactive Proactive Questionnaire, PSA = Prosocialness Scale for Adults, SDS = Social Desirability Scale

[2] As the distribution of scores on the Proactive scale of the RPQ was skewed, median and interquartile range (IQR) and McDonald's Omega (Hayes & Coutts, 2020) are reported.

Scores on each psychopathic personality thermometer (bold, mean, reckless) were positively and strongly associated with scores on their counterpart triarchic scale (Table 3.8). Correspondingly, the associations between scores on the non-psychopathic personality thermometers (wary, kind, sensible) were negatively and moderately to strongly associated with their counterpart triarchic scale. TriPM domain scores were correlated in a similar pattern, and with similar magnitude, to data reported in other studies (e.g., Burley et al., 2017; Collison et al., 2021). As each participant completed only thermometers that related to their respective condition and IAT, it was not possible to complete comparative correlations between thermometers.

Table 3.8: Zero-order coefficients (r) and partial correlations (partial r) after controlling for social desirability scores on the SDS between implicit and explicit measures of psychopathy.

		Tri-PM			**Personality Thermometers**					
		Boldness	**Meanness**	**Disinhibition**	**Bold**	**Wary**	**Cruel**	**Kind**	**Reckless**	**Sensible**
IAT	**Boldness**	**.42* / .41***	-.01 / .03	-.05 / -.02	**.43* / 43***	**-.38* / -.38***	-	-	-	-
	Meanness	.01 /.02	**.23* / .21***	.12 / .08	-	-	**.19* / .19***	**-.18* / -.16**	-	-
	Disinhibition	.03 / .04	.12 / .10	**.16 / .15**	-	-	-	-	**.18* / .17***	**-.26* / -.25***
TriPM	**Boldness**	-	**.24* / .32***	-.03 / .05	**.74* / .73***	**-.59* / -.58***	.02 / .03	.11 / .09	.07 / .14	-.03 / -.08
	Meanness	-	-	.57* / .50*	.12 / **.19***	-.07 / -.13	**.43* / .44***	**-.35* / -.31***	**.46* / .40***	**-.32* / -.26***
	Disinhibition	-	-	-	-.03 / .05	.12 / .07	.26* / .26*	**-.23* / -.17***	**.58* / .52***	**-.39* / -.31***

Figures in bold $p < .01$; *$p < .001$. IAT = Implicit Association Test, TriPM = Triarchic Psychopathy Measure. Correlations were not available between all personality thermometers and IATs as participants only completed their respective thermometers and IAT.

Boldness IAT

As the mean boldness-IAT score was 0.60 (SEM = 0.03), most participants associated themselves with being bold rather than wary at this implicit level, and men were significantly bolder than women (p = .029). The IAT had good internal consistency (split-half correlations), which was comparable to the direct equivalent, TriPM Boldness (Table 3.9).

Table 3.9. Descriptive statistics, reliability, and gender comparison (mean) for the psychopathy Implicit Association Tests (IATs)

	N	(α)	Mean (SD)[3]	Men : Women	p	Effect Size [95%CI])
Boldness-IAT	334	.85	0.60 (0.51)	0.66 : 0.54	.029	0.24 [0.02, 0.46]
Meanness-IAT	376	.86	-0.77 (0.52)	-0.71 : -0.83	.019	0.24 [0.04, 0.45]
Disinhibition-IAT	358	.86	-0.58 (0.53)	-0.56 : -0.61	.314	0.10 [-0.10, 0.31]

To examine the discriminant validity of the boldness-IAT, scores on the IAT were correlated with the explicit measures of psychopathy. Crucially, there was a significant and positive association between the boldness-IAT scores and only TriPM Boldness; no associations emerged between the IAT and other TriPM domain scores (Table 3.8). Furthermore, the IAT was positively associated with the bold personality thermometer and negatively associated with the wary personality thermometer. Thus, the boldness-IAT showed discriminant validity.

A multiple regression was completed to examine further the relationship between the triarchic psychopathy scales and the boldness-IAT. The IAT score was the criterion variable, and the three scales of the TriPM were entered simultaneously as predictor variables. This regression yielded

[3] The negative meanness-IAT scores indicate that overall, most participants associated themselves with being kind rather than cruel, or sensible rather than reckless. The positive score for the Bold-IAT indicates that most participants associated themselves with being bold rather than wary.

a significant model (R^2 = 0.19, p < .001); only the Boldness scale of the TriPM was predictive of the boldness-IAT score (β = .46, p < .001). Similar findings emerged when age was added to the model. Separate models run for gender also produced similar results.

Table 3.10 illustrates the associations between the boldness-IAT scores and self-reported levels of aggression and prosocial behaviour. The boldness-IAT was not associated with either aggression scales or prosocial behaviour. Separate analysis for each gender yielded similar findings.

Table 3.10. Zero-order coefficients (r or rho) and partial correlations (partial r or rho) after controlling for social desirability scores on the SDS, between implicit and explicit measures of psychopathy, and external correlates of psychopathy.

		RPQ		PSA	SDS
		Proactive[4]	**Reactive**		
IAT	**Boldness**	.03 / .06	-.03 / .01	.08 / .06	.09
	Meanness	**.16 / .13**	.08 / .04	**-.17 / -.15**	-.09
	Disinhibition	**.13 / .12**	**.13** / .11	-.06 / -.04	-.07
TriPM	**Boldness**	**.17* / .26***	.00 / .08	.07 / .01	**.15***
	Meanness	**.51* / .44***	**.47* / .37***	**-.52* / -.45***	**-.35***
	Disinhibition	**.54* / .46***	**.48* / .34***	**-.32* / -.19***	**-.43***

Figures in bold p < .01; *p < .001. IAT = Implicit Association Test, TriPM = Triarchic Psychopathy Measure, RPQ = Reactive Proactive Questionnaire, PSA = Prosocialness Scale for Adults, SDS = Social Desirability Scale

[4] As the distribution of scores on the Proactive scale of the RPQ was skewed, Spearman's correlations and partial correlations are reported

Meanness-IAT

As the mean score on the meanness-IAT was -0.77 (SEM = 0.03), participants associated themselves with being kind rather than cruel at this implicit level. As with the boldness-IAT, gender differences emerged; Men appeared significantly less kind (more cruel) than women (p = .019). The IAT had good reliability; the internal consistency (split-half correlations) of the IAT was high and comparable to its direct equivalent, TriPM Meanness (Table 3.9).

Table 3.8 sets out the associations between the meanness-IAT and the direct psychopathy measures. As with the boldness-IAT, the meanness-IAT also showed discriminant validity. The meanness-IAT was significantly and positively associated with only the Meanness scale of the TriPM. Furthermore, it was positively associated with the cruel personality thermometer and negatively correlated with the kind personality thermometer.

A multiple regression was completed to examine further the relationship between the triarchic psychopathy scales and the meanness-IAT. The IAT score was the criterion variable, and the three scales of the TriPM were entered simultaneously as predictor variables. This analysis yielded a significant model (R^2 = 0.06, p < .001) where only TriPM Meanness was predictive of the meanness-IAT score (β = .25, p < .001). Similar findings emerged when age was added to the regression model. Separate multiple regressions run for gender produced similar results.

Table 3.10 illustrates the associations between the meanness-IAT scores and self-reported levels of aggression and prosocial behaviour. This IAT was positively associated with RPQ proactive aggression (r = .16). The association between the IAT and RPQ reactive aggression (r = .08) showed a positive trend, although this was not significant (p = .05). Self-reported prosocial behaviour was negative associated with the meanness-IAT (r = -.17). Separate analysis for each gender yielded similar findings.

Disinhibition-IAT

The reckless-sensible meanness IAT score was -0.58 (SEM = 0.03); therefore, most of the participant sample associated themselves with being sensible rather than reckless at this implicit level. Unlike the boldness- and meanness- IATs, there was no gender difference in the mean disinhibition-IAT score. Again, this IAT had good reliability, comparable to that of its direct counterpart, TriPM Disinhibition (see Table 3.9).

The correlations between the direct psychopathy measures and the disinhibition-IAT are given in Table 3.8. As with the other two IATs, the disinhibition-IAT showed discriminant validity. The IAT was significantly and positively associated only with the Disinhibition scale of the three TriPM domains. Thus, as with the other IATs, the disinhibition-IAT demonstrated discriminant validity. It was also positively correlated with the reckless personality thermometer and negatively with the sensible personality thermometer.

A multiple regression was completed to examine further the relationship between the triarchic psychopathy scales and the disinhibition-IAT. The three scales of the TriPM were entered simultaneously into the model as predictor variables, and the IAT score was the criterion variable. The regression yielded a significant model (R^2 = 0.03, p < .001) where only TriPM Disinhibition was predictive of the disinhibition-IAT score (β = .16, p = .02). Unlike the bold and mean regressions, adding age to the model reduced the predictive validity of the Disinhibition TriPM score (β = .12, p = .09). Again, contrasting with the other IATs, separate analyses for men and women showed that TriPM Disinhibition was not significant for either gender alone (men β = .09, women β = .16, ps > .1).

As shown in Table 3.10, the disinhibition-IAT was positively associated with both the proactive and reactive aggression scales of the RPQ. However, these associations were of small effect size. There was no association between self-reported prosocialness and the disinhibition-IAT.

Social Desirability and Psychopathy

As discussed previously, one theorised benefit of indirect measures is that they are less open than self-report measures to issues of desirable responding. In support of this, the three psychopathy IATs showed no association with scores of social desirability indexed by the SDS. In contrast, each domain score on the TriPM was significantly associated with social desirability. However, these associations were not all as anticipated. In line with expectations, TriPM Meanness and Disinhibition were negatively associated with social desirability; greater endorsement of social desirability items on the SDS was related to less endorsement of TriPM Meanness and Disinhibition. Conversely, TriPM Boldness was positively associated with social desirability. To explore whether socially desirable responding might influence the relationships of the three IATs to the direct psychopathy measures and self-reported aggression and prosocialness, partial correlations were completed after controlling for SDS scores (Tables 3.8 and 3.10). As anticipated, no large changes from the zero-order correlations emerged for the IATs, supporting the notion that indirect measures such as the IAT are comparatively robust to issues of impression management.

Discussion

This study aimed to develop three classic Implicit Association Tests (IAT; Greenwald et al., 1998) to index the psychopathic self-concept represented by the three domains of psychopathy represented in the Triarchic Psychopathy Measure (TriPM; Patrick, 2010). Each of the IATs showed good internal reliability. There was also evidence of discriminant validity, with each IAT only being associated with scores on its equivalent TriPM scale. Unlike the direct TriPM measure, no associations emerged between each IAT and a measure of social desirability (SDS-17; Stöber, 2001). Some predicted associations emerged between the IATs and prosocialness (PSA; Caprara et al., 2005), and proactive and reactive aggression scales of the Reactive-Proactive Aggression Questionnaire (RPQ; Raine et al., 2006) replicating previously identified associations with TriPM scales. Thus, the IATs showed promise as a potential indirect measure to explore further within the thesis.

Internal Consistency

As hypothesised, all three IATs demonstrated high internal consistency (=< .85), in line with the consistencies of the equivalent direct measure, the TriPM scales. This level of consistency is towards the top end of the range (.70 - .90) reported in Nosek et al.'s (2007) IAT meta-analysis. It also exceeds the mean consistency of 0.79 reported in (Hofmann et al., 2005) IAT meta-analysis. Furthermore, it is higher still than the median consistency of 0.82 across a meta-analysis of 51 personality self-concept IATs (De Cuyper et al., 2017). Moreover, the IATs' consistency was far in excess of those reported within the Nentjes et al. (2017) psychopathy IATs. Given that this level of consistency is only sometimes achieved in personality IATs (e.g., De Cuyper et al., 2017; Vianello et al., 2013), this is a strength of the IATs designed within this study.

Concurrent and Discriminant Validity

All three IATs were significantly and positively correlated with scores on their respective TriPM scale, a validated measure. Thus, they showed concurrent validity. Moreover, they were each positively correlated to a similar magnitude with their corresponding psychopathic trait personality thermometer and negatively correlated with their corresponding non-psychopathic trait personality thermometer. These associations were comparable with or well in excess of the median correlation of .20 between direct and indirect measures reported by (De Cuyper et al., 2017). These relationships suggest that a good conceptual correspondence was achieved between the indirect IATs and the direct TriPM and personality thermometer measures.

The IATs also displayed discriminant validity; each IAT was associated only with its respective TriPM domain score and not with the other domains. This is an important finding. As previously mentioned, personality self-concept IATs such as these might only be tapping into a valence dimension with traits being classified as either positive or negative. When combined with the self-concept categories, these IATs may come to index self-esteem rather than the personality self-concept (see, e.g., Grumm & von Collani, 2007). As it was not possible to find positive equivalents

for each psychopathic trait to use as exemplars in these IATs, they might have been open to such a recoding based on valence. However, the discriminant correlations that emerged in the results suggest that such recoding did not occur, as this would have produced comparable correlations for each IAT with each explicit scale which did not emerge.

Predictive Validity

Aggression

While some predicted associations between the IATs and proactive and reactive aggression were supported, these were not wholly as hypothesised and were generally of small effect size. As predicted, the disinhibition-IAT was associated with proactive and reactive RPQ scores. While these correlations were weak, these associations align with previous findings for the Disinhibition TriPM scale (Donnellan & Burt, 2016; Gray et al., 2019; Pink et al., 2022). Again, in line with hypotheses and some previous findings relating to proactive forms of aggression (Donnellan & Burt, 2016; Gray et al., 2019), the meanness-IAT was associated with the proactive RPQ scale. Based on previous work (Donnellan & Burt, 2016; Gray et al., 2019), it was also predicted that the meanness-IAT would be associated with the reactive RPQ scale; this relationship did emerge, although it did not reach significance (p = .05). A lack of association between triarchic Meanness and reactive aggression might relate to the nature of the participant sample, as other research with a mixed gender sample has also found no relationship between Meanness and RPQ reactive aggression (Pink et al., 2022). Against hypotheses, no association emerged between the boldness-IAT and the RPQ proactive scale. Thus, some hypotheses were supported, although where associations emerged they were of small effect size.

As predictive validity is an important aspect of any measure, including the IAT (Perugini et al., 2010), these findings require some consideration. One possible explanation is that the sample's implicit meanness and disinhibition levels were too low for strong associations with aggression to emerge. Within the general population, research suggests that only after a certain threshold do

levels of aggressive and violent behaviours increase substantially (Coid & Yang, 2008). Thus, such an association may not materialise in a community sample like the one recruited for this study. To address this, community samples with elevated levels of psychopathic traits could be targeted to further explore these associations, such as gambling cohorts (Trombly & Ziegler-Hill, 2017) or domestic violence populations (Sica et al., 2024). Another possible consideration relates to the multifaceted nature of the domains represented within the TriPM; while aggression of differing forms features in the conceptualisations of Meanness and Disinhibition, these domains comprise manifold traits. Given that for each of the IATs a direct-indirect association emerged, it is conceivable that while the IATs indexed aspects of the self-concept relating to Meanness and Disinhibition traits, these aspects did not include aggressive traits. Regarding the lack of hypothesised positive association between the boldness-IAT and proactive aggression, this may again relate to the nature of the sample; while such relationships have emerged using self-report measures in research with offending populations (e.g., Gray et al., 2019), other studies with community and student samples have found no such association (Gatner et al., 2016; e.g., Pink et al., 2022). Moreover, the description of the Boldness triarchic domain (Patrick et al., 2009) describes a socially dominant but not necessarily proactively aggressive individual.

Prosocialness

The hypotheses relating to prosocial behaviour and the IATs were partially supported. As predicted, the meanness-IAT was negatively associated with self-reported prosocial behaviour. This is in line with previous findings (Gatner et al., 2016) and likely reflects the nature of the positive actions included within the PSA which are counterpoint to the callousness associated with this domain which was reflected in exemplars within the meanness-IAT. Against prediction, no association emerged between the PSA scores and either the direct or indirect boldness measures, counter to the findings of Gatner et al. (2016). Nonetheless, perhaps this is unsurprising given that

Boldness, defined by Patrick et al. (2009), does not discuss prosocial activities or intentions. Thus, the findings of Gatner et al. (2016) may be an anomaly.

Social Desirability

In line with predictions, each IAT was not associated with social desirability measured by the SDS-17. This is a further strength of the IATs developed here as a key reason to consider indirect measures as potential tools to index the self-concept is their potential immunity to desirable responding. Also, as hypothesised, each TriPM scale was strongly related to the SDS-17 scores. The Boldness TriPM score was positively associated with social desirability, while the Meanness and Disinhibition TriPM domain scores were negatively associated. The direction of these associations mirrors those reported by Kelley et al. (2018) concerning scores on another measure of socially desirable responding: the Positive Impression Management scale (PIM; Morey, 1991). The positive relationship between socially desirable responding and triarchic Boldness may be underpinned by shared characteristics between extraverted attitudes and behaviours captured by measures of this kind (Kelley et al., 2018).

Limitations and Next Steps

The three psychopathic self-concept IATs described here appear to have several merits. They demonstrated good reliability and discriminant validity, and each produced a direct-indirect association of comparable or larger effect size to others reported in the general and personality IAT literature. However, while some predicted associations with correlates of psychopathy emerged, these were weak.

Some consideration of why these IATs did not predict known correlates of psychopathy has already been given. However, the use of self-report measures of past behaviours may be a contributory factor in the limited predictive utility of the three psychopathic self-concept IATs in predicting proactive and reactive aggression and (a lack of) prosocialness. This is perhaps not

especially surprising, as responses to direct measures are thought to be driven by reasoning, while indirect measures invoke more automatic activations (Schnabel & Asendorpf, 2010). Thus, using experimental tasks that capture spontaneous and implicit behaviours associated with psychopathic traits might be a more suitable way to test the predictive validity of the IATs robustly. It is possible that the IATs might have superior utility in predicting automatic behaviours of this nature, while direct measures such as the TriPM might be more predictive of controlled responses to self-reported behaviours. As set out in Chapter 2, the development of experimental tasks that capture spontaneous and implicit behaviours associated with psychopathic traits will be described and evaluated in subsequent chapters.

Chapter 4: Exploring the utility of priming to index the psychopathic self-concept

This chapter describes the exploration of priming as an alternative indirect method to the Implicit Association Test (IAT; Greenwald et al., 1998) to index the psychopathic self-concept, in line with the triarchic model of psychopathy (Patrick, 2010). First, it briefly revisits the potential benefits and shortcomings associated with priming tasks. Next, it describes a pilot study (Study 1) which explores the potential to use priming as an indirect measure to index the self-concept personality trait of extraversion. The chapter then reports a second study (Study 2), where stimuli from the IATs (Chapter 3) were used within a psychopathic trait self-concept priming task. The chapter presents the findings from Study 2 and sets out the next step in the thesis.

Evaluative or Affective Priming

To recap from Chapter 2, in the Evaluative Priming Task (EPT; Fazio et al., 1995), also known as *affective priming*, participants are presented with a brief prime stimulus, which could be of positive or negative valence but they are told to ignore this prime stimulus, followed quickly by a target stimulus to categorise, typically as positive or negative (Koppehele-Gossel et al., 2020; Teachman et al., 2019). The speed with which participants categorise the target stimuli is thought to be influenced by the preceding prime (Teachman et al., 2019). Responses should be quicker and more accurate if the prime evaluation is congruent in valence with the target stimulus evaluation.

The EPT is highly versatile, as almost any object could be represented within this task (Gawronski, 2022), but it also offers several potential advantages over the IAT. Separate priming effects can be calculated for both positive and negative associations rather than the relative comparison generated by the IAT (Teachman et al., 2019). Moreover, primes can be presented either supraliminally, where participants are aware of them, or subliminally where they cannot be consciously perceived (Gawronski, 2022; Hofmann & Wilson, 2010; Teachman et al., 2019). Additionally, and of particular interest in personality research, is that the IAT and EPT offer the potential to measure somewhat different psychological concepts as they are thought to operate at

different processing levels; IATs operate at the concept level, while priming operates at the exemplar level (Olson & Fazio, 2003). Theoretically, a personality self-concept priming task might be able to index individual traits (talkative) rather than a broader trait (extraversion) that is likely tapped with an IAT. For psychopathy, this means that priming may be able to tap into particular psychopathic traits, such as sadistic or callous, while the IAT indexes a domain of psychopathy or broader group of traits, such as Meanness. Thus, a personality self-concept priming task based on the EPT might offer a more granular tool to index the self-concept than the IAT.

While the EPT has clear potential advantages to the IAT, there is also a fundamental disadvantage with the task that might contribute to its comparative lack of popularity (Koppehele-Gossel et al., 2020). The EPT demonstrates poor internal consistency, ranging from .00 to .55 (Gawronski, 2022). This issue may be related to suboptimal outlier treatment; unlike the IAT (see Greenwald et al., 2003), there is no consensus on how response latencies which are excessively fast or slow should be dealt with, and published studies use a variety of scoring algorithms taking different approaches with outlier data (Koppehele-Gossel et al., 2020). This array of options makes comparisons between studies challenging (Koppehele-Gossel et al., 2020). The lack of consensus on the approach for outlier treatment also enables *p*-hacking (Simmons et al., 2011), as post hoc algorithm selections can be made to suit the data (Koppehele-Gossel et al., 2020). Moreover, an inadequate choice of algorithm might lead to false negative results (Koppehele-Gossel et al., 2020).

Priming as a Tool to Index the Psychopathic Self-Concept

Temporarily putting aside the issues of consistency and outlier treatment, a priming task based on the EPT can potentially be a novel method to index the psychopathic self-concept. However, creating a personality priming task to index the psychopathic self-concept requires adapting the EPT's classic form as a task to evaluate attitudes. Typically, the task involves the presentation of an attitude object as a prime and then a target to classify as positive or negative. However, in a personality self-concept priming task, the attitude object primes need to be changed

to personality traits, and the target stimuli changed to idiographic information to be categorised as either *me* or *not me*. In this way, the trait prime should either facilitate or hinder the classification of idiographic information, depending on its compatibility with the self-concept.

The EPT, has been used to index the implicit self-concept (see, e.g. Schabel & Asendorpf, 2010) but there appear to be few adaptations of the task to index implicit personality traits in particular. Therefore, using this task in this manner appears to be relatively novel. To evaluate whether a priming task of this kind might be a valuable way to index the psychopathic personality self-concept, a pilot study was first undertaken to test the concept with one of the Big-5 (McCrae & Costa, 1987) personality traits.

Study 1: Priming as a Tool to Index the Introversion-Extraversion Self-Concept

Study 1 aimed to develop and test an idiographic priming task to index implicit personality traits. It used one of the universal dimensions originally identified by Eysenck, included in his Eysenck's Personality Questionnaire-Revised (EPQ-R; Eysenck et al., 1985), and latterly adopted within both the Big-5 (McCrae & Costa, 1987) and HEXACO (Lee & Ashton, 2004) personality models: *extraversion*. This trait was selected because it is well understood in addition to being considered universal. Moreover, it is perhaps less associated with negative connotations than some of the other traits within these models, such as *neuroticism* or *psychoticism,* and certainly when compared to some of the traits associated with psychopathy. Thus, it is likely to be less affected by complexities associated with positive impression management. While consideration of this kind is highlighted as important for IATs (Greenwald et al., 2021), there do not appear to be similar recommendations for priming. Thus, in the absence of such guidance, it seems prudent to apply similar principles to those Greenwald et al. (2021) set out where possible and relevant when designing a self-concept priming task.

Preparatory Work

Priming Exemplars

As IATs which index the self-concept of Big-5 personality traits have already been published (see, e.g. Back et al., 2009), trait exemplars used in these tasks are available for use in a priming task. However, high conceptual correspondence between the exemplars and the equivalent direct measure is essential for good structural fit (Payne et al., 2008). Thus, a similar approach was taken to that of the IAT design; prime personality trait exemplars were firstly distilled from the direct measure to be used in the task, the EPQ-R's *extraversion* scale (Eysenck et al., 1985), to represent the dimensions of *extraversion* and its' counterpart *introversion.* Where single trait words featured in the scale items these were taken as exemplars. However, most traits in the EPQ-R are represented by more than one word as part of complex propositions. To address this and ensure conceptual correspondence, further single-word adjectives were selected which represented EPQ-R items. These were then checked against Saucier and Goldberg's (1996) extensive analysis of Big-5 personality adjectives to ensure they were loading positively or negatively onto extraversion as necessary. The list was then cross-checked with the exemplars from Back et al. (2009) for completeness. Table 4.1 details the extraversion exemplars extracted through this process and their introversion counterparts. Category exemplars of *extraversion* and *introversion* were also included, aiming to comprehensively capture the essence of this scale and generate six exemplars for each of the bipolar constructs. The same idiographic information, such as birthdate and first name used in the IATs was also used here as the target stimuli for sorting into either *me* or *not me* categories.

Table 4.1: Trait exemplars used along with their respective sources and loadings where relevant

EPQ Item	Item	Extraversion Exemplar and Source	Introversion Exemplar and Source
3	Are you a talkative person?	*Chatty* Selected as simpler alternative to *Talkative* used in Back et al. (2009).	
41	Are you mostly quiet when you are with other people?		*Quiet* -.64 loading on to Extraversion (Saucier & Goldberg, 1996).
7	Are you rather lively?	*Lively*	*Reserved* Used by Back et al. (2009); -.60 loading onto extraversion (Saucier & Goldberg, 1996).
		Happy-go-lucky .54 loading on to Extraversion (Saucier & Goldberg, 1996).	*Serious* (-.31 loading onto Extraversion (Saucier & Goldberg, 1996))
11	Do you enjoy meeting new people?	*Social* Loading of .58 onto Extraversion (Saucier & Goldberg, 1996). Selected instead of *Sociable* used in Back et al. (2009).	*Inhibited* -.54 loading on to Extraversion (Saucier & Goldberg, 1996).
N/A	Taken from Back et al. (2009)	*Hasty* (selected as simpler alternative to *Impulsive* used in (Back et al., 2009))	*Cautious* (selected as a counterpoint to *Hasty*. -.32 loading on to Extraversion (Saucier & Goldberg, 1996))

EPQ Item	Item	Extraversion Exemplar and Source	Introversion Exemplar and Source
N/A	Category Exemplars	*Extraverted* .64 loading on to Extraversion (Saucier & Goldberg, 1996).	*Introverted* -.65 loading on to Extraversion (Saucier & Goldberg, 1996).

Personality Thermometers

As with the IAT study, personality thermometers were created, which integrated the priming exemplars and concepts within their descriptions. The descriptions for each thermometer are given in Table 4.2.

Table 4.2: Descriptions for the two personality thermometers created to use alongside the extraversion-introversion priming task

Thermometer	Description
Extraversion	People who are extraverts are lively individuals. They enjoy interacting with others in social situations, and like meeting new people. They prefer busy, exciting environments and seek stimulation. They can be hasty and are comfortable making quick decisions.
Introversion	People who are introverts are quiet and reserved, preferring solitary activities to social situations. They may appear more serious and thoughtful than their extraverted counterparts and enjoy peaceful and quiet environments. They are cautious and think through things before making decisions.

Experimental Manipulations

The task incorporated two experimental manipulations: the length of onset between the prime and the target presentation and presenting the prime and target words in the same or different colours. Affective priming appears facilitated at under 300ms between prime and target presentations but is thought to diminish after this timeframe and be absent at 1000ms (Hermans et al., 2003; Moors et al., 2010). However, as there is little published that reports priming tasks which

aim to index the personality self-concept, it was important to explore the effects of stimulus onset asynchrony, or SOA, within this novel personality self-concept priming task. Since affective priming is facilitated at under 300ms, an SOA of 250ms was selected as one manipulation for this pilot study. A second SOA manipulation of 500ms was chosen as this is beyond the SOA at which affective priming appears most effective but should still be present. Whether the prime and target stimuli were in the same colour was also important to explore. Perception research has shown that when directed, participants can selectively attend to stimuli of a particular colour (Brawn & Snowden, 1999). Given that priming tasks rely upon cognitive processing of both the prime and target, it is possible that if they are in different colours, participants may be able to selectively attend to only the target, thus failing to process the prime. Conversely, if they are in the same colour, there may be limited ability to selectively screen out the prime, thus, enhancing the priming effect.

Thus, two personality self-concept priming tasks were designed to explore SOA and colour. Both used the same *extraversion-introversion* prime words and *me-not me* target words. However, in one, both primes and targets were presented in black font, and in the other, primes were presented in green font with targets in blue font. Half of the trials in both priming tasks used an SOA of 250ms and half an SOA of 500ms.

Outlier Treatment and Analytic Strategy

As discussed above, multiple algorithms have been used to deal with outliers in EPT studies (Koppehele-Gossel et al., 2020). Koppehele-Gossel et al. (2020) highlight that the most frequently taken approach excludes error trials without any further removals based on fast or slow response latencies. However, some approaches use *a priori* cut-off values to eliminate very fast and very slow outliers, while others analyse the response latency distribution (see Table 4.3). The general analytic strategy within EPT studies is calculating a priming index after excluding outliers (Koppehele-Gossel et al., 2020). As an example, for an extraversion-introversion personality self-concept priming task, the index calculation would be as follows: Trials are grouped into either *me-extraversion* trials

(*extraversion* prime + *me* target or *introversion* prime + *not me* target) or *me-introversion* trials (*introversion* prime + *me* target or *extraversion* prime + *not me* target). Mean reaction times are calculated per participant for each group of trials (*me-extraversion* and *me-introversion*). The *me-extraversion* mean is subtracted from the *me-introversion* mean to generate a priming index. This generates a score above zero for a higher association between extraversion and the self and a score below zero for a greater association between introversion and the self.

Table 4.3: Algorithms used in EPT scoring from most popular (top) to least popular (bottom), reproduced from Koppehele-Gossel et al. (2020).

Algorithm	**Description of outlier treatment**
Errors only	Exclude error trials without further treatment of response latency data
300-1000 ms	Exclude error trials and reaction times lower than 300ms and higher than 1000ms
300-1500 ms	Exclude error trials and reaction times lower than 300ms and higher than 1500ms
0–800ms	Exclude error trials and reaction times higher than 800ms
250ms – 3 *SD*	Exclude error trials and reaction times lower than 250ms and higher than 3 standard deviations of mean participant reaction time
0-1500 ms	Exclude error trials and reaction times higher than 1500ms
250-1500 ms	Exclude error trials and reaction times lower than 250ms and higher than 1500ms
300-3000 ms	Exclude error trials and reaction times lower than 300ms and higher than 3000ms
300ms – 2 *SD*	Exclude error trials and reaction times lower than 300ms and higher than 2 standard deviations of mean participant reaction time
+ / - 2 *SD*	Exclude error trials and reaction times lower than 2 standard deviations of mean participant reaction time and higher than 2 standard deviations of mean participant time

As the most typical analytical approach taken in the EPT studies reviewed by Koppehele-Gossel et al. (2020) was to remove only error trials without any outlier exclusions, an *a priori* decision was made to analyse the extraversion priming data in this manner. However, Koppehele-Gossel et al. (2020) compared the different algorithms they identified in published EPT studies for internal consistency, the effect size for priming and the association between priming scores and the

corresponding score on direct measures; the outlier treatment which appeared to deliver the best performance on these points was to exclude trials outside of 300–1000 ms (Koppehele-Gossel et al., 2020). As such, a second analysis was completed on the data using these bounds selected *a priori* for trial exclusions. However, while data analysis in EPT studies typically uses the priming index calculation set out above, D-scoring is the generally accepted scoring mechanism for IAT studies. This mechanism considers variances in individual average response speed (Greenwald et al., 2003) which may be advantageous as a method to account for individual differences in priming tasks. Thus, rather than using the priming index treatment set out by Koppehele-Gossel et al. (2020) and planned within the first analysis here, D-scoring was applied to the 300-1000ms bounds model. A third analysis of the data was also planned a priori. The data was to be analysed using the IAT D-scoring algorithm and treatment of outliers and incorrect responses as Greenwald et al. (2003) recommended (Chapter 3).

Hypotheses

It was hypothesised that prime and target stimuli in the same colour (black) would enhance priming to a greater effect than stimuli in different colours, in line with Brawn and Snowden (1999). Corresponding with research on affective priming, which finds that priming is most effective at under 300ms SOA (e.g., Hermans et al., 2003), it was hypothesised that priming effects would be greater on trials using an SOA of 250ms compared to those with a 500ms SOA.

Method

Participants

Power Analysis. The study employed a mixed design. SOA (250ms and 500ms) and stimuli colour (both black, different colours) were within-subject factors, each with two levels. The order of conditions was a between-subjects factor with two levels (black words first, different colour words first). Replicating Koppehele-Gossel et al. (2020), the study used a minimum sample size of 100

participants. Koppehele-Gossel et al. (2020) determined this sample size by a power analysis assuming 80% power, a priming effect of d = 0.28 and a correlation of r = .27 between explicit measures and implicit priming scores. An additional 10% was added to the sample size to account for data loss, giving a final target sample of 110 participants.

Participant Sample. Participants were recruited through social media platforms, word-of-mouth and the Swansea University psychology participant pool. If the participants were Swansea University psychology students, they were awarded one credit for participation. No other incentives were offered for taking part in the study. Swansea University College of Human and Health Sciences granted ethical approval for the study, and testing took place between June and July 2021 (Ref: 2021-5153-4277). Appendix B provides a complete copy of the ethical application.

As with the IAT study, it was advertised as suitable for participants aged 18-55 due to possible slowing of reaction times with age (Der & Deary, 2006; Dykiert et al., 2012) and any participants who indicated that they were not fluent in English were excluded from the study. Altogether, 112 individuals took part in the study.

After data cleaning and validity checks (detailed in the Results section), 87 participants remained. The majority of the sample, 58 participants, were female, 24 were male, 4 were other gender, and one preferred not to say. The final sample had a mean age of 30.45 (SD = 10.50). Of the participants, 85.7% were White, 4.5% were Black or Black-British African, and 4.5% were of Asian or Asian-mixed ethnicity. The majority had a postgraduate degree (35.7%), with 21.4% holding undergraduate degrees and 39.3% holding either A/AS-level or HNC-level qualifications.

Materials

Eysenck Personality Questionnaire–Revised (Short Form). The Eysenck Personality Questionnaire–Revised Short-Form (EPQ-R; Eysenck et al., 1985) was administered primarily to index explicit extraversion. This questionnaire was selected because it minimises participant demand in its

short-form version. While the measure also captures psychoticism and neuroticism traits and desirable responding via its lie scale, these were not analysed. Each of the four sub-scales on the short-form version of the measure comprises 12 questions, such as 'Are you a talkative person', requiring a yes or no response. The measure generates a maximum score of 12 for each scale, where higher scores indicate higher levels of that personality trait. While the psychoticism scale has been criticised for its poor reliability, the extraversion scale has demonstrated good internal reliability in its original English version (Caruso et al., 2001) and translated forms (Ivkovica et al., 2007; Karanci et al., 2007).

Personality Thermometers. As previously discussed, supplementary to the EPQ-R, two personality thermometers were included in the study, which asked participants to rate from 0 (*not at all*) to 100 (*very*) how much they felt they were an extraverted person and an introverted person. Table 2 provides the corresponding definitions. Such thermometers are an extremely fast method of obtaining an explicit measure of these particular personality traits, and, as covered in Chapter 3, relative explicit scales of this kind might be more strongly associated with implicit scores than absolute explicit measures (Hofmann et al., 2005).

Social Desirability Scale. As with the IAT study, the Social Desirability Scale-17 (SDS-17; Stöber, 2001) was administered to index levels of desirable responding across the direct measures.

Attention Checks. Again, corresponding with the IAT study, the EPQ-R and SDS-17 measures included an attention check question to provide a filter to identify careless responders.

Personality Self-Concept Priming Task. Two priming tasks were devised to index implicit associations between the self and extraversion, and introversion. There were two colour conditions. In each task, participants were required to sort target words related to themselves or others into categories of *me* and *not me* as quickly as possible by pressing the A and L keyboard keys, respectively. The same me and not me words were used as in the IAT study described in Chapter 3.

Each task comprised two blocks. In the first familiarisation block, all 12 *me* and *not me* exemplars were presented in random order. Each was preceded by a row of stars (*****) as a filler for the personality primes featured in the second block. Feedback was given for each trial, and participants could only proceed to the next once they had responded correctly. Before each trial, a fixation cross was displayed for 500ms, then the prime filler for a further 500ms, a blank screen for 20ms, and then the target *me* or *not me* exemplar requiring a keyboard response.

For the second data collection block, the rows of stars were replaced by either an introversion or extraversion personality prime word (Table 1). This second main block comprised 72 trials where each personality word was used as a prime three times before a *me* and three times before a *not me* word. Each personality word was presented as a 250ms prime three times and a 500ms prime three times. Thus, the different stimulus onset delays were interleaved through the priming task. Unlike the familiarisation block, no feedback was given to participants.

The same experimental structure and timings were used for both colour conditions. The prime and target words were presented in black font in the *same colour* condition. In the *different colour* condition, the primes were in blue font colour, and the target words were green. All participants completed both conditions. However, the order of conditions was counterbalanced such that some participants completed the *same colour* condition, then the *different colour* condition, and vice versa. Figures 4.1 and 4.2 provide illustrate the screen displays for the *same colour* and *different colour* tasks.

Figure 4.1: Screen displays for familiarisation (top) and main trials (bottom) for the priming task, same colour conditions.

Figure 4.2: Screen displays for familiarisation (top) and main trials (bottom) for the priming task, different colour conditions

Procedure

All participants completed the study online using Gorilla Experiment Builder (Anwyl-Irvine et al., 2019). Participants entered the experiment via a link on social media posts. They viewed a participant information sheet and consented to participate in the study. They provided demographic data (age, gender, highest qualification, ethnicity, and fluency in English) and then provided their personal information as the *me* stimuli in the priming task. They also selected *not me* equivalents from pre-selected options that had no personal relevance. Next, they completed the personality thermometers and rated themselves on each personality adjective. To ensure that the participants understood how each of the adjectives related to the personality dimension of introvert-extravert, they were next asked to categorise each of the adjectives as either *extravert* or *introvert*. Feedback was given for incorrect answers, and they could only progress to the next adjective once they had completed the previous one correctly. Participants were then allocated to either the *same colour* priming task first or the *different colour* priming task first. Following the priming tasks, the participants completed the EPQ-R and the SDS-17 and were debriefed.

Analysis

Data Analysis Plan. As previously described, the data were analysed using three different algorithms to explore internal consistency differences generated by applying various scoring methods to this data. These three algorithms are set out in Table 4.4.

Table 4.4: Data analysis models for the extraversion priming data

Model	Outlier Treatment	Scoring Method
1	Errors only: Exclude error trials without further treatment of response latency data	Priming index (Koppehele et al., 2020)
2	300-1000ms: Exclude error trials and reaction times lower than 300ms and higher than 1000ms	D-Scoring (Greenwald et al., 2003)
3	300-3000ms: Exclude error trials and reaction times lower than 300ms and higher than 3000ms	D-Scoring (Greenwald et al., 2003)

For Model 1, mean reaction times were calculated per participant for *me-extraversion* (all *extraversion* + *me* and *introversion* + *not me* trials) and *me-introversion* trials (all *introversion* + *me* and *extraversion* + *not me* trials). The *me-extraversion* mean was then subtracted from the *me-introversion* mean to generate the priming index score. For Models 2 and 3, D-score calculations required the difference between these groups of trials to be divided by the pooled standard deviation (Greenwald et al., 2003). Across all models, these processes generated scores above zero for a higher association between extraversion and the self and below zero for a greater association between introversion and the self.

For each of the three analytical models, the reliability and internal consistency of the EPT was calculated using split-half correlations with Spearman-Brown corrections. If responses were missing on questionnaires, items were prorated using the remainder of the data if 75% or more responses were given. Correlational analysis was planned to explore associations between the priming tasks and the direct personality measures (EPQ-R and personality thermometers). All tests of association were one-tailed, as hypotheses were directional, with $p < .05$ as the significance level. The analysis was completed in SPSS, version 26.0.

Results

Data Cleansing

Of the 112 participants who took part in the study, 2 were removed for being over 55 years old, 2 had failed the EPQ-R attention check, and a further 21 made errors on 30% or more of the four types of trials (colour 250ms SOA, colour 500ms SOA, black 250ms SOA, black 500ms SOA). Thus, the final sample for analysis was $N = 87$.

Data Distribution

Key variables were screened for normality by visually examining histograms and examining descriptive statistics (Tabachnick & Fidell, 2007). Distributions were highly skewed. Therefore, non-parametric methods (Spearman's rho) were employed for hypothesis testing and correlations.

Explicit Extraversion

Descriptive statistics for the EPQ-R extraversion scale and each personality thermometer are given in Table 4.5. The internal consistency for the EPQ-R was high (α = .89, 95% CI [.85 - .92]). EPQ-R extraversion was positively correlated with the extraversion thermometer ratings (r_s = .78, p < .001, one-tailed) and negatively with the introversion thermometer ratings (r_s = -.76, p < .001, one-tailed), both with large effect sizes. These thermometers were significantly and negatively correlated with each other, again with large effect size (r_s = -.81, p < .001, one-tailed).

Table 4.5: Range, mean and standard deviation of self-report EPQ-R extraversion score and personality thermometer ratings

Trait (Range)	**Reported range**	**Mean (SD)**
EPQ-R Extraversion (0-12)	0-12	5.93 (3.95)
Extraversion (0-100)	5-100	44.95 (23.57)
Chatty (0-10)	1-10	5.76 (2.41)
Lively (0-10)	0-9	4.90 (2.29)
Social (0-10)	0-10	5.77 (2.40)
Extraverted (0-10)	0-10	4.70 (2.54)
Happy-go-lucky (0-10)	0-10	4.56 (2.71)
Hasty (0-10)	0-10	3.71 (2.27)
Introversion (0-100)	0-100	61.39 (24.47)

Trait (Range)	Reported range	Mean (SD)
Quiet (0-10)	0-10	4.31 (2.59)
Reserved (0-10)	0-10	5.41 (2.81)
Inhibited (0-10)	0-10	5.25 (2.84)
Introverted (0-10)	0-10	5.24 (2.75)
Serious (0-10)	0-10	6.39 (2.06)
Cautious (0-10)	1.-10	6.39 (2.14)

EPQ-R = Eysenck Personality Questionniare-Revised Short Form

Implicit Extraversion

Model 1, Errors Only, Priming Index. Following the removal of all error trials, the mean reaction times for the me-extraversion trials were subtracted from the me-introversion trials to generate priming indices, in line with Koppehele-Gossel et al. (2020) 'errors only' model. Data for each of the four conditions in this model are given in Table 4.6. There was no evidence of internal consistency for the EPT in any of the four conditions.

Table 4.6: Range, mean and standard deviation of priming indices and internal consistency (split-half correlations with Spearman-Brown correction) for each experimental condition in Model 1

	Same colour stimuli		**Different colour stimuli**	
	250ms SOA	**500ms SOA**	**250ms SOA**	**500ms SOA**
Range of Priming				
Index Scores	-567.60 – 851.66	-278.32 – 512.56	-358.02 – 315.03	-628.53 – 281.45
Mean Priming Index	3.53	- 7.48	-2.36	-28.97
(SD)	(144.25)	(100.86)	(112.07)	(134.15)
Internal consistency	.05	-.07	.14	-.23

Priming indices were correlated (Spearman's rho) with the EPQ-R extraversion scores and the extraversion and introversion thermometers (Table 4.7). However, only one of the EPT conditions

(500ms SOA, *different colour* stimuli) was associated with one of the explicit measures (extraversion thermometer) with a small effect size.

Table 4.7: Correlations (Spearman's ρ) between EPT priming indices and explicit measures of extraversion and introversion for each experimental condition in Model 1.

	Same colour stimuli		**Different colour stimuli**	
	250ms SOA	**500ms SOA**	**250ms SOA**	**500ms SOA**
EPQ-R E	.04	.01	.10	.16
Extraversion Thermometer	.02	.04	.04	**.26***
Introversion Thermometer	-.03	-.10	-.13	-.10

* correlation significant at $p < .01$ (one-tailed). EPQ-R E = Eysenck Personality Questionniare-Revised Short Form, Extraversion subscale

Model 2, 300-1000ms, D-Scoring. The second algorithm used to analyse the data used D-scoring (Greenwald et al., 2003), but with Koppehele-Gossel et al. (2020) recommended treatment of outlier data where only correct trials with response latencies between 300 and 1000ms were included. Ranges and means (*SD*) for the D-scores for each experimental condition, along with internal consistencies, are given in Table 4.8. As with Model 1, split-half correlations yielded no internal consistency for any of the four experimental conditions.

Table 4.8: Range, mean and standard deviation of priming indices and internal consistency (split-half correlations with Spearman-Brown correction) for each experimental condition in Model 2.

	Same colour stimuli		**Different colour stimuli**	
	250ms SOA	**500ms SOA**	**250ms SOA**	**500ms SOA**
D-Score Range	-0.65 – 0.71	-1.33 – 0.95	-0.85 – 0.75	-1.06 – 0.67
Mean D-Score (SD)	0.03 (0.33)	0.00 (0.35)	0.04 (0.38)	-0.05 (0.38)
Internal Consistency	-.16	.07	.12	.09

Correlations (Spearman's ρ) were performed again per Model 1 (Table 4.9). The only associations between the implicit measure (D-scores) and the explicit measures emerged in one of

the different colour stimuli conditions (250ms SOA). While this was again contrary to the hypothesis that priming effects would be enhanced in the *same colour* condition, when compared to the *different colour* condition, it was in line with the hypothesis that priming effects would be greater at 250ms SOA than 500ms SOA.

Table 4.9: Correlations (Spearman's ρ) between EPT priming indices and explicit measures of extraversion and introversion for each experimental condition in Model 2.

	Same colour stimuli		**Different colour stimuli**	
	250ms SOA	**500ms SOA**	**250ms SOA**	**500ms SOA**
EPQ-R E	-.01	-.06	**.34***	.12
Extraversion Thermometer	.02	-.09	**.24**	.11
Introversion Thermometer	.12	.02	**-.29***	-.05

Note: Bold = correlation significant at $p < .05$, * $p < .01$ (one-tailed). EPQ-R E = Eysenck Personality Questionniare-Revised Short Form, Extraversion subscale

Model 3, 300-3000ms, D-Scoring. The final algorithm used to analyse the priming data followed Greenwald et al. (2003) D-scoring method. Trials excluded from this analysis were those with reaction times of less than 300ms or over 3000ms. Any remaining incorrect trials within these bounds had a 600ms penalty applied. The mean (*SD*) and ranges for the D-scores, along with internal consistency for each of the four conditions in this model are displayed in Table 4.10. Model 3 again yielded no evidence of internal consistency for the EPT in any of the four conditions.

Table 4.10: Range, mean and standard deviation of priming indices and internal consistency (split-half correlations with Spearman-Brown correction) for each experimental condition in Model 3

	Same colour stimuli		Different colour stimuli	
	250ms SOA	**500ms SOA**	**250ms SOA**	**500ms SOA**
D-Score Range	-0.99 – 0.73	-0.78 – 0.91	-0.88 – 0.87	-1.05 – 0.74
Mean D-Score (SD)	-0.07	-0.04	-0.03	-0.04
	(0.35)	(0.32)	(0.35)	(0.35)
Internal Consistency	.00	-.36	-.21	.06

Correlations (Spearman's ρ) were repeated as per Models 1 and 2 (Table 4.11). Contrary to hypotheses, D-scores from the EPT *different colour* conditions were significantly associated with each of the explicit measures, while only D-scores from the 500ms SOA *same colour* condition were related to two of the explicit measures.

Table 4.11: Correlations (Spearman's ρ) between EPT priming indices and explicit measures of extraversion and introversion for each experimental condition in Model 3.

	Same colour stimuli		Different colour stimuli	
	250ms SOA	**500ms SOA**	**250ms SOA**	**500ms SOA**
EPQ-R E	.03	**.19**	**.23**	**.25***
Extraversion	.10	.17	**.27***	**.32***
Thermometer				
Introversion	-.04	**-.20**	**-.32***	**-.20**
Thermometer				

Note: Bold = correlation significant at $p < .05$, * $p < .01$ (one-tailed). EPQ-R E = Eysenck Personality Questionniare-Revised Short Form, Extraversion subscale.

Discussion

The pilot study aimed to create an idiographic priming task based on the EPT to index self-concept extraversion; this was a precursor to exploring whether the task might be suitable as an indirect measure for triarchic psychopathy. Trials used two different timeframes between the presentation of the prime and the target (either 250 or 500ms SOA) to explore conditions that may maximise the priming effect. Additionally, the prime and target stimuli were presented in the same

colour font (black) or different colour fonts (blue/green) to explore whether either presentation enhanced or reduced the priming effect. Lastly, the data from the priming task was analysed using three different algorithms to ascertain if any maximised the internal consistency of the task, a well-established issue with priming tasks of this nature (Asendorpf et al., 2002; Koppehele-Gossel et al., 2020).

Stimulus Colour Consistency

While there was little evidence of priming in Model 1, in both D-scored models (Models 2 and 3), priming consistently emerged in the *different colour* conditions, yet was also evident in Model 3 for the 500ms SOA trials when stimuli were presented in the same colour (black). These findings were against hypotheses which predicted that priming would be enhanced in trials where the prime and target were presented in the same colour.

This is a surprising outcome, given that perception research has illustrated that participants can selectively attend to stimuli of a particular colour (Brawn & Snowden, 1999). Theoretically, in the *different colour* condition trials, it should have been possible for participants to selectively attend only to the targets and not attend to, and therefore process, the different colour primes. However, this is not what the data from the study suggests. It seems that despite giving the participants directions to ignore the blue personality words, they were attended to and processed regardless. Furthermore, the different colour words may have made the task easier, providing colour cues to the participants indicating which stimuli required a response in line with IAT protocol recommendations from Greenwald et al. (2021). In the *same colour* trials, such colour cues were lacking, which may have made it more challenging for participants to quickly identify which words required a categorisation response. An attempt to relate these findings to those of previous studies has yet to identify studies reporting a comparison of this kind.

Stimulus Onset Asynchrony

Prior research finds that priming is facilitated below 300ms SOA and diminishes after that (Hermans et al., 2003; Moors et al., 2010). Thus, it was hypothesised that priming would be more effective with a 250ms SOA when compared to a 500ms SOA. The data partially supported this prediction. In Model 2, which applied the Greenwald et al. (2003) scoring method with the Koppehele-Gossel et al. (2020) exclusion criteria, the EPT D-scores correlated with the explicit measures only in the *different colour* 250ms SOA condition. However, in Model 3, which used the Greenwald et al. (2003) algorithm, penalties, and exclusion criteria, the EPT D-scores for both the 250ms and 500ms SOAs in the *different colour* condition were significantly correlated with ratings on the explicit measures. From these findings, priming may work equally well at both SOAs but be masked depending on the analytical approach applied to scoring the EPT data.

Internal Consistency

Across all three analytical models, the EPTs demonstrated poor internal consistency. None of the conditions in any of the models reached even a moderate level of consistency of .40 or greater, as defined by Koppehele-Gossel et al. (2020). In many conditions, there were negative correlations between D-scores and mean reaction times on odd and even trials. By comparison, split-half correlations in IAT studies typically fall between .70 and .90 (Nosek et al., 2007). Thus, while the data from this pilot study support the potential utility of an idiographic personality EPT where primes and targets are presented in two different colours, such a lack of consistency continues to be problematic. Despite the lack of consistency, significant associations emerged between the explicit measures and the priming task, which raises the question of the importance of internal consistency. Koppehele-Gossel et al. (2020) note that poor internal consistency does not render the EPT inadequate for experimental research. However, it does become problematic when wishing to make predictions of behaviours from EPT scores. Underpinning such predictions is an assumption that between-participant differences in EPT scores reflect systematic differences rather than measurement errors associated with poor internal consistency (Koppehele-Gossel et al., 2020). If

priming is working at the exemplar level, it is possible that some exemplars from a category such as extraversion might represent the self-concept (e.g., being talkative) while others might not (e.g., being social). Personality constructs, such as extraversion are heterogeneous, and if there is partial identification with certain exemplars and not others which differs from person to person, that may be a contributory factor to the poor internal consistency which emerged in this study. To explore this account further, granular analysis might be feasible to undertake where self-report responses at the item level are compared to comparable exemplar responses on the priming task.

Conclusion and Next Steps

This pilot study demonstrated that priming may be a useful indirect method to index personality trait self-concepts. In two of the three analytical models, significant priming effects emerged at 250ms SOA. Furthermore, the study yielded a novel finding; priming effects appear superior when the prime and target are displayed in different colour fonts. However, the lack of consistency across experimental conditions and analytical models, common to EPT studies, was a major limitation of the pilot study. Furthermore, once data had been cleansed, the sample size fell beneath the level required for power. Nonetheless, as the task demonstrated potential utility as an alternative indirect measure to the IAT, the next section of this chapter describes a pilot study where the personality self-concept priming task was subsequently adapted to attempt to index the triarchic psychopathic self-concept.

Integrating the findings from Study 1, an SOA of 250ms was chosen for the psychopathic self-concept priming task, and primes and exemplars were presented in different colours. Model 2 (300-1000ms, D-Scoring) was retained as the scoring algorithm for Study 2.

Study 2: Adapting the Extraversion Priming Task to Triarchic Psychopathy

This study aimed to create a priming task to index the psychopathic self-concept, integrating all three domains of triarchic psychopathy: Boldness, Meanness and Disinhibition (Patrick, 2010; Patrick et al., 2009).

Preparatory Work

Stimuli

To adapt the pilot priming task to index triarchic psychopathy (Patrick et al., 2009), the extraversion-introversion prime exemplars were replaced with the personality trait words selected for the IAT (see Chapter 3).

Measures of Explicit Psychopathy and External Validity

Two explicit measures of psychopathy were administered: the Triarchic Psychopathy Measure (TriPM; Patrick, 2010) and the psychopathic personality trait thermometers described in Chapter 3. To examine the external validity of the priming task, the Reactive-Proactive Aggression Questionnaire (RPQ; Raine et al., 2006) was administered to test the predictive validity of the priming task. As discussed in Chapter 3, associations between reactive and proactive aggression and triarchic disinhibition and meanness often emerge (Donnellan & Burt, 2016; Pink et al., 2022).

The Balanced Inventory of Desirable Responding Short Form (BIDR-16; Hart et al., 2015) was used to index socially desirable responding. This is a short-form version of the 40-item Balanced Inventory of Desirable Responding (Paulhus, 1998) which indexes both impression management and self-deception. Impression management is of primary concern with self-report measures, of particular relevance in psychopathy given that pathological lying is one of its features. However, as evidence suggests that socially desirable responding is unidimensional (Hart et al., 2015), this tool may be preferable to the Social Desirability Scale (SDS-17; Stöber, 2001) used alongside the IAT in Chapter 3 as the effect of impression management alone in particular can be explored.

Hypotheses

It was predicted that the priming D-scores for each triarchic domain would be associated with their respective TriPM domain score. Secondly, it was hypothesised that there would be a positive association between priming D-scores and their respective psychopathic trait thermometer and a corresponding negative association with their respective non-psychopathic trait thermometer. Thirdly, it was predicted that meanness and disinhibition priming D-scores would both be positively associated with reactive and proactive aggression scores. Lastly, it was predicted that there would be an association between the explicit measures and BIDR-16 impression management scores due to links between psychopathy and pathological lying, but not between the priming scores and BIDR-16 impression management scores.

Method

Experimental Design

Study 2 was a within-participants design, with every participant completing 72 trials each for primes associated with Tri-PM Boldness, Meanness and Disinhibition.

Participants

Power Analysis. The sample size of N = 150 was calculated using an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%). This was a more conservative effect size than that used by Koppehele-Gossel et al. (2020) and in Study 1. However, it is in line with typical implicit-explicit correlations in personality research (De Cuyper et al., 2017) and is consistent with the effect size used in Chapter 3. To account for missing data and excessive response errors, the sample size was increased by 10%, giving a final target of 165 participants.

Participant Sample. Through social media and psychology participant pool recruitment, 166 participants were recruited (135 females, 28 males, 3 other gender). Their ages ranged between 18 and 71 (M = 28.35, SD = 12.42). Following removals (detailed in the Results section), the final sample

(*N* = 143) had a mean age of 27.64 (SD 11.66) and comprised 23 men, 117 women and 3 participants who reported other gender. Of the final sample, 87.4% were of white ethnicity, 1.4% were of mixed ethnicity, 6.3% were Asian or Asian-British, and 2.1% were Black or Black British. 15.4% of the sample had postgraduate qualifications, 23.8% had undergraduate qualifications, and the majority (57.3%) had A-Levels or HNC/HND qualifications.

As with the Extraversion EPT study, participants who indicated they were not fluent English speakers were excluded from the study. Ethical approval for this study was included within the same application as that of the Extraversion EPT study (2021-5153-4277, Appendix B). Community participants were given the opportunity to win one of four £25 shopping vouchers, while Swansea University psychology students were granted two credits for their time.

Materials

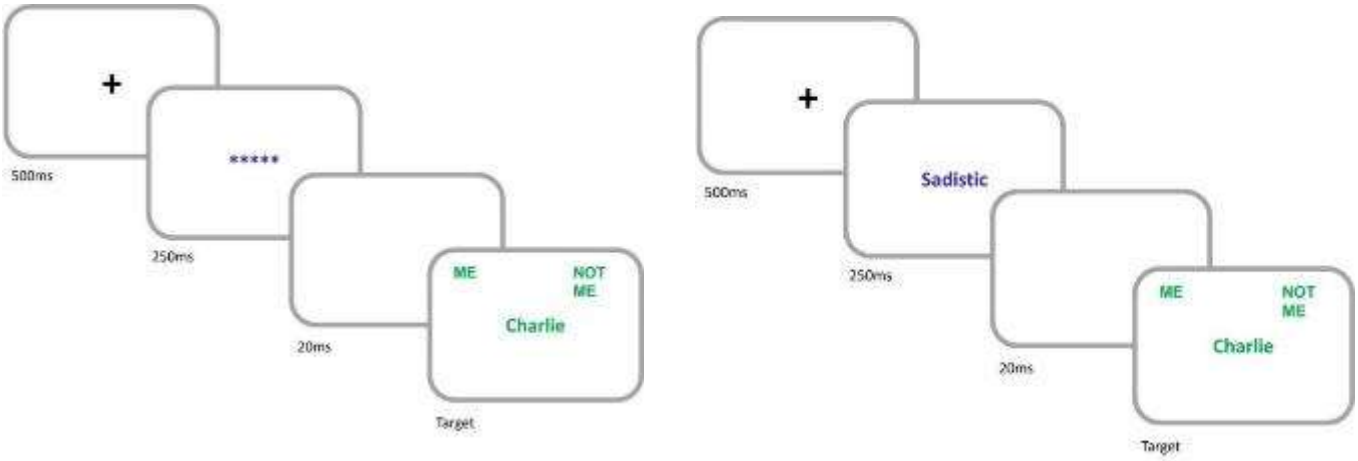
Priming Task. One priming task was designed to index implicit associations between the self and the three triarchic domains of psychopathy (Boldness, Meanness and Disinhibition). Participants were asked to sort words related to themselves or others into categories of *me* or *not me*, using the *A* and *L* keyboard keys, respectively. The primes representing both psychopathic and non-psychopathic traits/behaviours for each domain were the same as those used in the psychopathy IATs. Similarly, the concepts of *me* and *not me* were represented by the same word stimuli as in the psychopathy IATs (Chapter 3).

There were 432 combinations of possible prime targets, 144 for each psychopathy domain. These were generated by combining each of the 12 primes (6 psychopathy primes, 6, non-psychopathy primes) with each of the 12 targets (6 *me* and 6 *not me*). However, as this was a within-subjects design, the number of trials administered to the participants was halved from 432 to 216 to minimise fatigue. Additionally, the 216 trials were split across two blocks (A and B) to allow for a break in between and facilitate test-retest analysis.

To generate an equal number of trials per block (108 for A, 108 for B) for each of the three Tri-PM domains with equal quantities of prime-target combinations of *psychopathy-me, psychopathy-not me, not psychopathy- me,* and *not psychopathy-not me*, the stimuli were subset and selected using randomisation as follows. For each psychopathy domain, all primes were combined with half of the *me* and half of the *not me* targets in block A and the other half of the targets in block B. The six targets were split between the blocks, so two targets considered most idiographic, and hence more potent in implicit research, appeared in each block (see Bluemke & Friese, 2012). Block A featured the highly idiographic *first name* and *place of birth*, along with *star sign*. Block B featured the highly idiographic *birth date* and *nationality*, along with *occupation*. By pairing all 12 primes (6 *psychopathy* and 6 *n*on-*psychopathy*) with the 6 targets (3 *me* and 3 *not-me*) 72 possible trials were generated, per psychopathy domain, for each of the two blocks. To select the final 108 trials per block, scripting was used in the experimental software to randomly select 36 trials of these 72 trials per domain, ensuring that 25% (9 trials) were presented which combined *psychopathy* and *me, not psychopathy* and *me, psychopathy* and *not me* and *not psychopathy* and *not me.*

As in Study 1, the familiarisation block was included in the task. All 12 *me* and *not me* exemplars were presented in random order in this block. Each was preceded by a row of stars (*****) as a filler for the psychopathy primes appearing in the trial block. Feedback was given on each familiarisation trial, and participants could only proceed once they had given the correct *me* or *not me* response. Before each trial, a fixation cross was displayed for 500ms, then the prime filler for 250ms, a blank screen for 20ms and then the target, which required either an A-key or L-key response. For the second and third blocks, the row of stars was replaced with either a psychopathy or non-psychopathy prime word. Figure 4.3 illustrates the trials.

Figure 4.3: Screen displays for familiarisation (left) and main trials (right) for the priming task



Triarchic Psychopathy Measure. Explicit psychopathy was indexed using the 58-item Triarchic Psychopathy Measure (TriPM; Patrick, 2010).

Personality Thermometers. The same personality thermometers from the psychopathy IAT study were used here. All participants completed six thermometers. To capture boldness, participants were asked to indicate how *bold* they were on a scale of 0 – 100 and on a second thermometer, how *wary* they were. Similarly, to capture meanness, participants were asked to indicate how *cruel* they were using the same thermometer scale and also how *kind* they were. The last two thermometers represented disinhibition, with participants completing identical thermometers for the attributes of *reckless* and *sensible*. Participants were given descriptions for each of the six traits, based upon items from the TriPM (Table 3.5, Chapter 3).

Reactive Proactive Aggression Questionnaire. The 23-item Reactive Proactive Aggression Questionnaire (RPQ; Raine et al., 2006) was administered to measure levels of reactive (11 items) and proactive aggression (12 items). Using a Likert scale (0 = *never*, 1 = *sometimes*, 2 = *often*), participants report the frequency they engage in particular aggressive behaviours.

Balanced Inventory of Desirable Responding Short Form. The 16-item Balanced Inventory of Desirable Responding Short Form (BIDR-16; Hart et al., 2015) was administered to index impression management and self-deception. Participants respond to each statement indicating on an 8-point Likert scale (1 = *totally disagree*, to 8 = *totally agree*) the extent to which they agree. For example, "I don't gossip about other people's business". Both subscales, each of 8 questions, include reversed items.

Procedure

Participants completed the study online using Gorilla Experiment Builder (Anwyl-Irvine et al., 2019). It was accessed through a web link advertised via social media and Swansea University's participant pool. Participants gave informed consent and provided their age, gender, highest educational achievement, and ethnicity and indicated if they were fluent in English. Personal information for use in the priming study was gathered (first name, date of birth, place of birth, occupation, star sign and nationality), and participants completed the two-block priming task. They then completed the Tri-PM, personality thermometers, RPQ, BIDR-16, another measure not reported here, and were debriefed.

Analysis

Scoring Method. The D-scoring method defined by Greenwald et al. (2003) was applied to the data. This generated scores above zero for a higher association between the psychopathic trait and the self and below zero for a greater association between the non-psychopathic trait and the self.

The internal consistency of the priming task was calculated using split-half correlations with Spearman-Brown corrections. If responses were missing on questionnaires, items were prorated using the remainder of the data if 75% or more responses were given. Correlational analysis was planned to explore associations between the direct personality measures and aggression measure,

and the priming tasks. All tests of association were one-tailed, as hypotheses were directional, with $p < .05$ as the significance level. The analysis was completed in SPSS, version 26.0.

Results

Data cleansing

After removing those who were aged over 55, in line with Study 1, participants who failed any of the attention checks included in each questionnaire or any who achieved less than 70% accuracy on any of the three IATs, 149 of the original 166 participants remained. Visual inspection of mean reaction times highlighted a further 6 participants with a mean RT of +1000ms for one or more of the priming tasks. These were removed to give a final sample of 143.

Data Distribution

As with Study 1, distributions were found to be highly skewed following the examination of histograms and examination of descriptive statistics (Tabachnick & Fidell, 2007). Therefore, non-parametric methods were used for hypothesis testing and tests of association.

Explicit Measures

Descriptive statistics for each of the explicit measures are shown in Table 4.12.

Table 4.12: Range, mean, standard deviation and internal consistency of direct measures of psychopathy, impulsivity, aggression, self-deception and impression management.

Measure	Reported Range	Mean (SD)	Internal Consistency (α) and 95% CI
TriPM Boldness	3 – 49	27.40 (8.62)	.84 [.80 - .88]
TriPM Meanness	1 – 36	11.12 (7.26)	.86 [.82 - .89]
TriPM Disinhibition	3 – 37	14.23 (7.02)	.81 [.76 - .85]
Bold Personality Thermometer	0 – 100	56.80 (24.37)	
Wary Personality Thermometer	0 – 100	54.36 (27.05)	
Cruel Personality Thermometer	0 – 79	10.07 (15.05)	
Kind Personality Thermometer	0 – 100	79.92 (15.50)	

Measure	Reported Range	Mean (SD)	Internal Consistency (α) and 95% CI
Reckless Personality Thermometer	0 – 95	23.69 (22.98)	
Sensible Personality Thermometer	0 – 100	71.10 (21.49)	
BIDR-16 Self Deception	13 – 54	31.53 (8.85)	.71 [.64 - .78]
BIDR-16 Impression Management	6 – 58	34.13 (9.61)	.71 [.63 - .77]
RPQ Reactive Aggression	0 – 19	7.54 (3.84)	.82 [.77 - .86]
RPQ Proactive Aggression	0 – 9	1.17 (1.71)	.68 [.59 - .75]

TriPM = Triarchic Psychopathy Measure, BIDR-16 = Balanced Inventory of Desirable Responding Short Form, RPQ = Reactive Proactive Aggression Questionnaire.

Tri-PM domain scores showed associations consistent with those published in other studies (e.g. Burley et al., 2017; Collison et al., 2021); Meanness was positively related to Boldness and Disinhibition, while Boldness and Disinhibition were not associated (Table 4.13). Generally, scores on each of the psychopathic personality trait thermometers were moderately associated with their TriPM counterpart and negative associations emerged between the non-psychopathic trait thermometer and their respective TriPM scale. While the typical associations that emerge between TriPM domains were evident between Meanness and Disinhibition TriPM scales and thermometers, there was less evidence for corresponding associations between Boldness and Meanness scales and thermometers.

Table 4.13: Correlations (Spearman's rho) and partial correlations after controlling for BIDR-16 Impression Management, between implicit and explicit measures of psychopathy

		TriPM			**Personality Thermometers**					
		Boldness	**Meanness**	**Disinhibition**	**Bold**	**Wary**	**Cruel**	**Kind**	**Reckless**	**Sensible**
Priming	Boldness	.03 / .03	.03 / .11	.03 / .12	**.21 / .22***	.11 / .11	-.04 / .04	.06 / .06	-.04 / .01	.08 / .04
	Meanness	**.19 / .19**	**.28* / .28***	-.01 / -.04	.09 / .09	-.02 / -.02	.16 / .15	-.07 / -.06	**.21 / .20**	-.07 / -.06
	Disinhibition	-.07 / -.07	.11 / .11	-.01 / -.02	.00 / .00	-.03 / -.03	.12 / .13	.03 / .03	.03 / .02	-.04 / -.04
TriPM	Boldness		**.37* / .41***	-.07 / -.09	**.64* / .64***	**-.55* / -.55***	.02 / .02	-.10 / -.10	**.18 / .19**	-.11 / .-12
	Meanness			**.43* / .28***	**.19* / .20***	-.01 / -.01	**.53* / .40***	**-.28* / -.21***	**.39* / .29***	**-.35* / -.24***
	Disinhibition				.00 / -.01	**.19 / .23***	**.36* / .17**	-.03 / .10	**.38* / .27***	-.32* / -.20

Note: bold indicates $p < .05$; *$p < .01$. TriPM = Triarchic Psychopathy Measure

Implicit Psychopathy

Table 4.14 shows the overall percentage of excluded trials and the minimum and maximum number of trials excluded at the participant level for each of the three psychopathy domains. These align with figures reported in Koppehele-Gossel et al.'s (2020) Study 1.

Table 4.14: Percentage of excluded trials and minimum/maximum number of trials excluded per psychopathy domain priming task

Domain	% Excluded trials	Minimum excluded trials	Maximum excluded trials
Boldness	9.63	0	31
Meanness	9.02	0	27
Disinhibition	8.55	0	29

The mean and standard deviations of the D-scores for each psychopathy domain priming task were calculated (Table 4.15). The meanness and disinhibition priming tasks yielded negative D-scores, suggesting the sample more greatly associated themselves with the non-psychopathic equivalents of these domains. However, the boldness priming task yielded a positive D-score, suggesting the sample more greatly associated themselves with being bold rather than wary.

Table 4.15: Mean (and standard deviation) per psychopathy domain priming task

Domain	D-Score M (SD)
Boldness	.03 (.24)
Meanness	-.08 (.24)
Disinhibition	-.03 (.24)

The internal reliability for each priming task by triarchic domain, is shown in Table 4.16. No evidence of internal reliability emerged for any of the three tasks.

Table 4.16: Reliability of each priming task (split-half Spearman's rho correlations with Spearman-Brown correction)

Domain	D-Score
Boldness	-.24
Meanness	-.11
Disinhibition	-.06

Implicit Boldness. The bold priming D-score was correlated (Spearman's ρ) with the explicit measures of triarchic Boldness (Table 4.13). No associations emerged between TriPM Boldness or the wary personality thermometer and the priming task. However, the bold personality thermometer was positively associated with the priming task.

The bold priming D-score was also correlated (Spearman's ρ) with the proactive and reactive aggression scale scores from the RPQ (Table 4.17). No associations were expected between proactive or reactive aggression and the bold priming task; none emerged from the analysis. The lack of association was mirrored with the explicit measures: proactive aggression was not associated with TriPM Boldness. Similarly, reactive aggression was not associated with TriPM Boldness.

Table 4.17: Correlations (Spearman's rho) and partial correlations after controlling for BIDR-16 Impression Management, between implicit and explicit measures of psychopathy and external correlates of psychopathy

		RPQ		**BIDR-16**	
		Proactive	**Reactive**	**Impression Management**	**Self Deception**
Priming	**Boldness**	-.04 / .04	-.05 / .03	**.15**	.07
	Meanness	.06 / .03	.03 / .00	-.06	.01
	Disinhibition	-.01 / -.02	.03 / .02	-.02	-.01
TriPM	**Boldness**	.04 / .04	.04 / .04	.00	**.47***
	Meanness	**.36*** / .16	**.38*** / **.21**	**-.45***	**-.14**
	Disinhibition	**.42*** / **.22***	**.43*** / **.26***	**-.49***	**-.53***

Figures in bold $p < .05$; *$p < .01$. TriPM = Triarchic Psychopathy Measure, RPQ = Reactive Proactive Aggression Questionnaire, BIDR-16 = Balanced Inventory of Desirable Responding Short-Form

Implicit Meanness. Again, the explicit measures of triarchic Meanness were correlated (Spearman's ρ) with the priming task D-score (Table 4.13). TriPM Meanness was positively associated with priming D-scores. No associations emerged between the cruel and kind personality thermometers and the priming task. To test whether meanness priming scores were positively associated with proactive and reactive aggression as predicted, the meanness D-score was correlated (Spearman's ρ) with both RPQ scale scores (Table 4.17). Against hypotheses, no associations emerged between either forms of aggression and the mean priming task. However, TriPM Meanness was associated with reactive and proactive aggression.

Implicit Disinhibition. Correlations (Spearman's ρ) were performed between the explicit measures of Disinhibition and the disinhibition D-score (Table 4.13). No associations emerged between the priming D-scores and any of the explicit measures of Disinhibition.

To test whether disinhibition priming scores were positively associated with both RPQ scales of proactive and reactive aggression, the D-scores were correlated (Spearman's ρ) with the RPQ scale scores (Table 4.17). No associations emerged between either form of aggression and the disinhibition priming task. However, TriPM Disinhibition was associated with reactive and proactive aggression.

Social Desirability

As discussed in previous chapters, indirect measures are thought to be more impervious than direct measures to impression management. Across the three psychopathy domains in the priming task, no association emerged between impression management scores on the BIDR-16 and the meanness or disinhibition priming scores. However, boldness priming scores were positively associated with impression management. Both TriPM Meanness and Disinhibition were negatively associated with impression management scores; greater impression management was related to lower endorsement of meanness and disinhibition TriPM items.

To explore if impression management might influence the association between priming scores and explicit measures of psychopathy and external correlates of psychopathy, partial correlations were completed after controlling for impression management (Tables 4.13 and 4.17). Generally, no large changes emerged for the priming tasks, offering some support that priming as an indirect measure is relatively robust to impression management.

Discussion

Study 2 aimed to create a priming task to index the psychopathic self-concept, integrating the three domains of triarchic psychopathy: Boldness, Meanness and Disinhibition (Patrick, 2010; Patrick et al., 2009). Integrating the findings from Study 1, this study used an SOA of 250ms and the prime and target stimuli were presented in different colour fonts (blue/green). The data were analysed using the most promising algorithm from Study 1: D-scoring with bounds of 300-1000ms. The predictive utility of the task was assessed using direct measures of aggression, known external correlates of psychopathic traits.

Internal Consistency

As in Study 1, each set of priming data demonstrated poor internal consistency, with none of the triarchic domains reaching moderate levels of .40 (Koppehele-Gossel et al., 2020) and each yielding a negative correlation between odd and even trials. Thus, the problematic consistency well established in priming was evident in each of the three triarchic domain priming tasks reported here. It is possible that there was an issue with the task, although it followed standard procedure in EPT type tasks and used stimuli which yielded promising results within an IAT. Therefore, perhaps, as with the analysis by Koppehele-Gossel et al. (2020), low internal consistency across all algorithms reflects an issue with priming in general rather than one which is related to selecting suboptimal outlier treatments. Or alternatively, as discussed in relation to Study 1's findings, this task may be operating at the exemplar rather than category level. Thus, within-category variability of personality

categories/traits might contribute to the consistency issue evident here. If this is the case, priming may not be suitable as a tool to measure heterogeneous personality constructs.

Priming Effects

For the meanness priming data, significant priming effects emerged; TriPM Meanness was positively and significantly associated with the meanness D-score. A less consistent pattern emerged for the boldness priming data. TriPM Boldness was not related to the priming D-score, but the bold personality thermometer was associated with it. The disinhibition priming task had no associations with either TriPM Disinhibition or its related personality thermometers. Thus, while the meanness priming task, and the boldness one to a lesser degree, showed some promise, overall scores on the priming tasks were largely unrelated to their equivalent explicit measures. It is possible that this lack of association between implicit and explicit measures has originated from the exemplars selected to use within Study 2. However, this seems unlikely, given that this study used identical stimuli to those within the IATs, which yielded promising results, and which were carefully selected to ensure conceptual correspondence, and hence, structural fit. Alternatively, perhaps the lack of any associations between the explicit measures of Disinhibition and scores on the disinhibition priming task may relate to the nature of this psychopathic domain. By definition, Disinhibition is behavioural, rather than cognitive. It can occur spontaneously and without intention. Thus, participants may find it challenging to rate themselves on this concept, which might then lead to less association between the implicit and explicit measures of Disinhibition.

Predictive Utility

The predicted associations between the priming tasks and explicit measures of external correlates of psychopathy were largely unsupported. While there was no association between the reactive and proactive scales of the RPQ and the boldness priming task, no relationships emerged between the RPQ scales and either the meanness or disinhibition priming tasks which was against hypotheses. Conversely, both reactive and proactive aggression were positively associated with the

Meanness and Disinhibition TriPM scales, mirroring relationships found in other research using explicit measures (Donnellan & Burt, 2016; Pink et al., 2022). As the priming tasks failed to offer any predictive utility, an important aspect of any personality measure (Perugini et al., 2010), this is a further issue with the study which renders the priming tasks problematic to explore further.

Limitations and Next Steps

While the meanness priming task was associated with TriPM Meanness, both the boldness and disinhibition tasks failed to show such a relationship with their direct triarchic counterpart scales. Moreover, while there were some promising results in Study 1, there was no evidence for internal consistency in either of the studies reported here and little predictive validity was evident for each of the psychopathy priming tasks. One further limitation which should also be noted, is that the sample for the psychopathy tasks was predominantly female; while this is unlikely to have impacted any associations between implicit and explicit psychopathy, greater gender parity in the sample should be achieved in future work.

In summary, until a resolution can be found for the issue of internal consistency, a priming task to index the personality self-concept cannot be developed to measure traits such as psychopathy reliably. As such, the indirect tasks to index the psychopathic self-concept, which will be carried forward for the remainder of the thesis, are the IATs developed in Chapter 3.

Chapter 5: The Affect Misattribution Procedure

This chapter describes the development and testing of two Affect Misattribution Procedure tasks (AMP; Payne et al., 2005) as potential implicit measures of affective processing associated with psychopathy. First, it briefly revisits dual-process models of cognition and considers the potential of implicit and explicit measures to predict different forms of behaviour. Then, it outlines the AMP as an implicit measure of behaviour (affective response), considering its use thus far and its perceived strengths and criticisms. The chapter next describes two versions of the AMP which may be suitable to index affective deficits thought to underpin psychopathy: threat and distress AMPs. It describes the development and testing of these two versions of the AMP. The chapter then reports the main study, where a threat AMP and distress AMP were administered alongside the boldness- and meanness-IATs (Chapter 3) respectively. Lastly, it considers the results from the main study and sets out the next chapter in the thesis.

Predicting behaviour

Many dual-process models of cognition (discussed in Chapter 2) propose a deliberate and controlled explicit system alongside an automatic and spontaneous implicit system (e.g., Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004). The explicit system features in intentional responses given in self-report methods and the implicit system contributes to impulsive and uncontrolled actions (Richetin & Richardson, 2008). Thus, responses to direct measures are thought to be driven by reasoning, while indirect measures invoke more automatic activations (Schnabel & Asendorpf, 2010).

This distinction between implicit and explicit cognitive systems might account for the differential predictive utility that emerged in Chapter 3 between the Implicit Association Tests (IAT; Greenwald et al., 1998) and the explicit measure of psychopathy (TriPM; Patrick, 2010). The TriPM was associated, as hypothesised, with self-reports of behavioural correlates of psychopathy. Contrastingly, the IATs were much less predictive of self-reported psychopathic behaviours; some, but

not all, hypothesised associations emerged, and where they did emerge, effect sizes were generally small.

Given the theorised distinction between implicit and explicit systems, and the role of the implicit system in impulsive and uncontrolled behaviours, using experimental tasks that capture more spontaneous behaviours associated with psychopathic traits might be a more suitable way to test the predictive validity of the IATs. Therefore, to test the utility of the IATs developed in Chapter 3, we developed an implicit measure of affective processing and a corresponding explicit measure of affective processing.

The Affect Misattribution Procedure

One measure thought to index implicit affective processing, is the Affect Misattribution Procedure. The Affect Misattribution Procedure (AMP; Payne et al., 2005) is an adaptation of sequential priming. The AMP combines priming with the interpretation of ambiguous stimuli, typically Chinese ideographs (Gawronski & Ye, 2014; Payne et al., 2005). In a typical AMP, participants are primed with either a negatively- or positively-valenced image followed by a Chinese pictograph. Participants are asked to indicate whether they feel the Chinese ideograph is more or less pleasant than the average one. Despite participants being asked to avoid being influenced by the primes, the evaluative judgments of the ambiguous stimuli typically correspond with the valence of the prime; hence, participants appear to misattribute the affect they experienced in response to the prime to the Chinese pictograph (Gawronski & Ye, 2014). Payne et al. (2005, p. 278) suggest that the AMP 'measures influences of attitudes on behaviour that persist *in opposition* to participants' intentions'. It is theorised that participants cannot detach their affective reaction to the prime from that of the target (Hazlett & Berinsky, 2018), thus, misattributing the affect arising from the prime onto the ambiguous stimuli.

The AMP has proven popular across psychological domains (Hughes et al., 2022). Within social psychology, it is typically used to index attitudes, including politics (Payne et al., 2005), racial

and gender attitudes (Stepanova et al., 2021; Vuletich et al., 2020), homonegativity (Kiebel et al., 2017) and transgender prejudice (Kanamori et al., 2020). It has also been used in clinical psychology to explore suicide (Jaroszewski et al., 2022; Wells et al., 2020), depression (Görgen et al., 2015), self-esteem (Schreiber et al., 2012), and sexual motives (Hill, 2016), and it has been used as an indirect measure of sexuality (Imhoff et al., 2011). While most studies appear to employ the AMP with adults, it has been used with children (e.g., Williams et al., 2016) and adolescents (e.g., Schreiber et al., 2012). Many AMP studies have used images as primes, in line with the original AMP (Payne et al., 2005). However, others have used words (e.g., Schreiber et al., 2012). Studies have also replaced the Chinese ideograph targets with alternative ambiguous stimuli, including abstract paintings (Flexas et al., 2013) and Tibetan characters (Mori & Mori, 2013). Furthermore, while typically categorical responses are given, Likert scales have also been used (see Payne & Lundberg, 2014), although it is unclear from the literature if either response method is more effective than the other.

The AMP appears to have several strengths but faces questions regarding its openness to intentional responding. It has been described as a "promising alternative" to the IAT as it does not require the IAT's compatible and incompatible block structure (Gawronski & Ye, 2014). Furthermore, it is flexible in its application. As with the Evaluative Priming Task (EPT; Fazio et al., 1995), almost any object can be represented as a prime (Gawronski, 2022). It also appears to have internal consistency of a similar magnitude to that seen in the IAT, in the range of 0.7-0.9 (Nosek et al., 2007). This is one of the strengths that both the IAT and AMP, but not the EPT, share (Gawronski, 2022; Nosek et al., 2007; Payne & Lundberg, 2014). Furthermore, it is considered by some to be more automatic than alternative indirect measures such as the IAT, as it is less demanding for participants to undertake (Dosch et al., 2016). However, this theorised automaticity and, hence, *implicitness* of the AMP has been called into question. For the AMP to have utility in indexing sensitive attitudes or affect, it must be resistant to intentional responding and, thus, automatic, for which the evidence is less than compelling (Hazlett & Berinsky, 2018). Teige-Mocigemba et al. (2016) demonstrated that participants could produce AMP effects in a particular direction when directed. Consistent with this, Hazlett and

Berinsky (2018) found that a subset of participants could overcome any AMP effect when financially incentivised. However, it is possible that some participants provide intentional, explicit evaluations even when not instructed or incentivised to do so. Heterogeneity in responses has naturally emerged (e.g., Bar-Anan & Nosek, 2012; Mann et al., 2019) where the frequency distribution of AMP results has been bimodal. This bimodality may reflect two subgroups of individuals: one subgroup able to control responses giving intentional, explicit evaluations and a second subgroup, unable to avoid the influence of the prime (Hazlett & Berinsky, 2018; Mann et al., 2019). Therefore, while the AMP is a popular indirect measure and demonstrates good internal consistency, there are questions about its automaticity.

Using the AMP to Index Fear and Distress

While the AMP is unlikely to be a suitable paradigm with which to index the implicit psychopathic personality, it might prove useful as an implicit measure of affect. This is highly relevant to psychopathy as affective deficits are thought by many (e.g., Cleckley, 1950; Lykken, 1957) but not all (e.g., Baskin-Sommers et al., 2011) to underpin the disorder. If affective deficits of varying degrees do indeed underlie psychopathy, the AMP has potential as an implicit measure to index diminished affect in response to various emotional stimuli. For example, in line with the low fear hypothesis of psychopathy (Lykken, 1957), those with low levels of psychopathic traits would be expected to experience a fearful affective response to fear-inducing primes, while those with high levels of psychopathic traits would experience a comparatively diminished affective response. Theoretically, in the AMP, this would manifest as those with lower levels of psychopathy rating ambiguous targets as more threatening and those with higher levels of psychopathy rating ambiguous targets as less threatening.

AMPs which index affective deficits thought to be diminished in psychopathy, such as fear and distress, might be suitable as implicit behavioural measures of affect to use alongside the IATs developed in Chapter 3. The distinction between implicit and explicit systems might suggest that

performance on such AMPs would be better predicted by the IATs developed in Chapter 3, when compared to its explicit counterpart measure of psychopathy, the TriPM (Patrick, 2010). Several studies have used the IAT and a comparable AMP and found small to moderate associations between the two measures, ranging from .22 to .39 (e.g., Bar-Anan & Nosek, 2012; Greenwald et al., 2009). Therefore, the AMP appears to have potential as a measure of implicit behaviour which is related to implicit traits or attitudes captured by an IAT.

Given this potential, this study developed AMPs to use in conjunction with the boldness-IAT and the meanness-IAT developed in Chapter 3 of this thesis. High danger tolerance, stress immunity, and reduced sensitivity to threat-signalling cues are all affective aspects of triarchic Boldness (Patrick et al., 2009). Therefore, in an AMP which uses primes which invoke a feeling of threat-to-self would theoretically generate a reduced affective response in those with higher levels of triarchic Boldness. Contrastingly, as callousness and coldheartedness are core aspects of the Meanness triarchic domain (Patrick et al., 2009), primes which would conventionally generate feelings of distress in response to the pain and suffering of others might be suitable images to use in an AMP to index distress; theoretically, those with higher levels of triarchic Meanness where there is callous ambivalence to the suffering of others would experience lower feelings of distress than typically expected in response to such primes, and thus misattribute less distress to the neutral targets. Triarchic Disinhibition is associated with impairment in emotional regulation (Patrick et al., 2009). Central to this domain of psychopathy is impulsivity and a lack of behavioural restraint. Therefore, alternative automatic and uncontrolled behavioural tasks to the AMP were explored to sit alongside the disinhibition-IAT; these are discussed in the next chapter of this thesis (Chapter 6).

An Explicit Equivalent of the AMP

A second task was developed to index explicit affective processing which was structurally similar to the AMP. Participants were asked to rate each prime images used within the AMPs for either how threatening or distressing they considered it to be. This task was intended to be an

explicit equivalent of the AMP, replicating the same task structure (Payne et al., 2008), but capturing intentional ratings of affective response to the stimuli which are subject to conscious control. This type of explicit comparison has been undertaken by other researchers (e.g., Bar-Anan & Nosek, 2012) and yielded results where the implicit and explicit equivalents correlate. For example, Payne et al., (2008) created a procedure, almost identical to their AMP where participants were shown the same prime images in the AMP and asked to rate them while avoiding any influence of the Chinese pictographs that they had used as ambiguous stimuli. They found a correlation of r = .64 between the AMP and its direct equivalent.

Pilot Study: Distress and Threat Affect Misattribution Procedures

Two AMPs were designed; one AMP used primes carefully selected to evoke feelings of threat, and the other AMP primes to elicit feelings of distress. The preparatory work undertaken for the image selection is set out in Appendix C. Within the pilot study, two versions of each AMP were created with categorical response scales and Likert response scales. While the categorical version appears more widely used (Payne & Lundberg, 2014), it is unclear if this is superior to the Likert version in generating an AMP effect. Thus, the comparative AMP effect was analysed between the two versions of each AMP.

It was hypothesised that the threat and distress primes would generate higher ratings of threat and distress, respectively, for the Chinese symbols when compared to neutral stimuli. Regarding the response method, as previous studies suggest both AMPs are suitable for use (Payne & Lundberg, 2014), no hypothesis was made as to whether either response form would generate superior AMP effects in terms of magnitude of effect size.

Method

This study was a 2 (Threat and Distress primes) x2 (Likert and Categorical response) between-participants design.

Participants

Participant Sample. A convenience sample of 185 participants was recruited from researchers' friends and family to complete the study. After exclusions of partial data sets, 166 participants remained, of which 83 were men and 83 were women. The mean age of the final sample was 27.81 (*SD* = 11.34). Most of the sample reported their ethnicity as White (68.1%) or Asian (27.1%). 51.2% of participants held an undergraduate degree, with 15.7% holding postgraduate qualifications. Swansea University College of Human and Health Sciences granted ethical approval for the study (Ref: 2022-5420-4647). A complete copy of the ethical application is included as Appendix D.

Materials

Affect Misattribution Procedure. All four AMPs (two Threat and two Distress) were structured identically. Participants completed four practice trials, which were discarded in analysis. They then completed four experimental blocks. In each block, ten threat or distress primes (depending on the AMP version), ten neutral primes and ten other prime images (not reported here) were presented in a randomised order. Each of these images was shown once per block. The blocks were presented back-to-back with no breaks between. Thus, in total, there were 120 trials per AMP. The Chinese pictograms for the AMP were sourced from an AMP study registered on the Open Science Framework (Deleuze et al., 2019). Each pictogram was unique, and they were all pre-checked for the study reported here by a first-language Chinese speaker to ensure that each represented Chinese words and that none had offensive or inappropriate meanings.

Each trial comprised a fixation cross (500ms), the IAPS prime (150ms), a blank screen (125ms), a Chinese pictogram (300ms[5]), and a final response screen. For the Likert-response versions

[5] Findings in the literature are that target duration of up to 750ms generates equivalent priming effects (Payne et al., 2005). However, to create a sufficiently fast-paced task, a presentation time of 300ms was chosen for this study.

of each AMP, the response scale was from 0 to 10 (e.g., *less threatening than average* (0) - *more threatening than average* (10)). For the categorical-response versions of each AMP, there was a choice of two response buttons *(*e.g*., threatening* and *neutral*).

The instructions given to participants were adapted from those given by Payne et al. (2005) and Imhoff et al. (2011) and are included in Appendix C.

Affect Attribution Procedure. In addition to the AMP, participants were asked to give their rating of the prime images while ignoring the Chinese symbols. A task was created to facilitate the ratings capture, with the stimuli, trial presentation and timings identical to that within the AMP; this is in line with matching the explicit test structure to that of the implicit equivalent (Payne et al., 2008). For the purpose of this thesis, this procedure has been termed the Affect Attribution Procedure (AAP). An example of the instructions given for this task within the Likert Distress condition is given in Appendix C.

Procedure

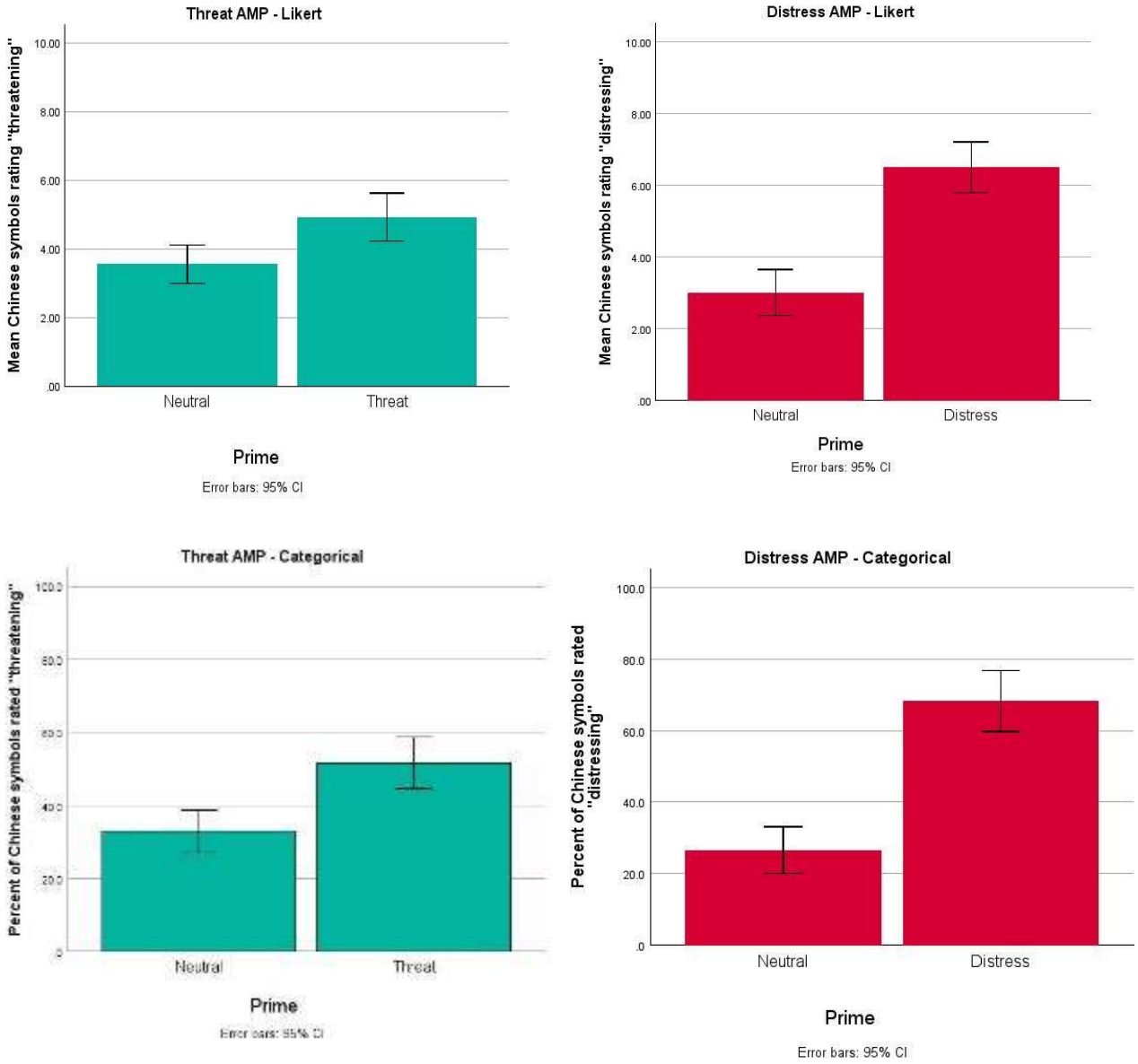
Due to the potentially distressing nature of some of the stimuli, a two-stage consent process was used. Participants were asked to consent to briefly view (1000ms) four example thumbnail images from each image category. Throughout, they were informed that they could click off the experiment at any time if they did not wish to proceed further and were given warnings before each set of images. Following the brief image viewing, they were asked to consent to the main experiment. Next, demographics of age, gender, ethnicity, and highest educational achievement were collected. Participants were then randomly allocated to one of four conditions (Threat AMP - Categorical, Threat AMP - Likert, Distress AMP – Categorical, Distress AMP - Likert). Each completed their respective AMP, AAP, and two personality questionnaires, which are not reported here, before being debriefed and thanked for their participation.

Results

Threat and Distress AMPs

Figure 5.1 illustrates the mean threat or distress ratings, respectively, of the Chinese pictographs by type of prime for Likert AMPs and the percentage of Chinese pictographs rated as threatening or distressing, respectively, for the Categorical AMPs.

Figure 5.1: Mean threat/distress ratings of Chinese pictograms, by type of prime for the Likert AMPs and percentage of Chinese pictograms rated as threatening/distressing, by type of prime for the Categorical AMPs.



The internal consistency (split-half correlations with Spearman-Brown corrections) for each AMP is displayed in Table 5.1. All four AMPs demonstrated high internal consistency (=< .94).

Table 5.1 Internal consistency of the AMP measures (split-half correlations with Spearman-Brown correction)

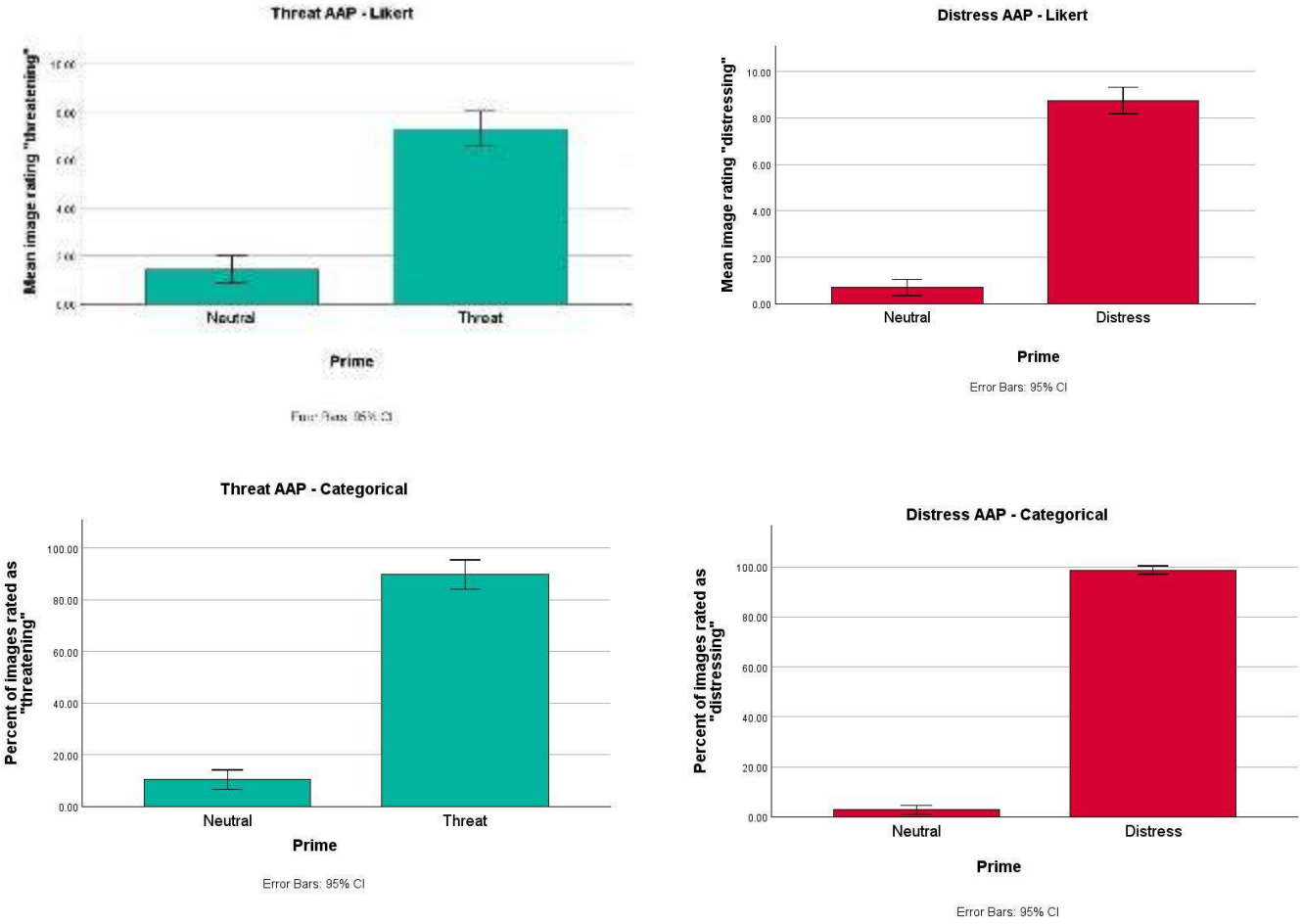
Response Format	**Condition**	**Internal Consistency**
Categorical	Distress	.95
Categorical	Threat	.94
Likert	Distress	.97
Likert	Threat	.97

The threat primes produced higher threat ratings of the Chinese pictographs than neutral primes with a moderate effect size ($t(41) = 3.08$, $p = .002$, $d = 0.48$ 95% CI [0.15, 0.79]) and also a greater percentage of them being categorised as threatening ($t(45) = 3.39$, $p < .001$, $d = 0.50$ 95% CI [0.19, 0.80]). The distress primes produced higher distress ratings of the Chinese pictographs than neutral primes with a large effect size ($t(38) = 6.03$ $p < .001$, $d = 0.97$ 95% CI [0.59, 1.34]) and also a greater percentage of them being categorised as distressing ($t(38) = 6.10$, $p < .001$, $d = 0.98$ 95% CI [0.59, 1.36]). An exploratory analysis confirmed that the AMP effect was present across all four blocks in each task.

Threat and Distress AAPs

Figure 5.2 illustrates the rating of the prime images in the AAP tasks, where participants were directed to ignore the Chinese symbols. It shows the mean threat or distress ratings for the primes for Likert AAPs, and the percentage of primes rated as threatening or distressing in the Categorial AAPs.

Figure 5.2: Mean threat/distress ratings of prime images while ignoring the Chinese symbols, by type of prime for the Likert AAPs and percentage of Chinese pictograms rated as threatening/distressing, by type of prime for the Categorical AAPs



The internal consistency (split-half correlations with Spearman-Brown corrections) for each AAP is displayed in Table 5.2. The four AAPs demonstrated high internal consistency (=< .80), although this was not as high as for the AMPs.

Table 5.2 Internal consistency of the AAP measures (split-half correlations with Spearman-Brown correction)

Response Format	Condition	Internal Consistency
Categorical	Distress	.83
Categorical	Threat	.80
Likert	Distress	.95
Likert	Threat	.95

When ignoring the Chinese symbols, the threat prime images were given higher threat ratings than neutral images with large effect size ($t(41) = 11.96$, $p < .001$, $d = 1.85$ 95% CI [1.34, 2.34]). A greater percentage of threat images were categorised as threatening when compared to neutral images ($t(45) = 19.50$, $p < .001$, $d = 2.88$ 95% CI [2.21. 3.53]). The distress prime images generated higher distress ratings than the neutral images with a large effect size ($t(38) = 23.59$, $p < .001$, $d = 3.78$ 95% CI [2.87, 4.68]) and a greater percentage of them being categorised as distressing ($t(38) = 63.85$, $p < .001$, $d = 10.23$ 95% CI [7.91, 12.53]).

Discussion

Robust AMP effects were shown in all conditions. Notably, the Likert version and Category version of each prime type produced highly similar results with near equivalent effect sizes. Given the lack of different between the two tasks there was no obvious basis for choosing one over the other. However, as such a choice was needed to be made, the Likert ones were selected for the main study to allow for greater variability in response.

In the AAP, the distress and threat images were rated as respectively more distressing and threatening than neutral images. This was the case in both categorical and Likert versions, and the rating difference was of large effect size throughout.

An exploratory analysis examined the AMP effects over the trials split into four time-blocks (1st 30 trials, etc.) showed strong effects across all blocks with no obvious change in the magnitude of the AMP effects. As some people reported that the study was tiring, it was decided to shorten the task for the main experiment by reducing the number of trails to 90.

Main Study: Implicit Boldness and Meanness, and Threat and Distress AMPs

The main study used the two Likert AMPs and the two corresponding Likert AAPs from the pilot study. Alongside this, the boldness- and meanness-IATs were administered, an explicit measure of psychopathy (TriPM; Patrick, 2010) and the BIDR-16 (Hart et al., 2015) in line with Study 2.

Firstly, it was hypothesised that explicit psychopathy (TriPM Boldness and Meanness) would be associated with lower explicit ratings of primes on the AAP (threat and distress images respectively), as those with higher levels of these traits would be predicted to report less fear and less distress. Secondly, it was hypothesised that a negative association would emerge between implicit psychopathy (boldness- and meanness-IAT scores) and the implicit measure of affect (indexed by the Threat and Distress AMP effects[6] respectively), where higher implicit psychopathy would be associated with lower implicit affective response. It was hypothesised that there would be no association between explicit psychopathy and implicit affect indexed by the AMP scores, and similarly, there would be no association between implicit psychopathy and explicit affect indexed by AAP. However, it was also hypothesised that as in Chapter 3, explicit psychopathy (TriPM Boldness and Meanness) would be positively associated with implicit psychopathy, indexed by D-scores on their respective IATs, in line with the theory that implicit and explicit measures are not considered to be accessing wholly different representations (Deutsch & Strack, 2010; Moors et al., 2010). Lastly, it was predicted that there would be no association between the AMP effect scores and AAP rating scores, as these are theoretically indexing distinct forms of behaviour: spontaneous and controlled.

Method

Participants

Power Analysis. A between-subjects design was employed to minimise participant demand, with participants each completing only one IAT and one AMP. There was no previous research on this particular topic available on which to base an estimate of the effect size and so an estimate of $r = .20$ was used as this is seen as "typical" in individual differences research (Gignac & Szodorai, 2016).

This estimate, combined with standard conditions ($\alpha = .05$, 80% power), showed 150 participants were required per condition. However, a target sample per condition of $n = 180$ was set

[6] See data analysis section for description of AMP index calculation.

to allow for missing responses and exclusions. To allow a gender comparison, should it have emerged, the sample size for each condition was doubled (180 x 2 = 360). In addition to the boldness and meanness conditions, the study also included a third condition of disinhibition; this condition used the disinhibition-IAT from Chapter 3 alongside another task and is reported in detail in Chapter 6. As such, with three conditions, the overall sample requirement for this study was *N* = 1080 (180 x 3 x 2). Descriptive data from the whole sample are reported in this chapter. However, the detailed results from the disinhibition condition are covered in full in Chapter 6.

Participant Sample. A total of 1192 community-based participants took part in the online study. This consisted of 658 women, 529 men, 3 who reported another gender and 2 who preferred not to give their gender. Their mean age was 29.95 years (12.74). The majority of the sample was White (71.4%). 22.1% of participants were of Asian ethnicity, 2.2% were of Mixed ethnicity, 1.8% were Black, 1% were of Arab ethnicity, and 1.5% were of another ethnicity or preferred not to say. Most of the sample held an undergraduate degree (42.0%), with 21.4% having postgraduate qualifications, 16.0% holding A-levels or equivalent qualifications, 6.7% holding GCSEs or O-Levels, 7.0% having an HND or BTEC, 1.8% having completed an apprenticeship, 3.1% holding other or non-UK qualifications and 2% reporting no formal qualifications. Various exclusions were completed on this data set (see Results section). The ethical approval for this study was covered by application 2022-5420-4647 (Appendix D).

Methods

These are the same as the pilot study except as detailed below (including all stimuli and data analysis techniques). Only the Likert versions of the AMP task were used, and these were shortened to 90 trials to limit fatigue effects. The same AAP tasks were used. Explicit psychopathy was measured by the TriPM and implicit psychopathy by the IATs described earlier in the thesis. The Balanced Inventory of Desirable Reporting Short Form (BIDR-16; Hart et al., 2015) was used to index impression management and self-deception.

Participants were randomly split into three conditions. First, all groups completed the TriPM. Those in the boldness condition then completed the boldness-IAT, the Threat AMP, and the Threat AAP. Those in the meanness condition completed the meanness-IAT, the Distress AMP and the Distress AAP. Those in the disinhibition condition completed other tasks to be reported in Chapter 6. All participants completed the BIDR-16 and another two self-report measures not reported here. They were debriefed, and community participants were allowed to enter a prize draw to win a shopping voucher.

Results

Data Cleansing

Of the original 1192 participants, 30 were aged 60 or over and, thus, were excluded from the analysis due to potentially slower response times on the reaction tasks (Dykiert et al., 2012)[7]. A further 42 participants were excluded as they indicated they were fluent in Mandarin/Chinese. An additional 100 participants were excluded from the analysis due to failing attention checks on one or more self-report measures. Those failing to achieve 70% or greater accuracy across IAT trials were also excluded. Further exclusions were made in relation to a task completed by those in the disinhibition condition which is reported in Chapter 6. This gave a final sample after all exclusions of 949, with a mean age of 29.20 (11.37).

Descriptives

Of the final sample, 543 were women, 402 were men, 2 preferred not to give their gender, and 2 were other gender. 77.1% of the sample reported their ethnicity as White, 1.8% as mixed, 17.6% as Asian, 1.2% as Black and 2.3% as other ethnicity. Altogether, 42.4% of the sample held an

[7] This was a higher age cut-off than used in previous chapters. However, due to removals for other reasons reducing the sample size below that required for power, particularly for men, a decision was made to use 60 rather than 55.

undergraduate degree as their highest educational level, 25.3% held A-Levels, HNCs, or an apprenticeship qualification, 21.1% had postgraduate qualifications, 6.7% held O-levels or GCSEs, 2.8% reported holding other/non-UK qualifications, and 1.7% declared they had no qualifications. Table 5.3 provides the number of participants per condition and the gender split for each.

Table 5.3: Gender of participants in final sample (after exclusions) by condition

Condition	TOTAL n	Men	Women	Other	Prefer not to say
Boldness	320	133	185	1	1
Meanness	317	128	187	1	1
Disinhibition	312	141	171	0	0

Table 5.4 gives the mean scores on the explicit measures of psychopathy (TriPM) and desirable responding (BIDR-16) for men and women. For each TriPM scale and the self-deception scale of the BIDR-16, a gender difference emerged, with men scoring significantly higher than women. No gender difference emerged for the BIDR-16 scale of impression management. All subscales were reliable.

Table 5.4: Descriptive statistics and reliability for direct measures of psychopathy and desirable reporting by gender (men and women only) for the final sample (n = 945) and gender comparison (independent samples t-test, aside from Meanness where Mann-Whitney U and r are given as data was skewed outside of acceptable limits).

	All			Men			Women			Gender difference	
	Mean (SD)	**Skew**	**α / Ω**	**Mean (SD)**	**Skew**	**α / Ω**	**Mean (SD)**	**Skew**	**α / Ω**	**t**	**d**
TriPM											
Boldness	29.16 (9.25)	-1.10	.86 / .86	31.26 (9.46)	-0.23	.86 / .86	27.63 (8.81)	-0.08	.85 / .85	6.06**	0.40
Meanness	12.04 (8.30)	1.06	.89 / .88	15.35 (8.86)	0.76	.88 / .88	9.55 (6.86)	1.31	.86 / .85	10.77[8]**	0.54
Disinhibition	15.52 (8.94)	0.94	.87 /.88	16.94 (9.79)	0.84	.88 / .88	14.41 (8.01)	0.91	.86 / .86	4.23**	0.29
BIDR											
Self Deception	36.41 (9.74)	-0.03	.74 / .73	37.46 (9.96)	-0.16	.74 / .73	35.69 (9.53)	0.06	.74 / .73	2.73**	0.18
Impression Management	37.79 (9.97)	-0.27	.72 / .70	37.19 (10.16)	-0.24	.71 / .68	38.24 (9.82)	-0.28	.74 / .73	1.60	0.11

** Significant at .01 level

[8] Standardised test statistic reported for Mann-Whitney U

Direct and Indirect Measures of Psychopathy

Explicit Psychopathy.

As some of the subscales of the measures were highly skewed, non-parametric methods were used for hypothesis testing and tests of association. TriPM scores were correlated in a similar pattern to those reported in Chapter 3 (Table 5.5) and were comparable in both direction and magnitude to data reported elsewhere (e.g., Collison et al., 2021). Scores on the BIDR-16 self-deception scale were positively associated with TriPM Boldness, while scores on the impression management scale were negatively associated with TriPM Meanness.

Table 5.5: Correlations (Spearman's rho) between TriPM and BIDR-16 subscales for the final sample (*N* = 949).

	Boldness	**Meanness**	**Disinhibition**	**Self-Deception**	**Impression Management**
Boldness	-	.20**	-.06	.49**	.06
Meanness	-	-	.55**	-.06	-.36**
Disinhibition	-	-	-	-.42**	-.38**
Self-Deception				-	.29**

** significant at .001 level

Implicit Psychopathy

Both IATs had good internal consistency (split-half correlations with Spearman-Brown correction), slightly exceeding those reported in Chapter 3 for the IATs. Furthermore, the internal consistency of each IAT was comparable to its direct equivalent, reported in Table 5.6. Unlike the gender comparison in Chapter 3, no difference emerged between men and women in their boldness-IAT scores. However, as reported for the meanness-IAT in Chapter 3, there was a significant difference between genders for meanness-IAT scores, where women associated themselves more greatly with being kinder than men.

Table 5.6: Descriptive statistics, reliability, and gender comparison (mean) for the psychopathy Implicit Association Tests (IATs) used in the Boldness and Meanness conditions.

	N	(α)	Mean (SD)[9]	Mean Men : Women	t / p	Effect Size [95%CI]
Boldness-IAT	320	.90	0.60	0.63 : 0.58	0.85 / .395	0.10 [-0.12 : 0.32]
Meanness-IAT	317	.91	-0.70	-0.57 : -0.79	3.38 / <.001	0.40 [0.18 : 0.63]

Direct and Indirect Measures of Affect

Indirect Affect: Affect Misattribution Procedure. The internal consistency of each AMP (split-half correlations with Spearman-Brown correction) for each AMP was high (α = .98).

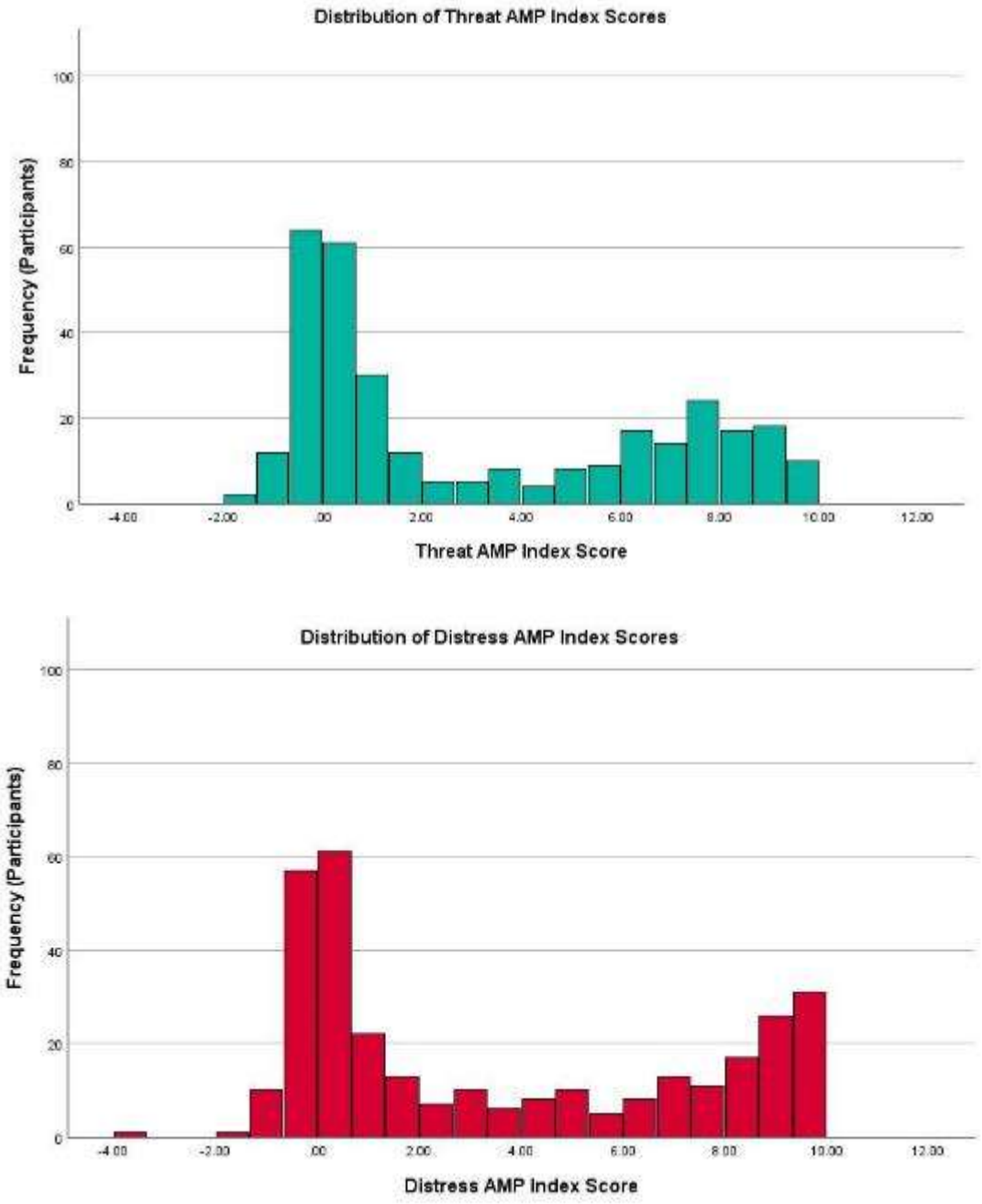
Indices were calculated for each AMP to quantify the magnitude of the AMP effect. For the Threat AMP, mean rating of symbols when primed by neutral images was subtracted from the mean rating of symbols when primed by threat images. For the Distress AMP, a distress index was calculated; the mean rating of symbols when primed by neutral images was subtracted from the mean rating of symbols when primed by distress images. Visual inspections of distributions for both AMPs indicated bimodality (Figure 5.3). Thus, for both AMPs, non-parametric statistics (Wilcoxon Signed rank test) were used to analyse whether there was an effect of prime in each.

For the Threat AMP, there was a significant difference in the ratings the Chinese symbols were given when they were primed by threat and primed by neutral images ($z = -12.09$, N – ties = 316, $p < .001$, $d = 1.86$). Thus, a strong AMP effect emerged, with the Chinese symbols rated as more threatening when primed by threat images than when primed by neutral images.

[9] The positive boldness-IAT scores indicates that overall, most participants associated themselves with being bold rather than wary. Conversely, the negative meanness-IAT scores suggest that overall, most participants associated themselves with being kind rather than cruel.

For the Distress AMP, there was again a significant difference in the ratings the Chinese symbols were given when they were primed by distress and primed by neutral images (z = -12.50, *N* – ties = 311, $p < .001$, $d = 2.01$). Thus, a strong AMP effect emerged, with the Chinese symbols rated as more distressing when primed by distress images than when primed by neutral images.

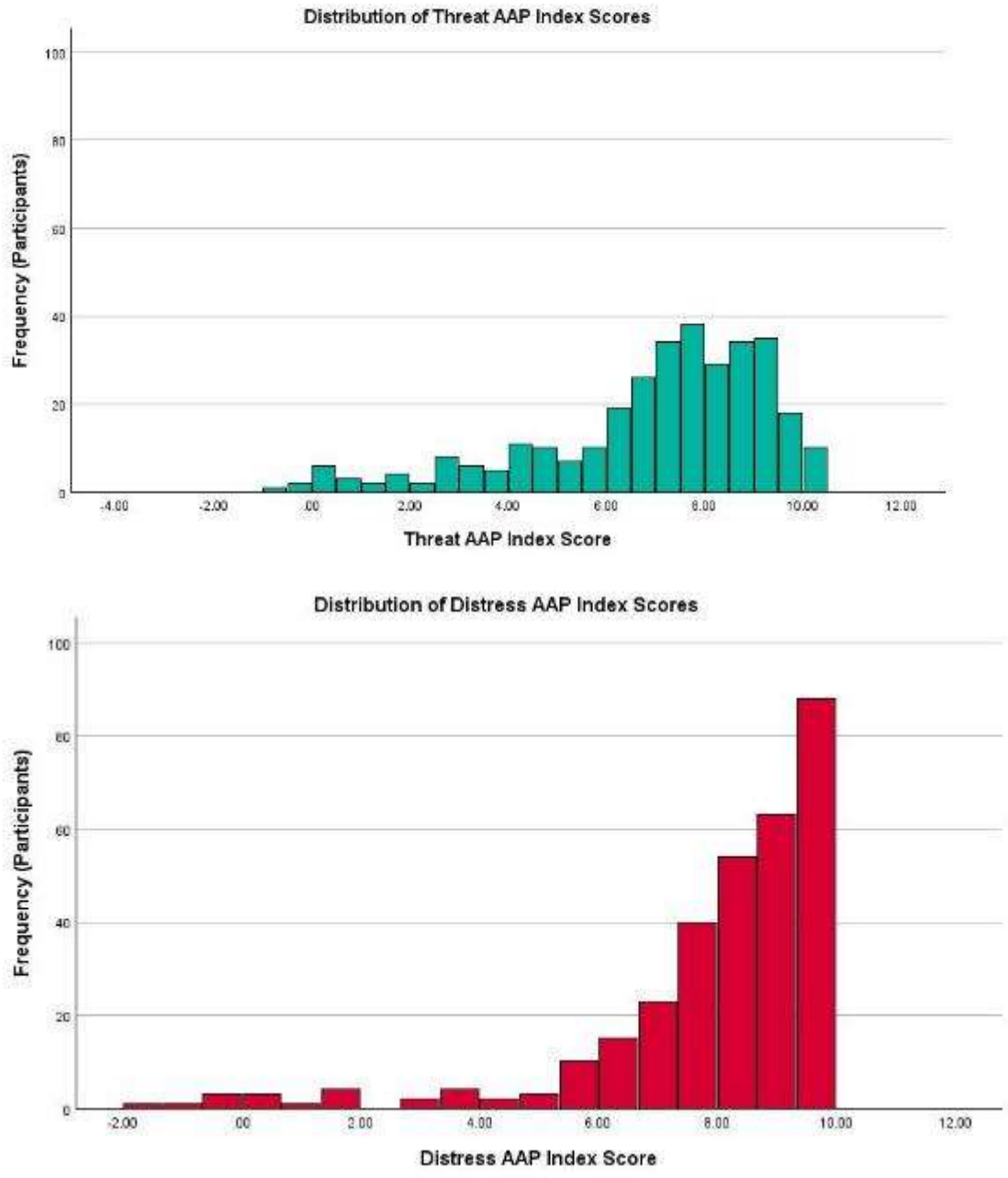
Figure 5.3: Frequency distribution of index scores for the Threat AMP and the Distress AMP.



Direct Affect: Affect Attribution Procedure. The internal consistency of each AAP (split-half correlations with Spearman-Brown correction) for each AMP was high (α =< .91).

As with the AMPs, indices were calculated for the AAP. For the threat images, the mean rating of neutral images was subtracted from the mean rating of threat images, and for the distress images, mean rating of neutral images was subtracted from the mean rating of distress images. Figure 5.4 shows the distribution of the AAP scores.

Figure 5.4: Frequency distribution of index scores for the Threat AAP and the Distress AAP



The mean threat index was 6.94 (SD = 2.39), and the mean distress index was 8.05 (SD = 2.09). However, both data were highly skewed (threat, -1.20; distress, -2.20). Thus, non-parametric statistics were used to analyse if there was an effect of image type on explicit threat or distress ratings. A comparison between ratings given for threat and neutral images yielded a significant difference where the threat images were rated significantly more threatening than the neutral images: z = -15.42, *N* – ties = 317, $p < .001$, *d* = 3.47). A comparison between ratings given for distress and neutral images also yielded a significant difference, where the distress images were rated significantly more distressing than the neutral images: z = -15.38, *N* – ties = 315, $p < .001$, *d* = 3.47).

Explicit-Implicit Associations

Due to some of the data distribution being bimodal and/or skewed, planned regression analysis was not possible. Thus, non-parametric correlations (Spearman's rho) were performed to explore relationships between the implicit and explicit measures used in the study.

Boldness and Threat. As self-deception was moderately and positively associated with Boldness (Table 5.5), partial correlations are also given, controlling for BIDR-16 self-deception (Table 5.7).

Table 5.7: Correlations (Spearman's rho) and partial correlations controlling for BIDR-16 self-deception between TriPM Boldness, the Boldness IAT, the Threat AAP index and the Threat AMP index.

	TriPM Boldness	**Boldness IAT**	**Threat AAP**	**Threat AMP**
TriPM Boldness	-	.22** / .19**	-.17** / -.18**	-.12* / -.08
Boldness IAT	-	-	.21** / 21**	.04 / .05
Threat AAP	-	-	-	.37** / .37**

* Significant at .05 level, ** significant at .01 level

None of the hypotheses relating to the Threat AMP task were supported. Firstly, no relationship emerged with implicit boldness, indexed by the boldness-IAT. Secondly, the Threat AMP scores were negatively correlated with explicit (TriPM) Boldness when no association between the two was predicted. Thirdly, counter to predicting no association between the AMP and the AAP task, these were correlated with moderate effect size.

As hypothesised, explicit (TriPM) Boldness was associated with lower explicit threat ratings of primes, indexed by AAP scores. TriPM Boldness was also associated with higher scores on the boldness-IAT; this was in line with predictions and replicates the finding from Chapter 3. However, counter to predictions, boldness-IAT D-scores were positively correlated with AAP scores.

Meanness and Distress. As BIDR-16 impression management scores were negatively and moderately associated with TriPM Meanness scores (Table 5.5), partial correlations are also given, controlling for impression management (Table 5.8).

Table 5.8: Correlations (Spearman's rho) and partial correlations controlling for BIDR-16 self-deception between TriPM Meanness, the Meanness IAT, the Distress AAP index and the Distress AMP index.

	TriPM Meanness	**Meanness IAT**	**Distress AAP**	**Distress AMP**
TriPM Meanness	-	.16** / .14*	-.20** / -.17**	-.06 / -.04
Meanness IAT	-	-	-.01 / .00	.22** / .22**
Distress AAP	-	-	-	.34** / .34**

* Significant at .05 level, ** significant at .01 level

Most of the hypotheses relating to the Distress AMP task were unsupported. A positive, rather than negative, association emerged between the Distress AMP and implicit psychopathy, indexed by the meanness-IAT. While no association was predicted between the AMP and the AAP

task, these were positively associated. However, supporting predictions, the Distress AMP scores showed no association with TriPM Meanness.

In line with hypotheses, TriPM Meanness was associated with lower explicit distress ratings of primes, captured by AAP scores. Higher scores on the meanness-IAT were associated with TriPM Meanness, replicating the finding from Chapter 3. Also, in line with predictions, meanness-IAT scores had no association with AAP scores.

Discussion

This chapter has described the development and testing of two Affect Misattribution Procedure tasks (AMP; Payne et al., 2005) as potential measures of affective processing. The AMPs aimed to index implicit threat and distress, thought to be diminished in those with high levels of triarchic Boldness and Meanness, respectively (Patrick, 2010; Patrick et al., 2009). In the main study, the Threat and Distress AMPs were used alongside explicit equivalents of the AMP (explicit ratings of prime images used within the AMPs which we termed the AAP), and explicit (TriPM) and implicit (IAT) measures of triarchic Boldness and Meanness to ascertain if any particular associations emerged between the respective implicit and explicit measures. Hypotheses were made in line with the idea that explicit measures may be more predictive of explicit behaviours, while implicit measures may better predict performance on experimental tasks that capture more spontaneous behaviours. However, most hypotheses relating the AMP tasks were not supported, and frequency distributions for the AMP tasks were bimodal.

Bimodality in the AMP

Corresponding with recent findings (e.g., Bar-Anan & Nosek, 2012; Hazlett & Berinsky, 2018; Hughes et al., 2022, Mann et al., 2019) both AMP distributions were bimodal. Inspection of Figure 5.3a (Threat AMP) shows two peaks in the distribution of scores: one at about a score of zero, and one for a score of about 8. Hence, it seems feasible that the distribution may be made of two

distinct groups of responders. The first distribution peak around zero, indicates that for one responder group there was no effect of the prime (threat vs neutral) on the rating of the Chinese pictogram. The second distribution peak seems to correspond well with the peak score on the AAP. This may suggest that those in the second responder group are largely producing the same score when they are rating the prime itself (AAP) as when they are rating the Chinese pictograph (AMP). A similar analysis of the data from the Distress AMP (Figure 5.3b) and Distress AAP is consistent with this idea. Furthermore, the moderate correlations (Tables 5.7 and 5.8) between the AAP and AMP tasks for both conditions support this position.

If this speculation is correct, this implies that the AMP is not a measure of misplaced attributions. Instead, those that (correctly) rate the Chinese pictograph are uninfluenced by the primes, while others who appear to be rating the primes are not really performing the AMP. It may be that these people may not have understood the task, or they might have been unconvinced that the task made sense (rating a "meaningless" pictograph for how threatening or distressing it was) and simply rated the prime despite the instructions. These groups combined generated an apparent AMP effect. However, it's interpretation may not be possible given these concerns. As such, the AMP's relationship to the other measures will not be discussed further.

Boldness and Threat

Consistent with predictions, higher levels of explicit (TriPM) Boldness were associated with lower AAP ratings of the prime stimuli. This is in line with Lykken's (1957) low-fear hypothesis, where there is either a diminished capacity to experience fear, or that fear and withdrawal responses are only activated at high thresholds (Brook et al., 2013; Sleep et al., 2019).

As anticipated, self-reported explicit (TriPM) Boldness appears to relate to reporting lower fear in response to stimuli which represent a threat to the self (AAP ratings). Contrastingly, the boldness-IAT scores were positively associated with explicit threat ratings of the primes, indexed by the AAP. This latter finding was not predicted and suggests that implicit boldness may be associated

with experiencing elevated fear in response to a threat to the self. While this latter finding seems counterintuitive, perhaps implicit and explicit forms of Boldness hold different relationships with threat to the self. The concept of triarchic Boldness is one highly related with the importance of the self as an assertive, confident, brave and socially poised individual (Patrick et al., 2009). Boldness shares self-focused features with grandiose narcissism, including leadership as well as being related to self-promotional and self-enhancing behaviours (Miller et al., 2020). Several studies have found correlations between Boldness and grandiose narcissism of around $r = 0.58$ (Sleep et al., 2019; Miller et al., 2020). Given the importance of the self in triarchic Boldness and the related concept of grandiose narcissism, it seems possible that when facing a threat to the self, the overt reaction is to present a brave and calm persona, outwardly displaying confidence and tolerance to threat, thus maintaining social poise associated with being bold. However, as the threat is to the self, which is central to the bold persona, implicitly the threat may be felt more keenly due to a need to protect and maintain the self to a greater degree. Thus, explicit Boldness would be associated with lower threat ratings, while implicit boldness would be associated with higher threat ratings. This may add some context to findings where TriPM Boldness has been positively associated with premeditated aggression (Paiva et al., 2020) and the leadership component of Boldness has found to be associated with proactive aggression in men (Pink et al., 2022); if those who are bold experience a heightened level of threat to the self they may be more inclined to take action early to protect the self.

Meanness and Distress

Consistent with prediction, higher levels of explicit meanness were associated with lower distress ratings of the prime stimuli (AAP). This supports Cleckley's (1950) original hypothesis of an emotional deficit in psychopathy, where diminished affective responses are seen in those with psychopathy. Specifically meaner individuals would be expected to experience less distress in response to the stimuli as they are ambivalent to the suffering of others (Patrick et al., 2009).

TriPM Meanness domain scores were positively correlated with D-scores on the Meanness-IAT which is in line with the findings from Chapter 3. As predicted the explicit distress ratings of the primes, were not associated with implicit meanness.

Limitations and Next Steps

In summary, while the two AMPs designed for this study yielded some interesting findings, due to the bimodality and lack of predicted associations between measures, the AMP tasks were not considered suitable for further use as part of this thesis. The next chapter discusses the exploration of measures of implicit impulsive behaviours to use alongside the Disinhibition IAT from Chapter 3.

Chapter 6: Behavioural Tasks as External Correlates for Disinhibition

This chapter describes developing and testing of two behavioural tasks, a go/no-go paradigm and the Stroop, as possible external correlates of triarchic Disinhibition (Patrick, 2010). As with the AMPs described in Chapter 5, the first part of the chapter reports the development and piloting of the two tasks. The latter section of the chapter (Study 2) reports the results of using one of the tasks alongside the disinhibition Implicit Association Test (IAT; Greenwald et al., 1998) (Chapter 3). The chapter closes by considering the findings of the research.

Disinhibition and Impulsiveness

As outlined in Chapter 1, triarchic Disinhibition reflects difficulties with impulse control (Drislane et al., 2014; Patrick et al. 2009). These difficulties manifest as a lack of foresight, poor behavioural control and planning, a need for instant gratification, unreliability and irresponsible decision making (Patrick et al., 2009). This dispositional liability for poor impulse control represented in triarchic Disinhibition is also frequently termed “trait disinhibition” within the literature (Delfin et al., 2020; Joyner et al., 2021).

While impulse control is central to disinhibition, it is important to note that disinhibition is not interchangeable with impulsiveness (Joyner et al., 2021). Impulsivity is a broad and multi-dimensional concept incorporating a diverse range of traits and behaviours (Gillespie et al., 2022; Strickland & Johnson, 2021). Those included in various conceptualisations of impulsivity include inattention and impatience, impulsive decision making, impairment in inhibiting inappropriate responses and difficulty persisting with tasks (Gillespie et al., 2022; Strickland & Johnson, 2021). There is commonality between disinhibition and impulsivity as they both include a lack of constraint and dysregulation (Joyner et al., 2021); however, there is divergence between the two. While disinhibition is considered to reflect a general proneness for externalising behaviour, prominent models of impulsivity, such as the UPPS-P (Lynam et al., 2006), also incorporate internalising behaviours (Joyner et al., 2021; Patrick et al., 2012; Patrick et al., 2009). Moreover,

conceptualisations of impulsivity typically consider it to represent a series of distinct traits or dispositions which are etiologically separate while disinhibition is considered to be a general proneness for externalising (Joyner et al., 2021; Sharma et al., 2014). Recent structural modelling confirms these distinctions between disinhibition and impulsivity (Joyner et al., 2021) and analysis of performance on tasks designed to index different impulsive behaviours finds little association between them (Gillespie et al., 2022).

Neurological Underpinnings of Disinhibition

Neurobehavioural research suggests that deficient inhibitory control is associated with dysfunctionality in anterior brain circuitry (Patrick et al., 2012). Individuals with lesions to areas of the frontal brain have been found to display disinhibited behaviours, and frontal lobe functioning deficits have been associated with impulse control problems (Patrick et al., 2012). Of particular relevance to Disinhibition and issues with impulse control are the prefrontal cortex (PFC) and anterior cingulate cortex (ACC) areas (Patrick et al., 2012). The dorsolateral PFC is responsible for cognitive control over behavioural responses (Patrick et al., 2012). The ACC initiates the PFC's cognitive control processes when required as it monitors performance, detecting errors and assessing conflict (Munro et al., 2007; Patrick et al., 2012). Therefore, ACC functional impairment would likely result in difficulties to strategic, inhibitory control over task performance (Munro et al., 2007).

An inability to inhibit pre-potent (dominant or automatic) responses, is thought to underpin behavioural disinhibition and be indicative of impaired ACC functioning (Munro et al., 2007; Young et al., 2009). Inhibiting, or withholding, a pre-potent response requires individuals to suppress a behaviour when it is inappropriate, counter to, or detrimental to a goal (Gillespie et al., 2022). Thus, response inhibition requires the ACC to monitor response tendencies and any errors, and invoke the control functionality of the PFC when appropriate (Munro et al., 2007; Patrick et al., 2012). Impairments in the ACC would likely impact the ability to withhold dominant or automatic responses

(Patrick et al., 2012) and atypical functionality in the ACC and localised areas has been linked with psychopathy (Munro et al., 2007).

One particular biobehavioural marker for disinhibition is considered to be the amplitude of the frontal "P3" or "P300" event related potential (ERP), which is associated with ACC activation (Delfin et al., 2020; Munro et al., 2007; Ribes-Guardiola et al., 2020). The P3 component occurs between 300 and 600ms after a stimulus onset and peaks over parietal and central areas of the brain (Delfin et al., 2020; Munro et al., 2007; Ribes-Guardiola et al., 2020). This component is thought linked to the updating of context, and evaluative processing of events (Ribes-Guardiola et al., 2020), both factors in response inhibition. An enhanced P3 amplitude would signify the invocation of cognitive control processes and contextual evaluation, leading to response inhibition when evaluated as appropriate (Ribes-Guardiola et al., 2020). Evidence finds that a reduced P3 amplitude is robustly associated with trait disinhibition (Brennan & Baskin-Sommers, 2018; Delfin et al., 2020; Patrick et al., 2012; Ribes-Guardiola et al., 2020) and hence, the P3 is considered the "best established" physiological marker for a propensity to externalise (Patrick et al., 2012, p. 1056).

Given that issues with response inhibition are thought to underlie behavioural disinhibition and are closely linked with disinhibitory psychopathology (Young et al., 2009), behavioural tasks which specifically index inhibition of the pre-potent response, might be especially suitable as possible external correlates of triarchic Disinhibition. There are particular tasks available which facilitate the measurement of this construct (Gillespie, 2022), including the go/no-go task which will be discussed next.

The Go/No-go Task

One popular paradigm which indexes response inhibition is the go/no-go task. This task has a long history dating back pre-1900 in its early conception as a two-choice procedure (Gomez et al., 2007). On each trial of a go/no-go task, participants are either required to give a motor response (e.g., key or lever press) to target stimuli (go trials) or to withhold the response when alternate

stimuli are presented (no-go trials) (Gillespie et al., 2022; Gomez et al., 2007). For example, in Michałowski et al.'s (2015) go/no-go task, participants were required to press the space bar in response to the letter "A" (go trials) or withhold the response when presented with a letter "P" (no-go trials). Typically, the task is constructed such that the majority of the trials are go trials to facilitate the development of a pre-potent response (Gomez et al., 2007). The nature of the task requires participants to select a response strategy (to press or to inhibit) as quickly as possible upon seeing the stimulus (Gomez et al., 2007). Thus, the task measures action restraint as response strategy decisions are required at the point of stimulus presentation (Gillespie et al., 2022).

Neurological evidence supports that the go/no-go task may be a suitable candidate as an external correlate of Disinhibition. This task involves activation of the ACC, where atypical functionality has been associated with psychopathy (Munro et al., 2007). The P3 ERP, which when diminished is associated with disinhibition (Brennan & Baskin-Sommers, 2018; Delfin et al., 2020; Patrick et al., 2012; Ribes-Guardiola et al., 2020) is amplified in no-go trials that are embedded within strings of go trials (Munro et al., 2007). Furthermore, where a response must be withheld infrequently on certain (no-go) trials only, a particular subcomponent of the P3 ERP is observed: the "NoGo P3" (Delfin et al., 2020). Evidence suggests that a reduced P3 ERP amplitude is predictive of disinhibited behaviours (Delfin et al., 2020).

As such, the go/no-go task has often been used to explore issues of response inhibition associated with psychopathy; however, the findings are somewhat mixed as illustrated in a recent meta-analysis by Gillespie et al. (2022). A study with an offending sample by Lapierre et al. (1995) found that offenders high in psychopathy made significantly more commission (no-go trial) errors when compared to those low in psychopathy. However, other research has failed to identify any association between performance on a go/no-go task and traits of psychopathy. In a female adult offender sample, no association between psychopathy and commission errors emerged (Maurer et al., 2016). Similarly, while a male offending sample made more commission errors on no-go trials

than control participants, there was no association between performance and psychopathy (Munro et al., 2007). A further study which used the TriPM alongside a go/no-go task found no evidence of an association between any of the triarchic scales and increased commission errors (Paiva et al., 2020). In fact, while Gillespie et al.'s (2022) review found a modest association (r = .14) between psychopathic traits and poorer response inhibition indexed by increased commission errors, when examined at a more granular level, neither the interpersonal/affective components (*r* = -.04) nor the lifestyle/antisocial components (*r* = -.06) of psychopathy were individually associated with commission errors. Therefore, while the task might be useful as a behavioural measure of disinhibition, the evidence supporting its relationship with psychopathy is not entirely convincing.

A lack of association between go/no-go task performance and the impulsive/antisocial components of psychopathy or triarchic Disinhibition may have failed to emerge in Gillespie et al.'s (2022) meta-analysis because some studies examined used emotional rather than standard go/no-go tasks. Some of the emotional go/no-go task studies (e.g., Iria & Barbosa, 2009; Iria et al., 2012; Krakowski et al., 2015) used stimuli with facial expressions of sadness, anger and joy. Participants were required to respond to certain emotions (go trials) and withhold responses to other emotions (no-go trials). Emotional impairments are thought to be linked to the meanness dimension of triarchic psychopathy and Factor 1 of the PCL-R (Psychopathy Checklist-Revised; Hare, 1991); however, such impairments are not markers for triarchic Disinhibition, which is centred on response inhibition issues. Therefore, issues due to the processing of emotional stimuli per se may have clouded the issue of whether there are changes in the ability to withhold a prepotent response.

Another reason that associations did not emerge between disinhibition or impulsive/antisocial components of psychopathy and go/no-go task performance in Gillespie et al.'s (2022) analysis could stem from the variability between studies in the proportions and order of go and no-go trials. Some studies (Kiehl et al., 2000; Lapierre et al., 1995) used an equal number of go and no-go trials. Contrastingly, other studies used much higher proportions of go trials, forming 75-

85% of the total number of trials (Maurer et al., 2016; Paiva et al., 2020, Ribes-Guardiola et al., 2020). Variability in the relative proportion of go and no-go trials is not specific to studies exploring psychopathy and response inhibition; across the wider go/no-go literature, the ratio between the two types of trials varies between 15:1 and 1:4 (Young et al., 2018) with around 40% of all go/no-go studies employing equiprobability between the two types of trials (Wessel et al., 2019). However, failure to ensure that the no-go trials are sufficiently infrequent may impact the task's efficacy as a test of response inhibition impairment. The NoGo P3 ERP is evoked in response to infrequent stimuli (Delfin et al., 2020) and it is unclear if prepotent activity is activated in designs with equiprobability between go and no-go trials (Wessel et al., 2019). Furthermore, in the studies reviewed by Gillespie et al., differences are also evident in the ordering of trials which may further impact the task to the extent that it sets up a robust prepotent response. For example, Lapierre et al.'s design commenced with 50 go trials, likely facilitating a strong response bias. Contrastingly in Kiehl et al.'s design, go and no-go trials could appear from the start of the experiment. Thus, the variability of the designs across studies in the area, in terms of proportion of trials and ordering therein, seems a likely contributor to the mixed findings in relation to psychopathy.

Further examination of the studies reviewed in Gillespie et al.'s (2022) analysis highlights other design areas which may merit attention for future studies. Many of the studies reviewed by Gillespie et al. used only one type of go stimuli. While this may be sufficient to elicit commission errors, it appears to be a suboptimal design choice; recent work by Young et al. (2018) has illustrated that increasing from one to two types of go stimuli increases task difficulty and thus, commission errors. Furthermore, some studies appear overly lengthy, which may lead to participant fatigue and lower effort. For example, Ribes-Guardiola et al.'s (2020) task comprised 1200 trials and was around 40 minutes in duration. Additionally, small sample sizes are reported in some research: Michałowski et al.'s (2015) student sample totalled only 26 participants and Munro et al. (2007) recruited only 30 participants across their two conditions of control participants and psychopathic participants. Therefore, there appear to be a range of design aspects which may have contributed to a lack of an

association between Disinhibition and performance on the go/no-go task. Aside from design, there may be a broader issue of reliability in individual difference paradigms, such as response inhibition tasks, contributing to the inconsistencies evident across the literature. It has been suggested that such tasks are not sufficiently reliable to detect individual differences (Rouder and Mehrvarz, 2024). Rouder et al. (2023) outlines that response inhibition tasks tend to yield small correlations, at best around .3. Design issues, such as those set out above could partly account for this, in some instances. Additionally, a lack of overlap between task performance (here, psychopathy and response inhibition), could also lead to weak correlations, indicating that the two are genuinely unrelated (Rouder et al., 2023). However, attenuated correlations can also point to low reliability of the task itself (Rouder et al. 2023). Such reliability depends on the range of scores in the population; if there is low between-subject variability, this leads to low reliability (Hedge et al, 2018). Small variation between scores is common in many response inhibition tasks, as true scores are positive for the vast majority of participants (*dominance assumption*) (Rouder et al., 2023). Furthermore, high measurement error in response inhibition tasks may mask much larger associations (Rouder et al., 2023). Therefore, even taking into account best practice design for response inhibition tasks, it may be that these measures are unsuitable for individual differences research, even if robust effects emerge at group level.

Larger questions around suitability of these tasks aside, the go/no-go task designed for this thesis chapter aimed to address the possible methodological shortcomings associated with many of the studies to date, set out above. Like Lapierre et al. (1995), the task started with a sequence of go trials, to set up a prepotent response. Further, in line with recommendations from Young et al. (2018) regarding proportion of go/no-go trials, a ratio of 3:1 (75% to 25% of trials) was employed, to produce a large percentage of commission errors. To further enhance the difficulty of the task and thus, likelihood of commission errors, two rather than one type of go stimuli were used. The trials were also fast-paced with a total intertrial stimulus interval of < 2000ms as it is unclear if prepotent activity is elicited in slow-paced designs (Wessel et al., 2019). Lastly, a strict response deadline of

only 500ms was allowed, as limiting the response window is thought to increase response urgency and facilitate the prepotent response (Wessel et al., 2019).

The Stroop Task

A second task which may be suitable as a possible external correlate of triarchic Disinhibition is the Stroop Task (Stroop, 1935) which has been described as the "gold standard of attentional measures" (MacLeod, 1992). In this task, participants are presented with colour words (e.g., blue, yellow, red), which are either shown in the same colour ink (i.e., *blue* shown in blue ink) or in different colour ink (i.e., *blue* shown in red ink) (Badzakova-Trajkov et al., 2009). Participants are required to name the ink's colour, not the word itself; when the ink colour and word meaning are congruent, participants are quick to name the ink colour (Badzakova-Trajkov et al., 2009). However, when they are incongruent, participants are slower due to interference from automatic semantic processing of the word; participants must inhibit this pre-potent response to name the ink colour (Badzakova-Trajkov et al., 2009).

As with the go/no-go task, neurological evidence supports that the Stroop task might be of interest when exploring Disinhibition. The ACC, thought to be impacted in disinhibition (Munro et al., 2007), is implicated in some aspects of processing in the Stroop task (Badzakova-Trajkov et al., 2009). During incongruent trials, the ACC is routinely activated; while its particular role is debated, it is crucial in managing conflicting information either by playing a part in controlling attention or acting as a detector for information which is conflicting (Badzakova-Trajkov et al., 2009). Moreover, it is considered a "P3" task (Gao & Raine, 2009), where the same ERP elicited in the go/no-go task is also elicited in the Stroop task.

Interference in the Stroop has been explored in psychopathic populations and those where disinhibition is a key factor such as ADHD and conduct disorder. In samples of individuals with ADHD, typically higher levels of Stroop interference emerge when compared with control samples (Hiatt et al., 2004; Lansbergen et al., 2007). Similarly, increased interference has been identified in those with

conduct disorder and in adolescents with disinhibition (Hiatt et al., 2004; Young et al., 2009). The relationship between performance on the Stroop task and psychopathy has been tested in adult, mainly forensic populations. However, the findings are mixed, and most find comparable interference in psychopathic and non-psychopathic participants. These studies are summarised in Table 6.1 and discussed in detail below.

Table 6.1: A summary of Stroop studies which have explored task performance with explicit measures of psychopathy

Study	Task(s)	Psychopathy Measure	Anxiety Measure	Sample (all male)	Comparison Group	N_p	N_c	Results
Smith et al. (1992)	Stroop	PCL-R	WAS	Inmates, PCL-R 30+	Inmates, PCL-R <20	37	32	No difference in interference between psychopathy groups. No difference in interference between "low" and "high" anxious psychopaths
Pham et al. (2003)	Stroop	PCL-R	N/A	Inmates, PCL-R 25+	Inmates, PCL-R <16	18	18	Psychopaths committed more errors than non-psychopaths (p = .026)
Hiatt et al. (2004)	Stroop	PCL-R	WAS	Inmates, PCL-R 30+	Inmates, PCL-R <21	29	34	No difference in interference between psychopathy groups. No difference in interference between "low" and "high" anxious psychopaths
	Box (Separated) Stroop			Inmates, PCL-R 30+	Inmates, PCL-R <21	26	43	No difference in interference between psychopathy groups (p = .05). Low anxious psychopaths less interference than high anxious psychopaths (p < .05)
Brinkley et al. (2005)	Stroop	PCL-R	WAS	Inmates, PCL-R 30+	Inmates, PCL-R <21	124		No difference in interference between psychopathy groups. No difference in interference between "low" and "high" anxious psychopaths
Dvorak-Bertsch et al. (2007)	Stroop	PCL-R	WAS	Inmates, PCL-R 30+	Inmates, PCL-R <21	55	42	No difference in interference between psychopathy groups. No difference in interference between "low" and "high" anxious psychopaths

Study	Task(s)	Psychopathy Measure	Anxiety Measure	Sample (all male)	Comparison Group	N_p	N_c	Results
Hamilton et al. (2014)	Box (Separated) Stroop	PCL-R	WAS	Inmates, PCL-R analysed as continuous variable		117		Higher psychopathy associated with less interference (p = .01). No evidence for a difference between high and low-anxious psychopathic participants.
Pasion et al. (2018)	Stroop	TriPM		Inmates	Community	56	48	Meanness was associated with increased interference, Boldness was associated with decreased interference, no relationship between Disinhibition and interference
Simmonite et al. (2018)	Stroop Box (Separated Stroop)	PCL-R	WAS	Inmates, PCL-R analysed as continuous variable		99		No relationship between psychopathy or anxiety and interference on either task.

PCL-R = Psychopathy Checklist-Revised; TriPM = Triarchic Psychopathy Measure; WAS = Welsh Anxiety Scale; N_p = number of participants in psychopathic group; N_c = number of participants in control group.

Psychopathy, at a global level, does not appear to inhibit performance on the Stroop task. Several studies have failed to identify any difference in Stroop interference, indexed by subtracting response times on congruent trials from incongruent trials, between offender groups considered high and low in psychopathy (e.g., Brinkley et al., 2005; Dvorak-Bertsch et al., 2007; Hiatt et al., 2004; Smith et al., 1992). Moreover, only one study appears to have identified a difference in error rates, with those high in psychopathy making a greater number of errors than those low in psychopathy (Pham et al., 2003). However, perhaps this is unsurprising. If response inhibition and modulation are related only to the Disinhibition domain of psychopathy, it is unlikely that any associations which might be present would emerge, as they would be masked during analyses such as these studies, which use only a composite PCL-R score, rather than analysing at the factor or domain level.

Other research examining Stroop effects and psychopathy at a more granular level has generated contrasting findings. Several studies (Table 6.1) have subdivided psychopathic participants into low and high-anxious subgroups using the Welsh Anxiety Scale (Welsh, 1956). High anxiety is thought to play a role in poor passive avoidance and failure to delay gratification (Newman et al., 2005; Patterson & Newman, 1993). Moreover, high anxiety is considered a marker for secondary psychopathy (Newman et al., 2005). Contrastingly, primary psychopathy is marked by low anxiety (Newman et al., 2005). In terms of anxious subgroups of psychopaths, high-anxious psychopaths (or disinhibited psychopaths) would be predicted to experience greater interference in a Stroop task because of issues with response inhibition and modulation. However, the findings do not entirely support this position. Most studies with male offenders appear to find no difference in interference on the classic colour word Stroop Task between high-anxious and low-anxious subgroups of psychopathic offenders (Brinkley et al., 2005; Dvorak-Bertsch et al., 2007; Hamilton et al., 2014; Hiatt et al., 2004; Smith et al., 1992). However, closer examination of their reported data indicates some evidence that high-anxious psychopathic individuals do experience greater interference in a classic Stroop Task. Brinkley et al. (2005) reported a mean reaction time on incongruent trials of 131.19 ms for high-anxiety psychopaths, compared with 106.37 ms for the low-

anxious psychopathic group, suggesting a heightened Stroop effect for high-anxious psychopaths. Similarly, the data from Hiatt et al. (2004) indicates a heightened Stroop effect (mean reaction time difference between incongruent and congruent trials) for high-anxious psychopaths (85.26 ms) when compared to low-anxious psychopaths (mean reaction time: 68.77 ms) which was not evident when comparing control groups which were similarly split. Both Hiatt et al. and Brinkley et al. used total sample sizes of around 60 participants, divided into psychopathic and anxious subgroups for comparison. Thus, the lack of significant findings may have arisen from having subgroups comprising as few as 10 individuals. Thus, there are suggestions within these studies that the classic Stroop task could be an indicator of difficulties with response inhibition and, hence, a possible external correlate of Disinhibition.

Research using psychopathy measures other than the PCL-R alongside the classic Stroop task appears scant. Only one study by Pasion et al. (2018) used the classic Stroop alongside the TriPM, and none could be identified which used the Box Stroop (see below) with this measure. With a forensic and a non-forensic community sample, Pasion et al. (2018) found that Meanness was associated with an increased Stroop effect, Boldness was associated with a decreased Stroop effect and there was no relationship between Disinhibition and performance on the Stroop. However, these findings are challenging to interpret as the calculation of the Stroop effect was unclear and did not appear to follow normal convention.

The Box Stroop Task

A variant of the Stroop task, the Box Stroop task, devised by Hiatt et al. (2004), may have the potential to offer further insight into whether there is an issue with response inhibition for those with Disinhibition. In this variation on a conventional Stroop, the word and colour are spatially separated, with the word (e.g., *red*) presented in black text inside a coloured rectangular frame, either congruent (red) or incongruent to the word (yellow). Participants are required to name the colour of the frame. This task aims to index attentional focus as the incongruent information (word)

is peripheral to the focus of the task (box colour) (Hamilton et al., 2014). This version of the Stroop should place less cognitive demands on participants as the classic Stroop; the spatial separation should allow participants to effectively screen out the irrelevant part of the display (colour word), while attending to the colour of the surrounding box (Dvorak-Bertsch et al., 2007). If response inhibition issues are underpinning Disinhibition, those with disinhibited tendencies should perform similarly to control participants. In incongruent trials, there is less conflicting information requiring detection due to the spatial separation. Thus, less demand will be placed on the ACC, thought to be functionally impaired in Disinhibition.

In addition to exploring the possibility of response inhibition issues underpinning Disinhibition, this task also allows exploration of the response modulation hypothesis (RMH; Baskin-Sommers et al., 2011) which theorises an attentional deficit underpinning psychopathy, briefly discussed in Chapter 1. This proposes that those with psychopathy fail to process secondary information which is peripheral to a goal or task (Hiatt et al., 2004). Therefore, in the Box Stroop, those with psychopathy might experience less, rather than equivalent, levels of interference when compared to control participants as they would fail to process the word stimuli due to being over-focused on naming the colour of the box frame, which is the goal (Hamilton et al., 2014).

Several studies have explored this paradigm in psychopathic forensic samples (Table 1) producing mixed findings. The original work by Hiatt et al. (2004) reported that psychopathic participants demonstrated less interference than control participants; however, it should be noted that the effect did not reach conventional levels of significance ($p < .05$). However, Hamilton et al. (2014) repeated this study and found that as PCL-R score increased, interference on the Box Stroop did in fact decrease. More recently, Simmonite et al. (2018) found no evidence to support the Box Stroop findings of Hamilton et al. (2014) or Hiatt et al. (2004). As with many of the Stroop studies with psychopathic offending samples, interference between high and low-anxious subgroups have been analysed. Interestingly Hiatt et al.'s (2004) found that high-anxious psychopathic participants

experienced significantly greater levels of task interference to their low-anxious counterparts. Though, this finding was not replicated by either Hamilton et al. (2014) or Simmonite et al. (2018). Therefore, the evidence for the Box Stroop as an indicator of greater goal-directed attentional focus in psychopaths seems limited.

Across the Stroop and separated Stroop studies, there are several methodological points to note. Firstly, many studies used small sample sizes, with some barely exceeding 10 participants per condition (e.g., Hiatt et al., 2004; Pham et al., 2003; Smith et al., 1992). Secondly, most have used offender samples (Brinkley et al., 2005; Dvorak-Bertsch et al., 2007; Hamilton et al., 2014; Hiatt et al., 2004; Pham et al., 2003; Smith et al., 1992) and thus, have not explored these tasks with samples where there are lower levels of psychopathic traits. Thirdly, many of the studies have analysed psychopathy as a global construct, creating subgroups of psychopaths on the basis of their PCL-R score. This approach does not allow for an examination of the disinhibited traits specifically, as it is feasible that those in the low psychopathy group may still be disinhibited. Contrastingly, those in the high psychopathy group might not be disinhibited if their traits are more interpersonal and affective, per Factor 1 psychopathy. Lastly, none of the studies explored the Stroop or Box Stroop with mixed gender samples; this is a possible shortcoming as gender effects in the Stroop have emerged in some studies where women have displayed shorter latencies in naming colours than men (Baroun & Alansari, 2006).

Study 1: The Classic and Box Stroop Tasks and the Go/No-go Task

Aims

As set out above, the studies covered in this chapter aim to explore the utility of the tasks discussed, go/go-go and Stroop (classic and separated) as potential external correlates of triarchic Disinhibition. However, revisiting the dual-process models of cognition covered in earlier chapters, performance on these tasks might be better predicted by an implicit measure of disinhibition than by the explicit equivalent, the Disinhibition scale of the TriPM. Thus, the disinhibition-IAT might better

predict performance on the go/no-go task or the Stroop tasks, particularly as these experimental tasks aim to index spontaneous behaviours, while TriPM Disinhibition may not predict it, or to a lesser degree. Study 1 reports the development of a go/no-go task, and a Stroop task which includes classic and separated trials.

This study designed a standard go/no-go task with a high proportion of go trials to set up the pre-potent response. Additionally, classic and Box Stroop tasks were created. Both tasks were explored with a large mixed-gender community sample size to evaluate whether either might serve as a behavioural measure of Disinhibition. Subject to both tasks demonstrating potential utility, the more successful one would be included in Study 2 as a behavioural measure with the disinhibition-IAT developed in Chapter 3. Consistent with the rest of this thesis, the Triarchic Psychopathy Measure (TriPM; Patrick, 2010) was used to measure explicit psychopathy.

Hypotheses

Go/No-go Task

It was hypothesised that Disinhibition would be related to increased levels of commission errors (no-go trials), given the importance of impairments in response inhibition theorised to underpin this psychopathic domain. However, given that others have identified a possible link between Meanness and commission errors (Ribes-Guardiola et al., 2020), an association between the two was also predicted.

Classic and Box Stroop Tasks

While the evidence is mixed for an association between disinhibition and the classic Stroop task, it was hypothesised that Disinhibition would be related to increased interference on the classic Stroop task; this is in line with evidence from several studies (Brinkley et al., 2005; Hiatt et al., 2004; Young et al., 2009), but counter to the findings of Pasion et al. (2018). No hypothesis was made

regarding the association between the Box Stroop task and Disinhibition due to the inconsistent findings across the literature.

Method

Participants

A within-participants design was employed.

Power Analysis. Consistent with other power analyses in the thesis, an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%) generated a sample requirement of N=160 per group (men and women). However, to allow for any poor-quality data or participants dropping out, the sample target was increased to 200 per gender.

Participant Sample. An online community sample was recruited by sharing the study link on social media and recruiting student participants via Swansea University's participant pool. Community participants were allowed to enter a prize draw for one of four £25 Amazon gift vouchers, while students were offered participation credits. All participants were required to be 18 or over and fluent in English due to using English-language questionnaires. Swansea University College of Human and Health Sciences granted ethical approval for the study, (Ref: 2022-5426-4655, Appendix E).

Altogether, 978 participants commenced the study, of which 510 completed it. As with previous studies within the thesis, participants aged 60 or over were removed, given possible slower reaction times (Dykiert et al., 2012), giving a final sample of 498 individuals (246 male, 234 female, 18 other or preferred not to say). The sample's mean age was 28.85 years (SD = 9.57; range 18 – 59). Participants were grouped into the ONS 5-category ethnic groups using their self-reported ethnicity. Most participants reported their ethnic group as White (81.9%), 10.1% reported their ethnicity as Asian, 3.6% as Mixed, 1.2% as Black, 2.2% as other, and 1.0% preferred not to say. Just over a third of the sample (36.7%) held an undergraduate degree, and almost a quarter (24.1%) held A-Level or

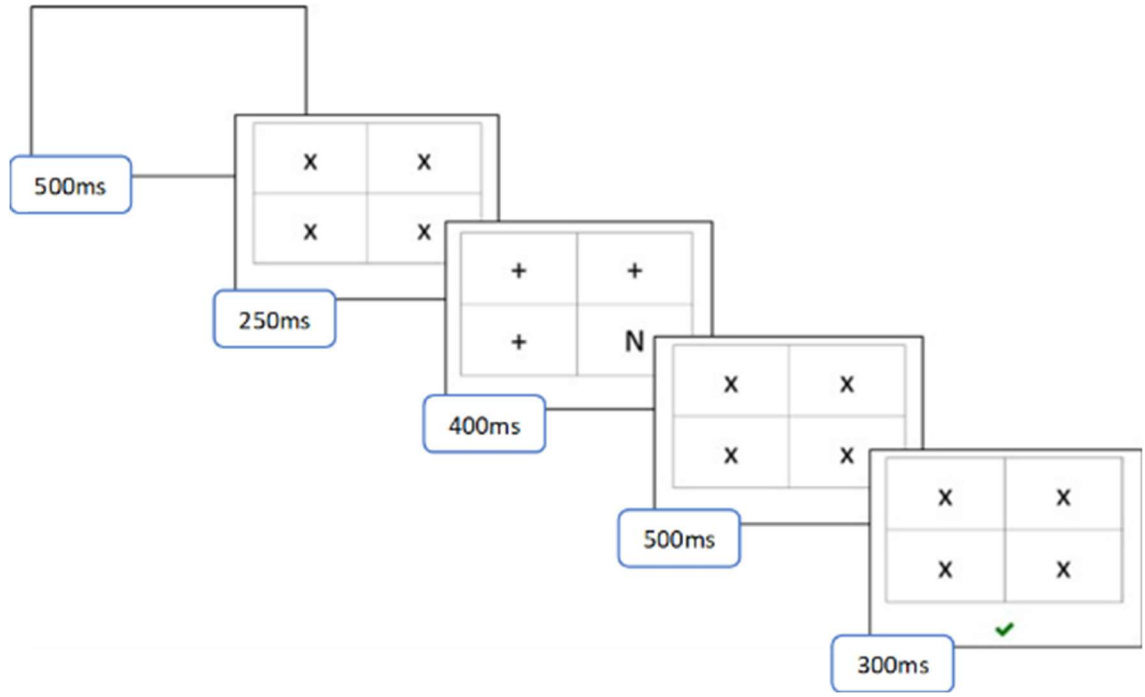
equivalent qualifications. 18.1% held a postgraduate degree, 10.3% reported holding non-UK or other qualifications, 7.0% held GCSE or equivalents, 2.4% reported no qualifications, and 1.4% had completed an apprenticeship.

Materials

Go/No-go Task. The go/no-go task used the letters M, N and W as stimuli. On go trials (M and N), participants were required to press a spacebar in response to the letter's appearance, while on no-go trials (W), they needed to withhold their response. Figure 6.1 illustrates the visual presentation and timings for each trial screen. The relevant letter was presented in black font on a white background within one of four quadrants, with the other three displaying a fixation cross. The letter grid was displayed for 400ms. On each trial preceding this was a blank screen shown for 500ms and a quadrant grid with an X in each quadrant shown for 250ms. After the letter grid, the same quadrant X grid was displayed, giving participants 500ms to press the spacebar or withhold response as necessary. Onscreen feedback (green tick or red cross) was provided for 300ms, indicating the participant's accuracy.

Before the main trials, there was a practice block of 6 trials (5 go and 1 no-go), which were randomly ordered. The block was then split into two halves. The first ten trials of each block were all N go-trials designed to set up a prepotent response. Altogether, there were 116 trials split equally across the two blocks (58 trials each). The first ten trials from each were discounted from analysis, and the remaining 48 per block consisted of 24 N, 12 M and 12 W trials. Thus, there were 72 go and 24 no-go trials altogether, giving a ratio of 75:25.

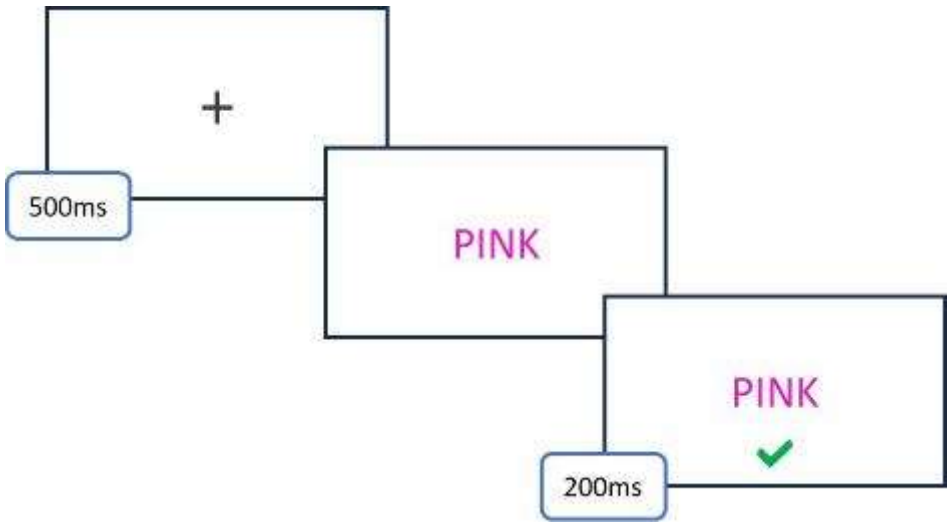
Figure 6.1: Sequence of screen presentations with display timings for the Go/No-go Task



Classic and Box Stroop Tasks. The classic and Box Stroop tasks were combined within a single task with two blocks. The first block was the classic Stroop task, and the second was the Box Stroop.

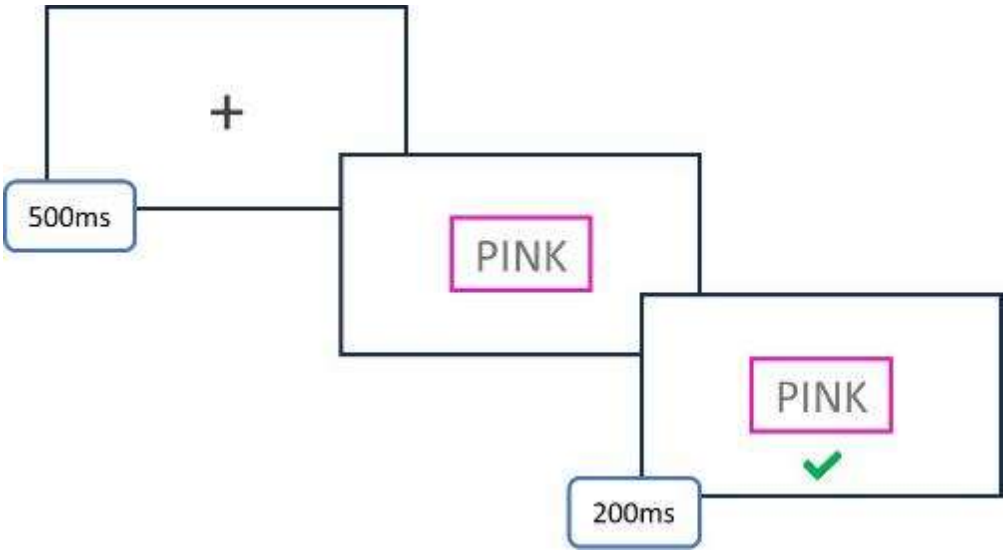
In the first block (classic Stroop), participants were presented onscreen with either the word *BLUE* or *PINK* and were asked to indicate using either the A key (pink) or L key (blue) on their keyboard, the font colour of the word. In the congruent condition, "BLUE" was in blue font, and "PINK" was in pink font. Font colours were reversed for the incongruent condition. The block commenced with six practice trials, where "XXXX" was displayed in blue or pink text. There were 64 main trials, with 16 for each word for both font colours and both congruencies. While the presentation of the trials was not randomised, due to concerns about randomisation generating too many identical trials in a row. Thus, trials were carefully ordered to ensure no consecutive trials were the same and participants completed them in the same order. Each trial was preceded with a fixation cross for 500ms; then, the stimulus was presented until the participant responded. Accuracy feedback was provided onscreen for 200ms, indicated by either a green tick or red cross. Figure 6.2 gives an illustration of trials in the classic Stroop.

Figure 6.2: Sequence of screen presentations with display timings for the Classic block of the Stroop Task



In block 2 (Box Stroop), the words “BLUE” or “PINK” were presented in grey font colour, with a coloured rectangle surrounding the word. Rather than indicate the font colour of the word, participants indicated the colour of the surrounding rectangle or box. The coloured box was congruent or incongruent with the word on the screen. All other details were as in the classic Stroop task. An illustration of the Box Stroop trials is shown in Figure 6.3.

Figure 6.3: Sequence of screen presentation with display timings for the Box block of the Stroop Task.



Explicit Psychopathy.

The 58-item Triarchic Psychopathy Measure (TriPM; Patrick, 2010) was administered to index explicit psychopathy.

Procedure

The study was delivered using the online programme Gorilla Experiment Builder. Participant information about the study was given, and they were asked to provide informed consent to participate. If they did so, they then provided demographic data of gender, age, ethnicity and highest educational qualification/achievement. Next, they completed the TriPM, and another self-report measure not reported here. Then they undertook three tasks: the Go/Nogo task, the Stroop (Classic and Box), and a third task, which is also not reported here. The tasks were presented in a randomised order to prevent order effects. Following this, they completed the two further self-report measure not discussed here. Participants were thanked, debriefed and allowed to either claim participation credits if they were Swansea University students or enter a prize draw to win a shopping voucher.

Data Analysis

Where questionnaire items were missing, as with the other studies reported in the thesis, scores were prorated using complete subscale item scores if there were less than 25% missing responses. Any questionnaire with 25% or more missing items was omitted from the analysis.

Results

Data Cleansing

Of the 498 participants who completed the study and were under 60, 56 had failed attention checks on the TriPM. Thus, the data from these participants were removed. This gave a final sample of 442 participants (219 men, 207 women, 14 other and 2 prefer not to say) with a mean age of 28.71 (9.84) years.

Visual inspection of histograms of the data highlighted that most scales were normally distributed with low levels of skew (< 1.0) (Tabachnick et al., 2007). However, both the Meanness and Disinhibition scales were negatively skewed with skew estimates > 1.0. For hypothesis testing, these scales were square root transformed ($x_{tran} = \sqrt{(1+x)}$), which produced distributions that were acceptable and had low skew (< 1.0).

Table 6.2 gives the means (standard deviations), skew and reliabilities for the subscales on the TriPM. It also reports a series of independent samples t-tests to ascertain if there were gender differences in each of the subscales. Differences between men and women emerged across all TriPM scales, with men self-reporting higher levels of Boldness, Meanness and Disinhibition.

The TriPM scales were correlated mainly in a similar manner to that reported previously (Chapters 3 and 5). Boldness and Meanness (r = .44, p <.001) and Meanness and Disinhibition (r = .68, p < .001) were positively associated. However, Boldness and Disinhibition were positively related (r = .23, p <.001) in this sample.

Table 6.2: Means, distribution skew and internal reliability for the TriPM, and a between-gender comparison for the final analysis sample (*N*=422).

		All			Men			Women			Gender difference	
		Mean (SD)	**Skew**	**α / Ω**	**Mean (SD)**	**Skew**	**α / Ω**	**Mean (SD)**	**Skew**	**α / Ω**	**t**	**d**
TriPM	**Boldness**	28.48 (9.98)	-0.06	.89 / .88	31.72 (9.81)	-0.40	.90 / .93	25.53 (9.02)	0.18	.85 / .84	6.78**	0.66
	Meanness	13.31 (10.81)	1.34	.94 / .94	17.28 (11.99)	0.99	.94 / .94	9.10 (7.68)	1.65	.89 / .89	8.77**	0.85
	Disinhibition	16.67 (10.48)	1.07	.91 / .91	18.87 (11.93)	0.91	.93 / .93	14.05 (8.23)	0.89	.86 / .87	4.57**	0.44

TriPM = Triarchic Psychopathy Measure. Note that both Cronbach's Alpha and McDonalds Omega are reported for reliability as some data was skewed. Independent samples t-test are reported (sqrt transforms were used for Meanness and Disinhibition data was skewed outside of acceptable limits for the whole sample). Levene's test for equality of variances was significant for all bar Boldness. Thus, t-test results for equal variances not assumed are reported. ** $p < .001$, * $p < .01$

The Go/No-go Task & Psychopathy

Further exclusions were made on the final sample of 442 participants. Any participants with >5 omission errors (incorrect response on go-trials) or a mean RT of <250 or >1000ms on either type of trial were removed from this analysis[10]. This gave a sample of *n* = 394 for the go/no-go task analysis. Table 6.3 provides the mean and range of the reaction times for both go and no-go trials and the mean and range of errors. As both the omission errors and No-go reaction time variables were skewed, sqrt and log transforms were used. However, neither brought the data into acceptable skew levels or a normal distribution. Therefore, Spearman's rho (non-parametric) correlations were completed between the TriPM and the reaction times and error rates (Table 6.4).

It is worth noting that the go/no-go task was designed to produce a relatively large percentage of commission errors in comparison to many previous studies (see p.168). It appears this endeavour was successful as mean percentage commission errors were 33.7% (SD = 18.1%) with a large range from 0 to 95.8% errors which is more conducive to detecting possible individual differences in performance.

Table 6.3: Descriptive data for the go and no-go trials

	Mean RT (SD)	**RT Range**	**Skew**	**Mean % errors (SD)**	**Error range %**	**Skew**
Go Trials	429.07 (57.65)	250.15 – 610.06	0.26	1.08% (1.74%)	0 – 6.95%	1.92
No-go Trials	715.28 (110.62)	285.59 – 899.17	-1.14	33.67% (18.14%)	0 – 95.83%	0.83

As hypothesised, Triarchic Disinhibition was positively correlated with the rate of commission errors (responding to trials on which no response should be given). Disinhibition was also negatively

[10] No exclusion criteria were placed on the number of commission errors (no-go trials). While some participants produced many commission errors, their data were included as theoretically high commission errors is linked to disinhibition. Supplementary analysis were completed where those with >20 commission errors were removed and the results remained significant.

associated with response speed on these no-go trials. As predicted, there were no effects relating to Disinhibition on the go trials. There were no effects related to Boldness or Meanness on any of the Go/No-go measures.

Table 6.4: Associations (Spearman's rho) between self-reported psychopathy and reaction times and error rates on the two types of trial for all participants

Measure	Subscale	No-go Errors (Commission)	No-go Reaction Times	Go Errors (Omission)	Go Reaction Times
TriPM	**Boldness**	-.04	.05	.01	.04
	Meanness	.12	-.10	.09	.13
	Disinhibition	.21**	-.19**	.08	.10

* denotes correlation at < .01 level, ** denotes correlation at < .001 level, TriPM = triarchic psychopathy measure

A hierarchical multiple linear regression was conducted to examine the role of each of the TriPM scales on commission errors (no-go errors). As the demographics of age and gender were entered at Step 1, 16 participants who reported their gender as neither male nor female were omitted from the regression. In Step 2, the three scales of the TriPM were added to the model. The results are displayed in Table 6.5. Increased commission errors were associated with being younger (p = .006), and higher self-reported levels of triarchic Disinhibition (p = .005).

Table 6.5. Hierarchical Regression Analysis – TriPM and Commission errors on No-go trials.

Variables		Model 1	Model 2
Step 1. Demographics			
	Gender	.05	.06
	Age	-.15*	-.14*
Step 2. TriPM			
	Boldness		-.03
	Meanness		.07
	Disinhibition		.17*
F-value		4.81*	5.70*
Adjusted R^2		.02	.06
ΔR^2		-	.04

* denotes p < .01, TriPM = triarchic psychopathy measure

The Stroop Tasks and Psychopathy

Classic Stroop Task.

As with the go/no-go analysis, exclusions were made on the final sample of 442 participants to determine the final analysis sample for each Stroop Task. Any participants with ten or more incorrect congruent or incongruent trials were excluded due to possible careless responding or task misunderstanding, giving a sample of n = 410 for the Classic Stroop Task. Mean congruent and incongruent reaction times were calculated per participant, excluding incorrect trials or any trials with excessively fast or slow reaction times (<250ms or >1500ms). These are shown in Table 6.6.

Table 6.6: Mean number of Classic Stroop incorrect trials and mean reaction time after exclusions. Standard deviations are given in parenthesis.

	Mean % Errors (SD)	**Reaction Time**
Congruent trials	2.91% (4.39%)	505.77 (119.94)
Incongruent trials	4.82% (4.95%)	544.11 (134.39)

As the distributions for congruent and incongruent trials were skewed, both variables were sqrt transformed, which brought skew within an acceptable range (congruent = 0.91, incongruent = 0.65). A paired samples t-test showed that reaction times were significantly shorter in the congruent compared to the incongruent condition ($t(409) = 15.11$, $p < .001$, $d = 0.75$, 95% CI [0.64, 0.86]) which replicates the classic Stroop effect with a moderate effect size.

To explore the relationship between the Stroop effect and psychopathy, a Classic Stroop effect score (Incongruent RT – Congruent RT) was calculated, which was then correlated with the scales of the TriPM. The Classic Stroop effect score was normally distributed, with a skew of 0.20. The TriPM Boldness ($r = .01$, $p = .83$) and Meanness ($r = .08$, $p = .09$) scales were not associated with the Stroop effect score. However, as hypothesised, Disinhibition ($r = .14$, $p = .004$) was positively associated with the Stroop effect score though the effect size was small.

A hierarchical multiple linear regression was conducted to examine the role of each of the TriPM scales on the Classic Stroop effect score. As the demographics of age and gender were entered in Step 1, participants who reported their gender as neither male nor female were omitted from the regression. In Step 2, the three scales of the TriPM were added to the model. The results are displayed in Table 6.7. A greater Stroop effect was associated with being female ($p = .001$), and with higher levels of triarchic Disinhibition ($p = .03$).

Table 6.7: Hierarchical Regression Analysis – TriPM and Stroop effect

		Classic Stroop Effect	
Variables		**Model 1**	**Model 2**
Step 1. Demographics			
	Gender	.16*	.17*
	Age	.09	.09
Step 2. TriPM			
	Boldness		.05
	Meanness		-.02
	Disinhibition		.13
F-value		6.25*	4.00*
Adjusted R^2		.03	.04
ΔR^2		-	.01

* denotes p < .01, TriPM = triarchic psychopathy measure

Box Stroop Task and Psychopathy

Any participants with ten or more incorrect congruent or incongruent trials were excluded, giving a sample of *n* = 414. Mean congruent and incongruent RTs were calculated per participant, excluding incorrect trials or any trials with excessively fast or slow reaction times (<250ms or >1500ms). These are given in Table 6.8.

Table 6.8: Mean number of incorrect Box Stroop trials and mean reaction time after exclusions. Standard deviations are given in parenthesis.

	Mean % Errors (SD)	**Reaction Time**
Congruent trials	4.17% (0.50%)	478.95 (102.08)
Incongruent trials	4.70% (0.54%)	494.20 (105.08)

As the distributions for congruent and incongruent trials were skewed, the variables were firstly sqrt transformed and then log transformed. The latter brought skew within an acceptable range (congruent = 0.84, incongruent = 0.61). A paired samples t-test revealed a Box Stroop effect with small effect size ($t(413) = 8.91$, $p < .001$, $d = 0.44$, 95% CI [0.34, 0.54]); reaction times were significantly shorter in the congruent trials.

To explore the relationship between the Box Stroop effect and psychopathy, a Box Stroop effect score was calculated (Incongruent RT – Congruent RT), which was then correlated with the scales of the TriPM. The Box Stroop effect score was normally distributed, with a skew of -.09. No relationships emerged between any of the TriPM scales and the Box Stroop effect: Boldness ($r = -.02$, $p = .73$), Meanness ($r = -.04$, $p = .40$) and Disinhibition ($r = -.03$, $p = .63$).

A hierarchical multiple linear regression was conducted to examine the role of each of the TriPM scales on the Box Stroop effect score. As the demographics of age and gender were entered in Step 1, any participants reporting their gender as neither male nor female were omitted from the regression. In Step 2, the three scales of the TriPM were added to the model. The results are displayed in Table 6.9. The Box Stroop effect was only associated with being female ($p = .007$).

Table 6.9: Hierarchical Regression Analysis – TriPM and Box Stroop Effect

		Box Stroop Effect	
Variables		**Model 1**	**Model 2**
Step 1. Demographics			
	Gender	.13*	.13*
	Age	-.03	-.04
Step 2. TriPM			
	Boldness		.05
	Meanness		-.04
	Disinhibition		-.03
F-value		4.21	2.06
Adjusted R^2		.02	.01
ΔR^2		-	.00

* denotes p < .01, TriPM = triarchic psychopathy measure

Discussion

Firstly, as predicted for the go/no-go task, Disinhibition was associated with higher commission errors (no-go trials). However, contrasting with Ribes-Guardiola et al. (2020), Meanness was not a predictor of higher levels of commission errors. Secondly, as hypothesised, Disinhibition was also related to increased Stroop interference, in line with some, but not all, findings (Brinkley et al., 2005; Hiatt et al., 2004; Young et al., 2009). Yet, it also emerged that being female was also associated with experiencing increased interference on this task. Gender effects in the Stroop task have emerged in some, but not all, studies, and there are inconsistencies as to whether men or women experience a greater Stroop effect (for discussion, see Baroun & Alansari, 2006; Sjoberg et al., 2023). Lastly, while no hypothesis was made regarding an association between the Box Stroop task and Disinhibition, in line with Simmonite et al. (2018) no evidence emerged to suggest less

interference on this task for those with higher levels of this triarchic domain. These results offer little support for the RMH (Baskin-Sommers et al., 2011), where those higher in psychopathy should experience less interference on this task due to over-focussing on the box frame and failing to process the word stimuli.

These findings offer support for both the go/no-go task and the Stroop as possible external correlates of disinhibition. However, a decision was taken to include only one behavioural task alongside the IAT in Study 2 due to efforts to minimise participant fatigue and ensure effort. The chosen task was the go/no-go. Of the two, this was selected as it is a commonly used measure of response inhibition specifically, allowing for construct measurement (Gillespie et al., 2022). Additionally, in the go/no-go results no gender effect emerged. This may be important for future attempts to generate behavioural tasks as correlates to psychopathy, as any selected behavioural task would ideally perform similarly across genders. The box Stroop was not considered for Study 2 as the results here suggest that performance on this task is not associated with triarchic psychopathy.

Study 2: Implicit Disinhibition and the Go/No-go Task

Study 2 used the go/no-go task from Study 1 alongside the disinhibition-IAT. Study 2 formed part of the same IAT study described in Chapter 5. Thus, the TriPM was administered to index explicit psychopathy (TriPM; Patrick, 2010) and the BIDR-16 (Hart et al., 2015) to measure self-deception and impression management.

Drawing on the findings from Study 1, it was hypothesised that of the three domains of the TriPM, only Disinhibition would be associated with performance on the go/no-go task. Specifically, as Disinhibition increased, there would be a corresponding increase in commission (no-go) errors. Secondly, it was hypothesised that, in line with the findings of Chapter 3, TriPM Disinhibition would be positively associated with the disinhibition-IAT D-scores. Thirdly, it was hypothesised that a positive association would also emerge between the disinhibition-IAT scores and the go/no-go task

performance, where higher implicit Disinhibition would be associated with greater commission errors.

Method

The method for this study is covered in Chapter 5's main study. The go/no-go task was identical to that developed and described earlier in this chapter, and the disinhibition-IAT from Chapter 3 was used alongside it. Ethical approval for this study was given in the application 2022-5420-4647 (Appendix D).

Results

Data Cleansing

The data cleansing process and exclusions for the whole sample are detailed in Chapter 5. Following these, the final sample for the disinhibition condition comprised 312 participants (Table 5.4, Chapter 5). Descriptives for the final sample are given in Table 5.5, Chapter 5. Explicit Disinhibition was negatively associated with both the self-deception (ρ = .42, p < .001) and impression management (ρ = .38, p < .001) scales of the BIDR-16.

Implicit Psychopathy (Disinhibition IAT)

The disinhibition-IAT demonstrated good internal consistency (split-half correlation with Spearman-Brown correction, Table 12), comparable with that reported for this IAT in Chapter 3. Moreover, as reported in Chapter 5, the IAT's internal consistency was comparable with that of its direct equivalent, the Disinhibition scale of the TriPM (α = .87). No difference emerged between scores for men and women on the disinhibition-IAT. The negative disinhibition-IAT scores (Table 6.10) indicate that most participants associated themselves with being sensible rather than reckless, mirroring the findings in Chapter 3 for the same IAT.

Table 6.10: Descriptive statistics, reliability, and gender comparison (mean) for the Disinhibition Implicit Association Test (IAT)

	N	(α)	Mean (SD)	Mean Men : Women	t / p	Effect Size [95%CI]
Disinhibition-IAT	312	.83	-0.42 (0.46)	-0.41 : -0.42	.19 / .850	.02 [-.20 : .25]

Implicit and Explicit Disinhibition

Unlike the results from Chapter 3, no association emerged between implicit and explicit disinhibition within this study (r = .01, p = .42).

Go/No-go Task and Explicit Disinhibition

While the distribution of commission errors was normal, the distribution of omission errors was skewed. Sqrt and log transforms were completed. However, neither brought the data into acceptable skew levels. Thus, Spearman's rho (non-parametric) correlations were completed between the TriPM and error rates and RTs on the go/no-go task (Table 6.11). Unlike Study 1, no associations emerged between the Disinhibition scale of the TriPM and no-go trial errors or reaction times.

Table 6.11: Correlations (Spearman's rho) and partial correlations controlling for BIDR-16 self-deception and impression management between direct measures of psychopathy and performance on the go/no-go task

Measure	Subscale	No-go Errors	No-go RTs	Go Errors	Go RTs
TriPM	**Boldness**	.02 / .03	.00 / -.02	.07 / .06	.09 / .05
	Meanness	-.02 / -.01	.00 / .01	.00 / -.02	.00 / .02
	Disinhibition	.02 / .00	-.03 / .00	.02 / .03	-.02 / .04

Go/No-go Task and Implicit Disinhibition

Non-parametric correlations (Spearman's rho) were completed between disinhibition-IAT D-scores and performance on the go/no-go task (Table 6.12). Against hypotheses, no association

emerged between the disinhibition-IAT D-scores and no-go errors. The only association between IAT D-scores and performance on the go/no-go task which emerged was a reduction in go trial errors (p = .017).

Table 6.12: Correlations (Spearman's rho) between the indirect measure of Disinhibition (Disinhibition IAT) and performance on the go/no-go task

Measure	No-go Errors	No-go RTs	Go Errors	Go RTs
Disinhibition IAT	-.03	-.00	-.12	-.02

Discussion

This chapter has described developing and exploring three behavioural measures, one go/no-go and two Stroop tasks, as potential tasks to sit alongside the disinhibition-IAT. In Study 1, greater interference on the go/no-go task and the Classic Stroop was associated with increased levels of explicit triarchic Disinhibition. For the Box Stroop (Hiatt et al., 2004), no evidence emerged to suggest an enhanced performance on this task for those with higher levels of this triarchic domain. While both the classic Stroop and go/no-go tasks demonstrated potential to carry forward into Study 2, due to efforts to minimise participant fatigue, only one task was selected: the go/no-go task. The second study used the go/no-go task alongside direct (TriPM) and indirect (IAT) measures of triarchic Disinhibition to explore whether the go/no-go task might be suitable as an indirect behaviour measure for this domain of psychopathy. In Study 2, against hypotheses and counter to findings from Study 1, no association between explicit psychopathy and increased commission (no-go errors) emerged. Moreover, the previously identified (Chapter 3) association between implicit and explicit Disinhibition was not evident. There was also no association between implicit psychopathy and performance on the go/no-go task.

Implicit and Explicit Disinhibition

Together with the findings from Chapter 3, there is mixed evidence for the utility of the disinhibition-IAT as an implicit tool to index triarchic Disinhibition. In Chapter 3, the Disinhibition

TriPM and D-scores were significantly and positively correlated, while in the second study of this chapter, no such association emerged. In Study 2 of this chapter, the IAT demonstrated no concurrent or discriminant validity.

Perhaps the IAT may not be a particularly suitable tool to index implicit Disinhibition. In Chapter 3, while there was an explicit-implicit association for Disinhibition, this magnitude was much smaller than that for the Meanness and Boldness domains. This may relate to triarchic Disinhibition essentially reflecting behaviours rather than particular personality traits, which are more suited to accessing via an IAT. Disinhibition is marked by impulse control issues, whereas Meanness and Boldness are both associated with affect and interpersonal engagement (Patrick et al., 2009). Thus, an alternative implicit measure for Disinhibition may be required to sit alongside the IATs created for the other domains of the triarchic model of psychopathy.

Disinhibition and The Go/No-go Task

Considering first explicit Disinhibition, across the two studies, mixed evidence emerged for the utility of the go/no-go task as a measure of behavioural Disinhibition. In the first study, higher levels of explicit Disinhibition were associated with higher commission (no-go) errors. Conversely, in the second study, there was no relationship between the two. These conflicting findings reflect those across the literature (Gillespie et al., 2022). Some (e.g., Lapierre et al., 1995) but not others (e.g., Maurer et al., 2016; Munro et al., 2007) which have found increased interference in the no-go trials for those with psychopathy. Given the array of go/no-go tasks which had been employed and issues with sample size, the design and method employed in both studies reported here aimed to deal with any apparent shortcomings in many of the studies. The first study indicated its potential utility. Thus, the conflicting findings in Study 2 were somewhat unexpected. Conceivably, the greater demands placed on participants in the second study might have impacted performance and effort on the go/no-go task. Study 2 was substantially longer and more demanding, including completing an IAT and several questionnaires. The samples that completed the disinhibition-IAT in Chapter 3 and

here appear similar in their educational and gender make-up, as well as the levels of disinhibition between the two being comparative. That the literature is also mixed on the association between impulsivity associated with psychopathy and performance on this task suggests further work is required to validate or discount it as a relevant and appropriate task.

Next considering implicit Disinhibition, as no association emerged between the implicit and explicit measures of Disinhibition, it is perhaps unsurprising that performance on the IAT was unrelated to the go/no-go task. If the Disinhibition IAT is not reliably indexing implicit Disinhibition, then no association with go/no-go task performance would be expected. As set out above, further options should be explored to identify alternative implicit methods which may be suitable to index implicit Disinhibition.

Limitations and Next Steps

As mentioned above, alternative implicit tasks should be identified which might be useful to index implicit disinhibition, as conceptualised by the triarchic model of psychopathy. Further research using the triarchic model and the go/no-go and Stroop tasks is also needed. The go/no-go task generated initially generated promising findings regarding its suitability as an external correlate of Disinhibition. While the Stroop was not carried forward to the second study, it too yielded some interesting results in the first study, save for the potential complications of the emergent gender variance. Thus, it would be interesting to attempt to replicate these tasks again to either validate or disconfirm their suitability as an external correlate of Disinhibition. The current literature using this psychopathy model is scant, perhaps surprising given the burgeoning prominence of the model and its close links to trait disinhibition and theorised neurological underpinnings. Further explorations of these, and other P3 tasks such as the stop-signal task (see Gillespie et al., 2022) would add further to the literature.

The next, and final, experimental chapter of the thesis explores a single task as a possible alternative external correlate of psychopathy, rather than a task for each psychopathic domain: the

attentional blink (Chun & Potter, 1995; Raymond et al., 1992). The response modulation hypothesis (RMH) proposes that both emotional dysfunction and disinhibited behaviours associated with psychopathy may originate from an attentional deficit. Thus, a task which indexes attentional deficit will allow for more in-depth consideration of the legitimacy of the RMH as an account for all psychopathic traits and behaviours.

Chapter 7: Attentional Blink

Chapter 5 explored the suitability of two Affect Misattribution Procedures (AMP; Payne et al., 2005) as potential implicit measures of affective processing associated with triarchic Boldness and Meanness. Chapter 6 examined the Go-Nogo and Stroop tasks as possible behavioural correlates of triarchic Disinhibition. As an alternative to using multiple tasks, this chapter explores the potential of a single task, the Attentional Blink (Chun & Potter, 1995; Raymond et al., 1992) as an external correlate for all three domains of triarchic psychopathy.

Attentional Dysfunction in Psychopathy

Recently, the response modulation hypothesis (RMH) of psychopathy has emerged which proposes that psychopaths have a disorder in attentional processes such that they over-focus on information related to their attentional goal and are unable to shift attention to other peripheral sources of information (Gorenstein & Newman, 1980). This exaggerated attention to the object of focus can also be thought of as an "exaggerated attentional bottleneck" (Wolf et al., 2012) in that less information outside the attentional bottleneck is processed.

Hence, this might on some occasions appear as a deficit in emotional processing when this emotional information is a peripheral source of information. However, RMH proposes that deficits in attentional processes should be seen even when no emotional information is being used (see Chapters 5 and 6).

The Attentional Blink Paradigm

The Attentional Blink paradigm has become a mainstay of research on attentional processing (Dux & Marois, 2009). In this paradigm a series of images is presented in rapid succession (e.g. 100 ms each) at the same location. The participant is required to look for targets occurring within this stream of images. A typical trial is illustrated in Figure 7.1. In this case, modelled on the work of Chun and Potter (1995), the participant is asked to report on the identity of two target stimuli identified as

the two letters within a set of other images that were digits, after the stream of images has finished. The “attentional blink” (Raymond et al., 1992) manifests itself as the poor detection of the second target (T2) when this second target occurs shortly (approximately 100 – 600 ms) after the presentation of the first target.

While various forms of the attentional blink paradigm exist, one of the most well-known attentional blink paradigms is that of Chun and Potter (1995) illustrated in Figure 7.1. Their seminal work explored and reconciled previous theories regarding the origin of the attentional blink and gave rise to the current understanding of its causes. Earlier researchers, such as Raymond et al. (1992), had suggested that when a second target is presented while a first is still being processed, interference and attentional suppression occurs, leading to the attentional blink. Others (e.g., Weichselgartner & Sperling, 1987) had proposed two forms of attentional processing: one effortless and one effortful, which together produce a bimodal pattern of target identification where targets close together and far apart are identified, but those with a gap between them of around 200-400ms are not identified. Chun and Potter’s letter target and number distractor paradigm indicated that processing in attentional blink tasks involves two stages. The first stage, where the first target is identified and consolidated, is slowed when it is followed by other items. This leads to delays in second stage processing for the second target (Chun & Potter, 1995). The Chun and Potter paper has been cited over 2,000 times (May, 2024) and their paradigm has been adapted in studies exploring the attentional blink and psychopathy which will be discussed shortly. It therefore formed the basis for the task developed in this thesis to investigate possible attentional disturbance due to psychopathic traits.

Attentional Blink and Psychopathy.

As the attentional blink is associated with encoding and overlapping processing demands, and the RMH is thought to be underpinned by an exaggerated attention bottleneck the attentional blink task is of particular interest in psychopathy and exploring the validity of the RMH. However,

advocates of the theory seem conflicted as to how the attentional blink may manifest in those with higher levels of psychopathy with even directly opposing predictions! For instance, Wolf et al. (2012) emphasised the idea that the goal of the participants is to identify the second target (T2) and would therefore be *less* distracted by the first target (T1) and predicted that psychopathy would be associated with a *reduced* attentional blink. On the other hand, Tillem et al. (2021) hypothesised that the exaggerated bottleneck would lead to a stronger focus on the first target (T1) and therefore a *greater* distraction from T1 on the detection of T2 and therefore an *exaggerated* attentional blink. From a purely theoretical viewpoint is seems impossible to say which of these two predictions is "correct". In the classic attentional blink paradigm (such as the one to be used in this chapter) participants are asked to report on both T1 and T2 with no instruction that one if more important than the other. So we might expect a similar level of "focus" on both targets.

Empirical research has suggested support for each of these predictions from its proponents. Wolf et al. (2012) used an attentional blink task and administered the Psychopathy Checklist Revised (PCL-R; Hare, 1995) in a sample of male offenders. Participants were categorised as either high psychopathy (PCL-R >=30) or low psychopathy (PCL-R <21). Those in the high psychopathy group displayed a significantly smaller attentional blink (better accuracy in recalling target letters) than those in the low psychopathy group. A hierarchical multiple regression analysis with intelligence at step 1, and PCL-R factors at step 2, as predictors of T2 accuracy, yielded significant change at both steps. Neither PCL-R factor was a significant predictor of T2 accuracy once the other PCL-R factor had been controlled for.

Baskin-Sommers et al. (2012) used a similar paradigm to that of Wolf et al.. While they did not state that they were exploring psychopathy in relation to the attentional blink, they used a measure of externalising (impulsivity-antisociality) strongly associated with Factor 2 psychopathy. . Baskin-Sommers et al. (2012) found that offenders with high externalising (thus, high levels of traits

related to PCL-R Factor 2) displayed significantly greater attentional blink than low externalising offenders.

Tillem et al. (2021) used a non-classic attentional blink paradigm that presented participants with a visual target (red or blue circle) and then, either 300 or 1100ms later, one of two auditory targets. Participants indicated which visual and auditory targets had been presented using a series of four buttons. Tillem et al. (2021) found that global psychopathy score, measured using the Self-Report Psychopathy Scale (SRP-4; Paulhus et al., 2016), was associated with slower response times (as opposed to the classic attentional blink task where accuracy is the dependent variable) to a second target when compared to baseline performance in a dual-task paradigm and interpreted this as evidence for a greater attentional blink in those with high psychopathic traits. Tillem et al.'s (2021) supplementary analysis revealed that only Factor 2 (the behavioural and impulsive traits) was associated with evidence for a bottleneck. This finding bears resemblance to earlier work by Baskin-Sommers et al. (2012) that offenders with high externalising (thus, high levels of traits related to PCL-R Factor 2) displayed significantly greater attentional blink than low externalising offenders. Therefore, it appears from both the Baskin-Sommers et al. (2012) and Tillem et al. (2021) studies that psychopathy may in fact be associated with a greater attentional blink, and that this is related in particular to the impulsive-antisociality aspects of psychopathy.

The Attentional Blink Paradigm and Personality Traits

The possible exaggerated attentional blink which appears to be associated with impulsive and antisocial aspects of psychopathy relates to some findings from research exploring attentional blink performance and personality traits more generally. MacLean and Arnell (2010) used the NEO-PI-R (Costa & McCrae, 1992) and the Emotion Report Form (ERF; Fredrickson & Branigan, 2005) alongside an attentional blink task. They found that higher levels of extraversion and state positive affect was significantly associated with a smaller magnitude attentional blink, and those with higher levels of neuroticism demonstrated a larger attentional blink (although the latter did not quite reach

conventional significance, *p* = .052). In a regression, where neuroticism, extraversion, openness, and conscientiousness were entered simultaneously as predictors of attentional blink, they combined to explain 44% of variability in attentional blink magnitude ($R = .66$, $p < .05$). Both extraversion and openness were predictive of a smaller attentional blink, while neuroticism was predictive of a greater attentional blink.

These findings are relevant to psychopathy and predictions which might be made about the attentional blink, as the TriPM domains hold particular associations with the five-factor model of personality. Poy et al.'s (2014) analysis highlighted that Boldness is marked by high extraversion and openness, and low neuroticism. Thus, from MacLean and Arnell (2010) findings it seems reasonable to expect those high in Boldness to generate a smaller attentional blink. Contrastingly, as Disinhibition is characterised by high neuroticism and to a lesser degree extraversion (Poy et al., 2014), correspondingly, those high in this triarchic domain may experience a greater attentional blink, similar to the findings of Baskin-Sommers et al. (2012) and Tillem et al. (2021). As Meanness is predicted by low agreeableness and low conscientiousness (Poy et al., 2014) this domain may have no association with attentional blink performance if MacLean and Arnell (2010) findings bear out.

The Attentional Blink Paradigm and Impulsivity

Further research adds to the prediction of differential attentional blink performance associated with different triarchic domain scales. Troche and Rammsayer (2013) explored the relationship between functional and dysfunctional impulsivity using Dickman's Impulsivity Inventory (DII; Dickman, 1990) and a phenomenon in attentional blink research where some participants do not show an attentional blink ("non-blinkers"). While there was no difference in dysfunctional impulsivity between non-blinkers and blinkers (who show an attentional blink), higher levels of functional impulsivity were found in non-blinkers. In the factor analysis which led to the development of the UPPS measure of impulsivity, Whiteside and Lynam (2001) found that the functional impulsivity scale of the DII loaded onto UPPS Sensation Seeking. Both TriPM Boldness and

Meanness have emerged as predictors of scores on the UPPS-P Sensation Seeking scale (Weidacker et al., 2017), and as such, may be associated with the "non-blinker" phenomenon. Thus, the evidence from the wider literature on personality traits and the attentional blink offers further support for the findings of Baskin-Sommers et al. (2012) and Tillem et al. (2021) while also pointing towards particular hypotheses which could be made about attentional blink performance and triarchic psychopathy scales.

Hypotheses

As the research examining attentional blink and personality traits has identified associations between traits associated with Disinhibition and poorer attentional blink performance, it was predicted that those high in Disinhibition would demonstrate a greater attentional blink (worse accuracy on T2) than those low in Disinhibition. As a reduced attentional blink (enhanced accuracy on T2) has emerged in those with traits associated with Boldness, it was also predicted that those high in Boldness would demonstrate a smaller attentional blink than those low in Boldness. Evidence which might allow a prediction to be made about Meanness is limited, therefore no prediction was made between Meanness and attentional blink performance.

Pilot Study

Prior to running the main study, a small pilot study was undertaken to ensure that the developed attentional blink task generated an attentional blink.

Method

Participants

A convenience sample of 16 participants was recruited from friends and family. The sample had a mean age of 41.06 (*SD* = 14.12); 12 were women and 4 were men. Ethical approval was granted by Swansea University College of Human and Health Sciences (Ref:1-2023-5998-5290). A copy of the ethical application is included as Appendix F.

Materials

Attentional Blink Task.

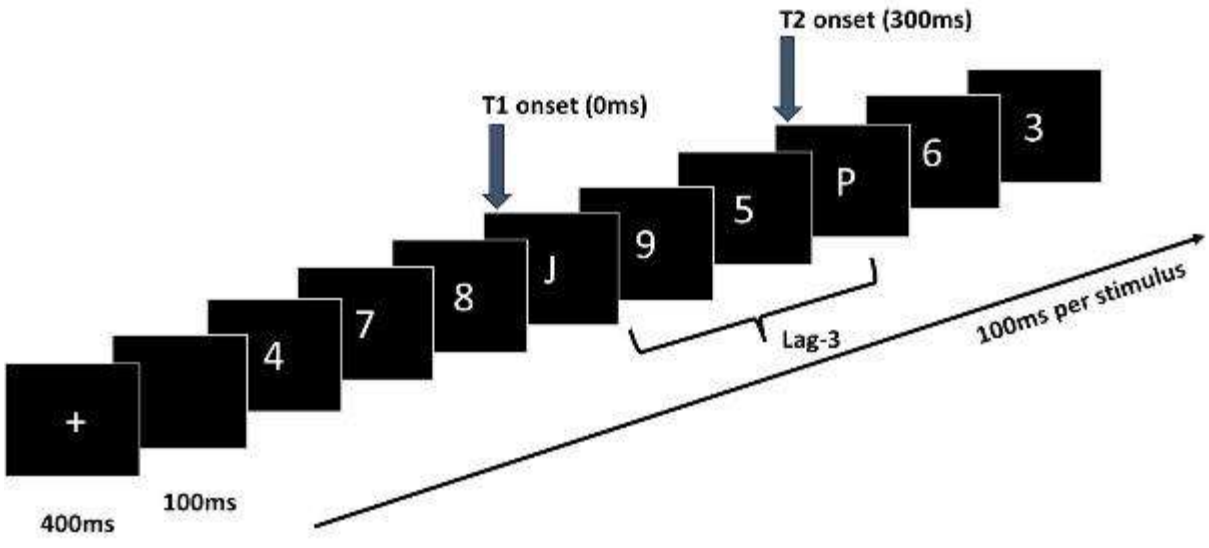
The attentional blink was based upon the experimental task devised by Chun and Potter (1995). This was chosen in preference to replicating the versions of the attentional blink task used by Wolf et al. (2012) and Baskin-Sommers et al. (2012) for several reasons. The Chun and Potter attentional blink task has 30 trials per lag compared to 24 trials per lag in both the Wolf et al. and Baskin-Sommers et al. attentional blink tasks. While this is not a large difference, sufficient data points are needed when exploring dual-task paradigms such as this, as it has been a criticism of some psychopathy studies previously undertaken (Kosson, 1996, cited in Tillem et al., 2021). Thus, 30 trials per lag were included to allow for greater individual differences, in line with Chun and Potter. Furthermore, the Chun and Potter paradigm has substantially shorter length trials (14 distractor digits, 2 target letters) than the task used by Wolf et al. and Baskin-Sommers et al. (24 distractor digits, 2 target letters) while still generating a robust attentional blink. Thus, it appears that shorter length trials perform the required function but place less time demands on participants. However, one adaptation was made to Chun and Potter's design to further minimise participant demand; the number of trials here was reduced to two blocks of 60 trials each (120 total), rather than three blocks of 80 trials. This was done in conjunction with removing some of the lags originally explored by Chun and Potter as their analysis shows little difference in attentional blink performance between Lags 2 and 3, and that task performance flattens out from Lag 6 onwards. In the version administered here, 30 trials each of Lag 1, Lag 3, Lag 5 and Lag 9 were given. One further practical adaptation was required to Chun and Potter's design; as the task was completed online using a computer, participant responses were given via the keyboard rather than verbally.

Trials consisted of 16-item rapid serial visual presentations (RSVP), comprising 14 digits and 2 letters. Digits and letters were shown in white font on a black background. The fourteen digits within each RSVP stream were randomly selected from numbers 2-9 (avoiding 0 and 1 due to

similarities with letters O and I), and no digit appeared in the previous four positions. The two target upper-case letters for each trial were also randomly selected by the programme, from a choice of 24 (excluding O and I, due to similarities with numbers 0 and 1). Each trial consisted of a fixation cross for 400ms, then a blank for 100ms, then the RSVP stream with no interstimulus interval blanks. Each digit and letter in the RSVP stream were displayed for 100ms. An illustration of each trial is given in Figure 7.1. The trial structure and screen timings are identical to those used by Chun and Potter (1995), save for removing the ampersand mask from the end of each trial as in test it was distracting and it was unclear why Chun and Potter included it. Participants were asked to report the two letters in order immediately after the trial.

Participants completed 6 practice trials. These started slowly, and progressively became quicker to gradually introduce participants to the task demands (1 x 400ms, 1 x 300ms, 2 x 200ms, 2 x 100ms). Accuracy feedback was provided on practice trials but not main trials. The experiment was self-paced, with participants pressing the space bar on the computer keyboard to move through trials. Responses were captured on two consecutive screens, the first asking them to key in the letter of the first target, and the second screen asking them to key in the letter of the second target.

Figure 7.1: Illustration of RSVP stream in the attentional blink task developed here.



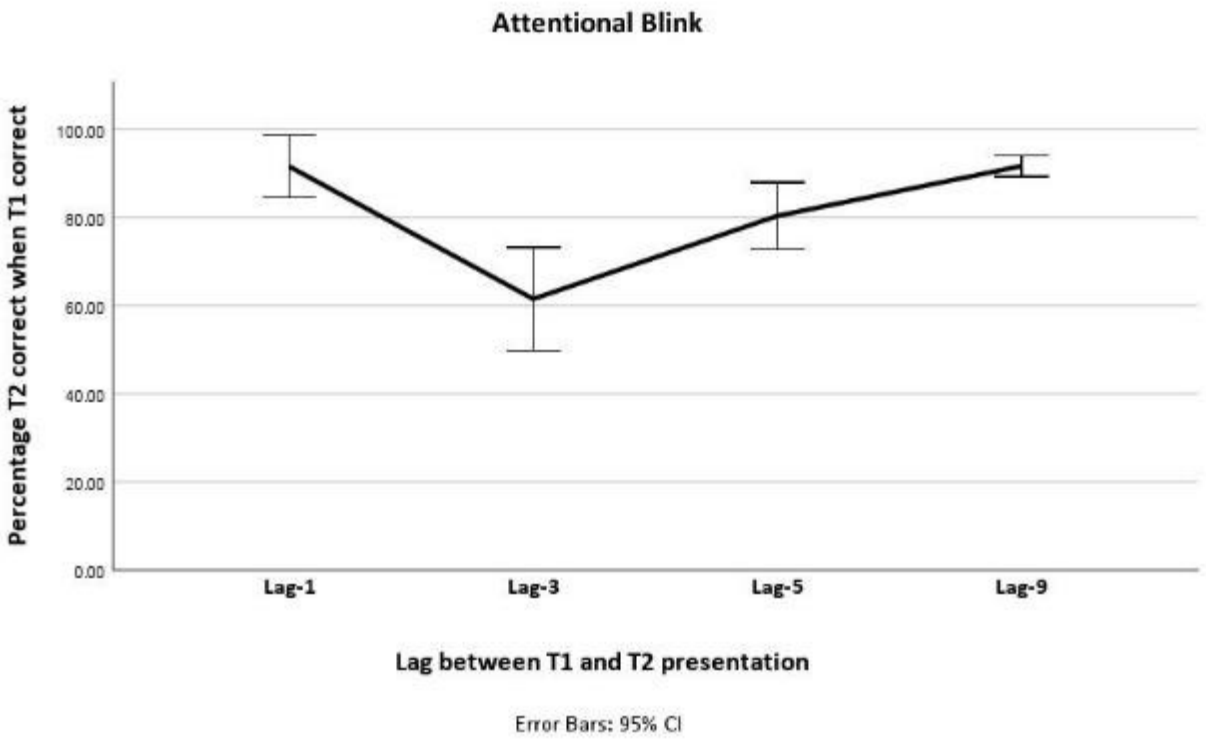
Procedure

As with the other research presented in this thesis, the study was delivered online via gorilla.sc (Anwyl-Irvine et al., 2019). Participants were given information about the study and asked to give informed consent. They provided their demographics of age and gender, then completed the attentional blink task and a second task which is not reported here. The task presentation was counterbalanced. Participants were then debriefed and thanked for their time.

Results

To ascertain whether the task generated the expected attentional blink, the percentage of second targets correctly reported when the first target was also correctly identified was analysed. This is the standard analysis to index the attentional blink, set out by Chun and Potter (1995). Figure 7.2 illustrates this data by lag.

Figure 7.2: Mean percentage of trials where T2 was correctly identified after correctly identifying T1, by lag.



A one-way repeated-measures ANOVA was performed on the data with 4 levels of lag (1, 3, 5 and 9). Mauchly's was not significant. There was an effect of lag: $F(3, 45) = 21.97$, $p < .001$, $\eta_p^2 = .59$. Planned comparisons revealed that participants identified significantly less T2s after correct T1s at Lag 3 compared to Lag 1 ($F(1, 15) = 36.25$, $p < .001$, $\eta_p^2 = .71$). However, there was significantly better performance at Lag 5 compared to Lag 3 ($F(1, 15) = 15.43$, $p = .001$, $\eta_p^2 = .51$), and at Lag 9 compared to Lag 5 ($F(1, 15) = 10.53$, $p = .005$, $\eta_p^2 = .41$).

Discussion

The task developed demonstrated a robust attentional blink. The identification of second targets following the correct identification of a first target followed a "U-shaped curve" in line with the findings of Chun and Potter (1995, p. 112) where a deficit occurs in T2 identification when T2 appears 200-500ms after T1. The task was therefore carried forward with no changes.

Main Study

Alongside the attentional blink task from the pilot study, the Triarchic Psychopathy Measure (TriPM; Patrick, 2010) was administered to index explicit psychopathy and to explore the hypothesised associations between the two.

A digit-span task was also included in the main study, intended to be a proxy to measure and control for individual differences in working memory. A measure of working memory is important to include as some research has found associations between working memory and the attentional blink. Some theorists have conceptualised working memory as the ability to control attention (Martens & Johnson, 2009). Thus, those with greater working memory may be better able to select and retain target information from amongst an RSVP stream of distractors (Martens & Johnson, 2009). This theoretical position is supported by some studies where associations have emerged between working memory and attentional blink magnitude. Using the Operation Span Task (OSPAN; Turner & Engel, 1989) to index working memory, which places heavy cognitive demands on an individual,

Colzato et al. (2007) identified an increased blink in those with lower working memory and Arnell et al. (2010) found that the executive components of working memory were associated with attentional blink magnitude. However, there are inconsistent findings in the field as not all research has identified similar associations (e.g., Lense et al., 2011; Martens & Johnson, 2009; Schmitz et al., 2018). Nonetheless, it is prudent to take a measure of working memory and explore these associations further; if left unmeasured, working memory could be a potential confound when exploring the association between the attentional blink and psychopathy.

For this study, a digit-span task was created which included forward, backward and sequencing spans. This was chosen as the working memory measure for several reasons. Firstly, both backwards and sequencing digit-span tasks are considered measures of working memory (Gignac & Weiss, 2015), placing increasingly higher demands on executive control. Thus, they may be a suitable alternative to the OSPAN. Secondly, the magnitude of the attentional blink has been linked with measures of intelligence in some studies (e.g., Baskin-Sommers et al., 2012; Klein et al., 2011; Wolf et al., 2012); while digit-span may not be the most obvious choice for a measure of intelligence to include, as historically it has been considered by some as a poor indicator of intelligence (Gignac & Weiss, 2015), recent analysis provides justification for its inclusion as a measure of general intelligence. Gignac and Weiss (2015) analysed a large sample of data (N = 1800) from Wechsler Adult Intelligence Scale (WAIS-IV; Wechsler, 2008) normed data and found that all three forms of digit-span are linearly associated with general intellectual functioning. Of the three digit-span tests, the sequential test places the greatest demands on executive processing and may, therefore, be the most appropriate of the three to measure working memory. Thus, digit-span tasks, in particular the sequencing task, appear to provide a measure of working memory which acts as a proxy to index intelligence for comparison with findings from other attentional blink studies exploring the RMH.

Method

Participants

Power Analysis. In line with the other thesis chapters, an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%) was calculated. This analysis generated a sample requirement of N=160. This was increased to 200 participants to allow for any poor-quality data.

Participant Sample. Participants were recruited via Prolific (www.prolific.com), a research recruitment platform to enable prompt data collection from a diverse global population. All participants completed pre-screening to confirm that they were fluent in English, due to the linguistic demands of completing the TriPM. Altogether, 202 individuals participated in the study, of which 84 were men, 116 were women, and 2 did not wish to report their gender. The mean age of the sample was 30.26 years old (9.46), with ages ranging from 19 to 71. The sample comprised 56.4% White participants, 35.6% Black participants, 3.0% of mixed ethnicity, 2.5% were Asian participants and 2.5% did not wish to report ethnicity. The majority of the sample (41.6%) had an undergraduate degree, 18.3% held postgraduate qualifications, 17.3% of participants had HNC/A-Level type qualifications and 2.5% of the sample had O-levels/GCSEs. Other qualifications were held by 9.9% of participants, 4.5% had "foreign" (i.e., non-UK) qualifications, 1.5% were or had completed an apprenticeship and 4.4% reported having no educational qualifications.

In line with Prolific's requirements, payments were made to each participant. This was set at £3.50 per participant, and funding was provided by Jennifer Pink's ESRC DTP research grant. Ethical approval for the study was covered by the same application as for the pilot study (Ref: 1-2023-5998-5290, Appendix F).

Materials

Attentional Blink Task. The same attentional blink task was used as within the pilot study.

Digit Span Task. A single task was created formed of three blocks, each one being a different type of digit span task: forward, backward and sequencing. Each task started with a span of three digits, increasing to a maximum of ten digits. Two trials were presented for each span. The task followed the same discontinue rule as that within the Wechsler Adult Intelligence Scale (WAIS-IV; Wechsler, 2008), where participants could only progress onto the subsequent digit span (e.g., 7 to 8 digits) if they had answered at least one correctly out of two at the current span. Each trial started with a fixation cross presented for 250ms with a 100ms pause after. Digits were then shown on screen for 1000ms each. Responses were given using the keyboard on the following screen, where participants were asked to either key digits in the order presented to them (forward digit-span), the reverse order presented to them (backward digit-span), or in ascending order from smallest to largest, as applicable (sequencing digit-span). They were reminded that if there were duplicate digits, they also needed to key those in. Only digits 1-9 were used in line with the WAIS.

Triarchic Psychopathy Measure. As with previous chapters in this thesis, explicit psychopathy was indexed using the Triarchic Psychopathy Measure (TriPM; Patrick, 2010).

Procedure

The study was created and delivered online using the Gorilla.sc experiment builder package (Anwyl-Irvine et al., 2019). Participants were recruited via Prolific, from where a link took participants to the Gorilla URL. Participant information was given and participants were asked to give informed consent, then provide demographics of age, gender, ethnicity and highest formal qualification. All participants first completed the attentional blink task, then the TriPM, digit-span task and another questionnaire not reported here in the same order. They were debriefed and thanked for their participation.

Data Analysis

Consistent with the approach in other chapters, missing scores in the TriPM were prorated if there were less than 25% missing responses. If missing responses exceeded this level, that data were omitted from the analysis.

Results

Data Cleansing

Of the 202 participants, two failed the TriPM attention check and as such were removed. Four further participants were excluded from analysis as they were older than 60. Thus, the final sample for analysis was 196 participants, with a mean age of 29.74 (8.41).

Descriptives

The means (standard deviations), skew and reliabilities for each of the domain scores on the TriPM are given in Table 7.1. The TriPM scales were correlated in the expected direction to that which emerged in other thesis chapters, although the correlations were much weaker than previously found. Boldness and Meanness (r = .14, p <.05) and Meanness and Disinhibition (r = .24, p < .001) were positively associated. No association emerged between Boldness and Disinhibition (r = -.11, p = .124) in this sample.

Table 7.1: Means, distribution skew and internal reliability (Cronbach's) for the scales of the Triarchic Psychopathy Measure.

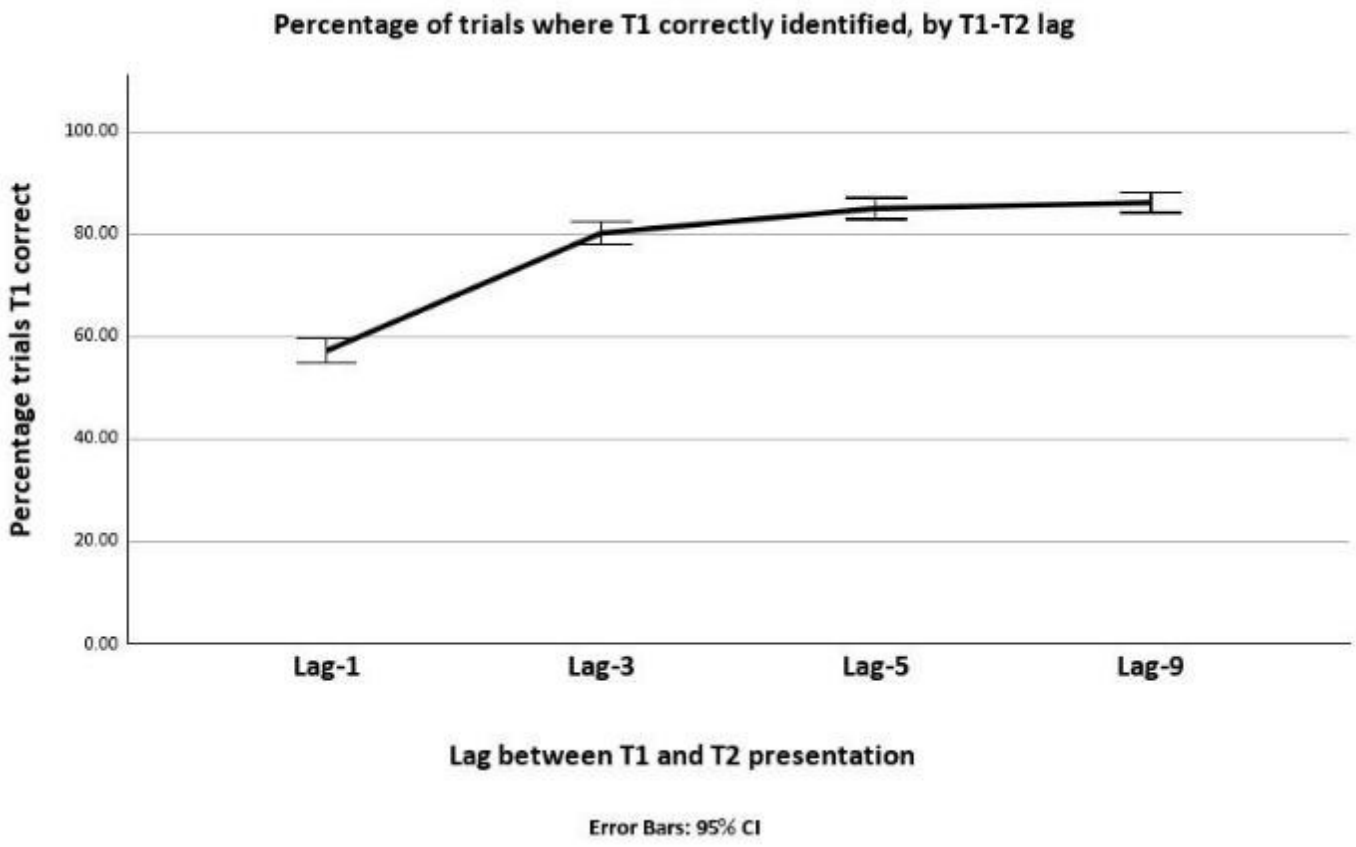
		Mean (SD)	Skew	α
TriPM	**Boldness**	27.76 (9.13)	-0.42	.87
	Meanness	12.10 (6.79)	0.71	.83
	Disinhibition	16.31 (7.24)	0.38	.80

TriPM = Triarchic Psychopathy Measure

Attentional Blink: First Target Identification

Figure 7.3 shows the mean percentage of trials where participants correctly identified the first target, by lag (1, 3, 5 and 9).

Figure 7.3: Mean percentage of attentional blink trials where participants correctly identified the first target letter (T1)), by lag.



To ascertain the effect of lag on accuracy of T1 identification, a repeated-measures ANOVA was performed with 4 levels of lag. Mauchley's test of sphericity was significant, therefore Greenhouse-Geisser is reported here. There was an effect of lag: $F(2.19, 426.32) = 460.55$, $p < .001$, $\eta^2_p = .70$. Follow up t-tests showed a difference in accuracy between all lags ($p < .001$) save for between lags 5 and 9 ($p = .076$).

Psychopathy, Working Memory, and Target Identification

Scores on the TriPM scales of Boldness, Meanness and Disinhibition were correlated with the percentage of trials where T1 was correctly identified to explore any associations between psychopathy and the attentional blink. These correlations are reported in Table 7.2. Only Boldness was associated with identification of the first target, and this was only on Lag 3.

Table 7.2: Correlations between explicit psychopathy measures of Boldness, Meanness and Disinhibition and percentage of trials where first target letter was correctly identified, by lag.

	Lag 1	**Lag 3**	**Lag 5**	**Lag 9**
Boldness	-.05	-.15*	-.11	-.07
Meanness	.07	.00	.00	.00
Disinhibition	.02	.00	-.03	-.08

* denotes *p* <.05

Maximum digit-span on each of the three digit-span tasks were correlated with percentage of trials where T1 was correctly reported, to explore the associations between working memory and the attentional blink (Table 7.3). Neither the forwards nor backwards digit-span tasks were associated with accuracy of T1 identification. However, the sequenced digit-span task was associated with accuracy of T1 identification in lags, 3, 5 and 9, where longer digit-span was associated with greater accuracy in T1 identification.

Table 7.3: Correlations between digit-span on the forwards, backwards and sequenced tasks, and percentage of trials where first target letter was correctly identified, by lag.

	Lag 1	**Lag 3**	**Lag 5**	**Lag 9**
Forwards digit span	.09	.10	.05	.02
Backwards digit span	.06	.06	.10	.04
Sequenced digit span	.13	.19**	.17*	.15*

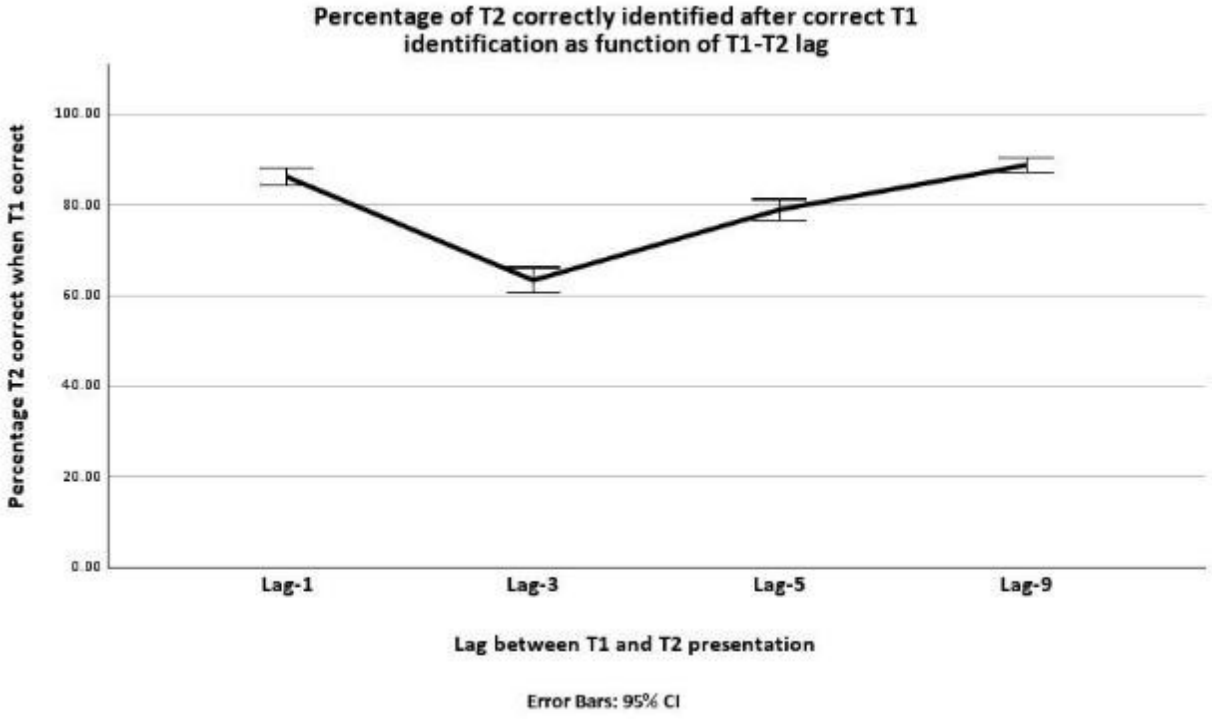
* denotes *p* <.05, ** denotes *p* < .01

These analyses suggest that there is no effect of psychopathy on first target identification in the attentional blink, but that working memory, indexed by the sequencing digit-span, is positively associated with greater first target identification.

Attentional Blink: Accuracy of T2 when T1 identified

The same analyses as undertaken in the pilot study were performed here. In order to examine the effects of the detection of T1 upon the subsequent detection of T2, the percentage of correct T2 responses after a correct T1 response was calculated. These are displayed in Figure 7.4. As set out previously, this is the standard way of analysing attentional blink data (see e.g., Chun & Potter, 1995), and is a measure of accuracy of detecting T2 when T1 has been processed.

Figure 7.4: Percentage correct response to T2 after a correct T1 response as a function of T1-T2 lag.



A repeated-measures ANOVA was performed with 4 levels of lag. As Mauchley's test of sphericity was significant, Greenhouse-Geisser is reported here. There was a significant effect of lag: $F(2.42, 466.78) = 200.30$, $p < .001$, $\eta^2_p = .51$. Follow up t-tests showed a difference in accuracy between all lags ($p < .001$).

This data reproduces the classic pattern of results for the attentional blink task with targets (T2) that follow the initial target (T1) being harder to detect at around 300 ms (lag 3). It also

reproduces the classic “lag 1 sparing” effect where targets that immediately follow T1 (at lag 1) are not subject to the attentional blink.

Effects of Psychopathy and Working Memory on the Attentional Blink.

Boldness, Meanness and Disinhibition scores were entered into a correlation analysis with and the percentage T2 correct after T1 correct. These correlations are reported in Table 7.4. No associations emerged for any of the psychopathy variables.

Table 7.4: Correlations between explicit psychopathy measures of Boldness, Meanness and Disinhibition, and percentage of trials with a correct response to T2 after a correct T1 response, as a function of T1-T2 lag.

	Lag 1	**Lag 3**	**Lag 5**	**Lag 9**
Boldness	.06	--.07	-.03	.07
Meanness	.04	-.03	-.01	.06
Disinhibition	.04	.06	.05	.03

Table 7.5 shows the correlations of percentage T2 correct after T1 correct against the measures of working memory. Overall, there is a pattern of weak positive correlations suggesting that working memory is implicated in overall detection of T2 in this task. However, there is no indication that this effect is confined to conditions where there is an attentional blink (e.g., lag 3).

Table 7.5: Correlations between digit-span on the forwards, backwards and sequenced tasks, and percentage of trials with a correct response to T2 after a correct T1 response, as a function of T1-T2 lag

	Lag 1	**Lag 3**	**Lag 5**	**Lag 9**
Forwards digit span	.13	.03	.18*	.13
Backwards digit span	.12	-.01	.10	.13
Sequenced digit span	.17*	.08	.20**	.21**

* denotes p <.05, ** denotes p < .01

Attentional Blink and Psychopathy

The analyses of above (correct T2 identification after correct T1 identification) provide an account of the time course of the attentional blink. However, they do not indicate the magnitude of

the attentional blink itself as this requires performance to be compared under conditions where the attentional blink is thought to be occurring (lag 3) to those where the attentional blink is not occurring (lag 9) as at such long lags the attentional blink has finished. A final analysis therefore calculated an attentional blink as the difference in performance under these two conditions (Lag 9 – lag 3). A hierarchical regression was used with the demographic variables of age and gender were entered at Stage 1, the three indices of working memory at Stage 2, and the indices of psychopathy at Stage 3. All predictor variables were z-scored where necessary.

The model was not significant at Stage 1 ($F(2, 191) = 1.89$, $p = .16$), nor at Stage 2 where the measures of working memory were added ($F(5, 191) = 1.02$, $p = .41$), nor at Stage 3 where the measures of psychopathy were added ($F(8, 191 = 0.93$, $p = .49$). Overall, despite strong attentional blink effects, it appears that neither any of the three domains of psychopathy nor indices of working memory moderated the magnitude of the attentional blink.

Discussion

This chapter described the development and testing of an attentional blink task as a possible external correlate for all three domains of triarchic psychopathy, in line with the theory that an attentional deficit underpins psychopathy (Baskin-Sommers et al., 2011). The task appears to have performed as expected with evidence of an attentional blink with a large effect size at lag 3, and with classic "lag 1 sparing" (Colzato et al., 2007, p. 1051).

Against hypotheses, no evidence emerged that the magnitude of the attentional blink was related to any of the triarchic domains of psychopathy. Associations emerged between intelligence/working memory, indexed by the sequential digit-span task, and performance at identifying first and, first and second targets. However, in a regression analysis there was no evidence that intelligence or working memory moderated the magnitude of the attentional blink itself.

Attentional Blink, Psychopathy and the Response Modulation Hypothesis

The lack of any effect of psychopathy on the attentional blink does not appear to stem from issues with the task itself. The attentional blink task generated anticipated blink patterns consistent with research completed within and outside the field of psychopathy (e.g., Baskin-Sommers et al., 2012; Chun & Potter, 1995; Colzato et al., 2007; Wolf et al., 2012). Thus, it seems that the task used here was robustly indexing attentional blink.

Another possibility for the lack of association between the attentional blink task and psychopathy is that the sample was not suitably high in psychopathic traits for any association between the attentional blink task and triarchic psychopathy to emerge. Both Wolf et al. (2012) and Baskin-Sommers et al. (2012) used offending populations for their research, and substantially higher levels of psychopathy are typically found in such populations (De Brito et al., 2021; Reidy et al., 2015; Sanz-García et al., 2021). Furthermore, while the TriPM scale data were correlated in line with expectation, the correlations were much weaker than previously found in this thesis and in other studies which have used this measure with community participants with similar levels of each of the three triarchic domains (see e.g., Burley et al., 2017; Pink et al., 2022).

Attentional Blink and Working Memory

Associations emerged between performance on the sequential digit-span task, and performance at identifying first and, first and second targets. Digit-span tasks, in particular the sequential digit-span task, are considered to be measures of working memory and are linearly associated with general intellectual functioning (Gignac & Weiss, 2015). These findings support those of previous studies where greater working memory (e.g., Arnell et al., 2010: Colzato et al., 2007) and higher intelligence (e.g., Baskin-Sommers et al., 2012; Klein et al., 2011; Wolf et al., 2012) have been found to be associated with a smaller attentional blink. Therefore, it appears there is a general relationship between working memory/intelligence and identification of the second target after the first has been correctly identified. However, when the attentional blink was isolated, by

calculating the difference in performance between lag 9 and lag 3, the regression provided no support that any of the digit-span tasks moderated the attentional blink effect. Thus, perhaps there is another factor contributing to attentional blink performance, not measured here, which is related to working memory. These findings further add to the inconsistencies in the field regarding the underlying contributors to attentional blink magnitude as many other studies have failed to find an association with working memory (e.g., Lense et al., 2011; Martens & Johnson, 2009; Schmitz et al., 2018).

Limitations and Future Directions

It would be beneficial to replicate this task with other samples. Firstly, this sample had low levels of psychopathy as it was a community sample which may have been one reason that no association emerged with explicit measures of psychopathy. Secondly, the sample recruited via Prolific was well-educated, and thus, possibly be of higher intelligence levels than might typically be expected in a community sample.

It might also be interesting to explore an adaptation of the attentional blink, the Emotional Attentional Blink (EAB; Most et al., 2005). Within an RSVP stream, instead of using letters as targets for recall, the EAB presents an emotional distractor image and latterly, a landscape image which has been rotated. Participants need to report which way the target has been rotated. This task might be suitable to explore both the RMH and emotional theories of psychopathy concurrently, and provide a single dual-task paradigm to index the different domains of triarchic psychopathy. If psychopathy is underpinned by particular emotional deficits, reduced emotion-induced blindness might be expected in those with higher levels of Boldness when the distractors are fear-inducing images, and reduced emotion-induced blindness in those with higher levels of Meanness when the distractors are distressing images. Conversely, if wholesale attentional deficits underpin psychopathy, reduced emotion-induced blindness might be expected across all facets or domains of the disorder, regardless of the content of the emotional distractors due to enhanced ability to focus and zone out distractions

in those with psychopathy in line with the RMH (Baskin-Sommers & Brazil, 2022). A version of the EAB which used the fear-inducing and distressing images from the AMP (Chapter 5) was developed and tested as part of the pilot study discussed in this chapter. However, due to issues with delivering this task over the internet, it was not deemed reliable enough to carry forward into the main study. It may be useful to revisit this task and deliver during face-to-face testing, where similar technical issues would be unlikely, to understand if the EAB might provide a suitable behavioural measure to complement the IATs from Chapter 3. Moreover, the use of the EAB alongside psychopathy has been little explored, and as such, this would be a novel tool to develop and test.

Summary

This chapter described the development and testing of a classic attentional blink paradigm as a possible external correlate for the triarchic domains of psychopathy. While the task performed as anticipated and a robust attentional blink was evident, no associations emerged with any of the three domains of the TriPM. These findings were counter to those reported in the extant literature, and the task appears to offer no utility as behavioural measure associated with global psychopathy or its triarchic domains.

Chapter 8: General Discussion

This final chapter provides a brief overview of previous chapters and outlines key findings. It discusses the respective strengths and limitations of the research, chapter by chapter. It highlights that this thesis has made several contributions to the field of implicit measures in psychopathy, and personality research more generally. Namely, the thesis illustrates that the IAT has potential utility in indexing the psychopathic self-concept. Furthermore, it presents findings which suggest that the implicit psychopathic self-concepts of Disinhibition and Boldness differ to that which is captured using self-report measures. It also provides supporting evidence that the Stroop and go/no-go tasks index response inhibition, and that this is associated with triarchic Disinhibition. This chapter concludes by setting out some consideration of the implications of the research and offers final thoughts.

Thesis Aims and Overview

Psychopathy is associated with manipulation and deceit. As such, self-report methods to measure psychopathy may be unreliable, and even those administered by other parties might also be open to manipulation. Thus, this thesis explored the potential utility of indirect measures to index the psychopathic personality self-concept; indirect measures are experimental tasks designed to tap into implicit processes (De Cuyper et al., 2017).

From the various conceptualisations available, the thesis used the triarchic model of psychopathy (TriPM; Patrick, 2010) as its representation of psychopathy. This model was selected as it aims to reconcile the wide range of manifestations of psychopathy evident across the literature, and it links with neuropsychological evidence in the field. In line with dual-system models of cognitive processing, the thesis aimed to develop an implicit measure of psychopathy, based on the TriPM, and then test its utility in predicting automatic and spontaneous behaviours associated with psychopathy.

To address these aims, three novel IATs were created, one for each of the triarchic domains of psychopathy (Boldness, Meanness and Disinhibition). Each IAT demonstrated internal reliability and discriminant validity. While the direct psychopathy measure (TriPM) might better predict levels of self-reported behaviours associated with psychopathy, an implicit measure (IAT) might be better at predicting performance on tasks that involve more automatic, impulsive or spontaneous behaviours. To explore this, behavioural tasks were developed which intended to invoke more automatic or spontaneous behaviours associated with psychopathy: Affect Misattribution Procedures (AMP; Payne et al., 2005), a go/no-go task , a Classic Stroop task (Stroop, 1935), a "box" Stroop task (Hiatt et al., 2004) and an attentional blink paradigm (Chun & Potter, 1995). The associations that each of these held with psychopathy were explored.

Chapter Summary

Chapter 1: Models and Mechanisms in Psychopathy

Psychopathy is often associated with violent interpersonal offending and high levels of the disorder are present in forensic populations (Reidy et al., 2015; Sanz-García et al., 2021). However, psychopathy is present in the general population (Coid & Yang, 2008; Sanz-García et al., 2021) and it presents concerns beyond the forensic setting, particularly in corporate organisations. Elevated levels have been identified in individuals holding management roles and it is associated with damaging managerial behaviours leading to considerable organisational and personal costs (Babiak et al., 2010; Mathieu et al., 2014; Sanz-García et al., 2021; Sheehy et al., 2021).

The exact nature of psychopathy is well-debated and a review of the current models of psychopathy illustrates considerable divergence in their conceptualisations of the construct. These include the degree that criminal behaviours and attitudes feature (Cooke et al., 2005), the level to which positive attributes such as a lack of anxiety are included therein (Patrick et al., 2009), and the extent that each model reflects neurophysiological indicators associated with psychopathy (Patrick & Drislane, 2014). The psychological mechanisms underpinning psychopathy are also debated; some

theories propose emotional deficits (Cleckley, 1950; Lykken, 1957), while another, the "response modulation hypothesis" (RMH; Baskin-Sommers et al., 2011), proposes an attentional deficit.

This thesis selected the triarchic model of psychopathy (Patrick, 2010) as its conceptualisation of psychopathy. This model considers that psychopathy is underpinned by three phenotypic domains (Patrick et al., 2009): Meanness, Boldness, and Disinhibition. Across these domains, the triarchic model attempts to reconcile debates around inclusions and omissions set out above. The triarchic domains incorporate positive adjustments such as confidence and assertiveness, as well as placing little weight on criminality. Furthermore, the triarchic model integrates the broader literature on neuropsychology which is essential for conceptualisations of psychopathologies.

Correspondingly, the Triarchic Psychopathy Measure (TriPM, Patrick, 2010) was used as the measurement tool for psychopathy. Unlike the PCL-R (Hare, 1991), the TriPM does not require case history and clinical judgment to identify psychopathic traits. As this thesis explored psychopathy with community samples, it would have been impractical to attempt to administer the PCL-R. A self-report version of the PCL-R would have overcome this practical challenge, however, it would not have addressed criticisms of Hare's conceptualisation of psychopathy. Hare's model considers antisocial and criminal behaviours to be central to the disorder (Cooke et al., 2005) and excludes some of the positive features associated with psychopathy which featured in Cleckley's (1950) seminal work in the field of psychopathy.

Chapter 2: Implicit Cognition and Psychopathy

Psychopathy is marked by exploitation and deceit (Patrick et al., 2009) and traits such as grandiosity, which are associated with a lack of insight into one's own motivations, attitudes or even personality traits (Sleep et al., 2019; Stanton et al., 2019; Watts et al., 2016). Thus, the suitability of self-report measures to accurately capture levels of psychopathy cannot be presumed. Even clinician-rated measures such as the PCL-R, which are time-consuming and reliant on historical data

and specialist training, may also be fallible; subjective or emotional experiences of an individual might be challenging for a clinician to identify (Stanton et al., 2019), and clinicians may be open to manipulation. Moreover, scores on the PCL-R can be open to variable application. Inter-rater reliability on the PCL-R can be problematic, with "adversarial allegiance" evident (Edens & Truong, 2021, p. 250) in forensic settings; defence evaluators commonly give significantly lower PCL-R ratings to defendants than prosecution evaluators, with medium to large effect sizes (Edens & Truong, 2021).

Self-report measures are thought to rely on conscious, deliberate, and controlled cognitive processes (De Cuyper et al., 2017; Richetin & Richardson, 2008). These access the explicit self-concept which is subject to conscious consideration, and hence, open to dissimulation and self-presentation strategies. Contrastingly, the implicit self-concept, is thought to be automatically activated and reflects associations between the self and traits (Schnabel & Asendorpf, 2010).

To access the implicit self-concept, experimental tasks, developed to infer an individual's attributes from task performance (De Cuyper et al., 2017), may offer a way to index the personality self-concept. These tasks are typically categorisation activities, aiming to access implicit processes and emotions, attitudes, and personality traits (Deutsch & Strack, 2010). Prominent implicit tasks may prove useful as tools to index the psychopathic self-concept, in particular the Implicit Association Test (IAT; Greenwald et al., 1998) and the Evaluative Priming Task (EPT; Fazio et al., 1995).

Chapter 3: Implicit Association Tests to index Triarchic Psychopathy (Pink et al., 2023)

The IAT (Greenwald et al., 1998) is a dual-classification task in which participants are required to categorise concepts (e.g., *violence* and *peace*) and attributes (e.g., *good* and *bad*) as quickly as possible. When congruent concepts and attributes are paired on the same response key (e.g., *violence* + *bad*), categorisation is quicker than when combined incongruently (e.g., *violence* + *good*).

The literature reveals two studies, thus far, attempting to create IATs to index the psychopathic construct. No associations emerged with direct measures of psychopathy in either

study (Florez et al., 2017; Nentjes et al., 2017). Possible issues with a lack of conceptual correspondence may have given rise to the lack of findings in these studies. Furthermore, in the Nentjes et al. study, the use of an IAT variant, the Single Category IAT (SC-IAT; Karpinski & Steinman, 2006) ,may also have contributed to the results. SC-IATs feature only one concept (e.g. *violence*), rather than two (e.g., *violence* and *peace*) alongside two attributes (e.g., *bad* and *good*). While these aim to gain an absolute, rather than relative concept evaluation, their psychometric properties are less well-established than the classic IAT which features two concepts and attributes (Teachman et al., 2019).

Three IATs were developed, each one based on a domain of the TriPM: Boldness, Meanness, and Disinhibition. Addressing concerns with prior attempts, these used the classic IAT design of Greenwald et al. (1998) and care was taken to ensure conceptual correspondence such that the words chosen for each IAT reflected the content of their respective domain (Hofmann et al., 2005; Payne et al., 2008). To achieve close conceptual correspondence, IAT exemplars were carefully distilled from items of the TriPM. Each IAT used idiographic data (e.g., first name, birth date) to index the self-concept in preference to nomothetic stimuli (e.g., *I* or *mine*) (Bluemke & Friese, 2012). Considerations of best practice in IAT design were included (Greenwald et al., 2021).

The IATs were tested online with a large sample of community-based participants (*N* = 1068). Alongside the IATs and the TriPM, self-report measures of socially desirable responding (Social Desirability Scale; Stöber, 2001), aggression (Reactive Proactive Aggression Questionnaire; Raine et al., 2006), and prosocialness (Prosocialness Scale for Adults; Caprara et al., 2005) were administered. Overall, the findings were promising. Each IAT demonstrated discriminant validity, where IAT scores were associated only with self-report scores on their counterpart TriPM domain. Each IAT had good internal consistency and they were all immune to social desirability, unlike the TriPM self-reported psychopathy scores. There was some evidence of predictive utility; scores on the Meanness IAT were

associated with proactive aggression and the Disinhibition IAT was associated with proactive and reactive aggression.

Strengths and Limitations

The IATs showed promise in their potential to index implicit triarchic Boldness, Meanness and Disinhibition. They showed concurrent validity, discriminant validity and internal consistency. Moreover, the lack of association with social desirability suggests the IATs may be more immune to faking good than self-report measures of psychopathy. However, while there was also some evidence of predictive utility, not all predictions between the IATs and measures of external correlates of psychopathy were supported. Thus, the IATs may be better predictive of spontaneous behaviours than controlled self-reports of behaviour. This is perhaps to be expected, given the theorised dual process model of cognition.

Future Research Directions

This chapters offers evidence that self-concept personality IATs may have some promise in indexing implicit psychopathic personality traits. However, one aspect of the IATs which has not been explored in this thesis is their test-retest performance. This is an essential next step if they are to have future potential as a tool to reliably measure psychopathic personality traits at an individual level.

While IATs typically show admirable internal reliability of around $\alpha = .80$, one major psychometric critique of them is that test-retest reliability appears to generally be around $r = .50$ which is at best, modest (Greenwald et al., 2022; Greenwald & Lai, 2020; Jost, 2019). Test-retest performance of this magnitude is acceptable when using IATs in studies with correlational designs or exploring group differences (Greenwald et al., 2022). However, it is insufficient if the IATs are intended as a reliable tool to measure an individual's traits as stability of the measure is needed (Greenwald & Lai, 2020). Therefore, if the psychopathy IATs have potential to discriminate between

individuals high and low in Boldness, Meanness and Disinhibition, evidence of strong test-retest reliability is required.

While general test-retest reliability in IATs appears disappointing, the psychopathic self-concept IATs may demonstrate better than expected results in this area. In a recent meta-analysis of implicit and explicit attitudinal measures, Axt and Roy (2024) found similar overall test-retest reliability to that identified by Greenwald and Lai (2020). However, substantial heterogeneity emerged with 87% of the variance in test-retest reliability potentially due to the topics of the implicit measures; they found that where attitudes being measured were related to the self-concept, higher test-retest reliability emerged for both implicit and explicit measures (Axt & Roy, 2024). Thus, as the psychopathy IATs aim to tap into the self-concept, this aspect of personal relevance may enhance test-retest reliability. Furthermore, the psychopathic self-concept IATs may demonstrate test-retest stability over longer periods. While personality traits are considered dynamic and changeable over time (Bleidorn et al., 2021), such changeability may not materialise to the same degree for psychopathic personality traits. Evidence suggests little change in psychopathy from late adolescence into early adulthood (Hemphälä et al., 2015), and interpersonal and affective psychopathic traits appear to endure throughout adulthood (Harpur & Hare, 1994; Huchzermeier et al., 2008).

In addition to exploring test-retest reliability of the IATs, there are several other research directions which may merit exploration. Alternative psychopathy measures such as the PCL-R could be used to develop psychopathy IATs which map to different conceptualisations of the disorder and their relevant self-report/clinician-rated measures. The same principles could be applied to develop IATs for other personality traits which are also associated with serious interpersonal offending behaviours. Some obvious contenders might be the other three personality constructs included alongside psychopathy in the “dark tetrad” (Paulhus, 2014) which are linked with criminality (Brugués & Caparrós, 2022): sadism, Machiavellianism and narcissism. As those higher on these traits

demonstrate a propensity to lie (Forsyth et al., 2021), exploration of implicit measures of these traits might also be useful to ascertain any potential value they may hold within clinical and forensic environments. Moreover, further exploration of implicit measures of psychopathy might also reveal something yet unknown about the implicit psychopathic self-concept.

Chapter 4: Exploring the utility of priming to index the psychopathic self-concept

This chapter describes a novel adaptation of the Evaluative Priming Task (EPT; Fazio et al., 1995), also known as *affective priming* to attempt to index the (psychopathic) personality self-concept. The EPT is commonly used to evaluate attitudes. In a typical EPT, an attitude object is presented as a prime, and then targets are presenting which require classification as either positive or negative. To adapt the EPT to index the self-concept rather than attitudes, the attitude object primes need to be changed to personality traits, and the target stimuli changed to idiographic information to be categorised as either *me* or *not me*. Thus, this was an exploration of the EPT's potential utility as a tool to index the triarchic psychopathic self-concept.

While the IATs were promising, the EPT offers the potential to measure somewhat different psychological concepts as they are thought to operate at different processing levels; IATs operate at the concept level, while priming operates at the exemplar level (Olson & Fazio, 2003). Therefore, a psychopathic self-concept priming task might be able to index individual traits (*sadistic* or *callous*) rather than the broader trait (triarchic *Meanness*) that is likely tapped with an IAT. However, while the EPT offers a possibly more granular tool to index the self-concept than the IAT, the task suffers from poor internal consistency (Gawronski, 2022) possibly limiting its utility as a predictor of behaviours.

A pilot study (N =112) was run with an online community sample to test the EPT's application to indexing a personality self-concept: extraversion. This personality trait was selected for the pilot as it is well understood. As with the IAT design, there was a focus on ensuring conceptual correspondence using items from Eysenck's Personality Questionnaire (Eysenck et al.,

1985) to create stimuli. The task explored two different stimulus onset asynchronies (SOA) of 250ms and 500ms as little appears known about any impact of SOA in personality priming tasks due to this self-concept form of the EPT being a relatively novel divergence from typical attitudinal EPTs. Furthermore, presentation of the prime and target stimuli in the same and different colours was explored; the same colour for both may enhance the priming effect as different colours may facilitate selective attention (Brawn & Snowden, 1999). Three optimal scoring algorithms were explored to maximise internal consistency, a well-established issue with priming tasks (Koppehele-Gossel et al., 2020).

The pilot study yielded promising and novel findings. In two of the three scoring models, priming score was positively associated with self-reported extraversion and negatively with self-reported introversion. However, despite applying several optimal scoring algorithms, each model demonstrated poor internal consistency. Of interest, and counter to expectation, priming consistently emerged in the *different colour* conditions rather than in the *same colour* conditions.

Internal consistency issues notwithstanding, the stimuli from the IAT were used to create a psychopathy version of the priming task, with different colours for primes and targets. In a small online community study (N = 166), the priming task was used alongside the same aggression measure as in the IAT study (RPQ; Raine et al., 2006) and a measure of socially desirable responding which captured self-deception as well as impression management, the Balanced Inventory of Desirable Responding Short Form (BIDR-16; Hart et al., 2015).

Some predicted associations emerged but these were limited and there were reliability issues with the psychopathy priming task. As predicted, the TriPM Meanness domain scores were associated with meanness priming scores. This association was of a comparable magnitude to that between triarchic Meanness and the Mean IAT. However, meanness priming scores were also associated with triarchic Boldness. Thus, the discriminant validity which was present in the IATs was not evident here. While no association emerged between Boldness TriPM scores and bold priming

scores, the bold personality thermometer was positively associated with bold priming scores, but this association was approximately half the magnitude of that which emerged between the Bold IAT and bold personality thermometer in Chapter 4. Moreover, the priming task yielded no other associations with the personality thermometers. Importantly, no associations emerged between the priming task and measures of aggression.

Due to few associations emerging between the priming task and the corresponding TriPM scales, the poor consistency of the task, and the lack of predictive utility, determined by using measures of known behavioural correlates of psychopathy, the psychopathy priming task was not carried forward to subsequent studies.

Strengths and Limitations

This seemingly novel use of the EPT as a possible tool to index the implicit personality self-concept yielded some interesting findings. Both the meanness and extraversion priming tasks produced priming effects which were associated with one of their respective self-report measures. A further strength of the priming studies is that it was revealed that using different colours for the prime and target in an EPT may facilitate priming effects rather than adversely affect them. These findings do not appear to have been reported in the literature to date and are counter to the idea that using different font colours of words may facilitate selective attention in experimental tasks such as priming.

Despite some positive outcomes from these studies, the psychopathy priming task had poor internal consistency. The issue of internal consistency is problematic when aiming to devise a task from which behaviour can be predicted (Koppehele-Gossel et al., 2020). Low inter-item consistency is driven largely by variance in random error (e.g., external influences on task performance such as an unexpected noise) rather than systematic sources which relate to the to-be-measured construct (Perugini et al., 2010). Thus, instability in individual scores is responsible for high levels of random error, and hence, low consistency (Perugini et al., 2010). However, if there is no requirement to

predict behaviour from a task, while still important, poor internal consistency is not necessarily problematic for experimental research (Koppehele-Gossel et al., 2020; Perugini et al., 2010). In fact, low consistency does not necessarily imply that a task is invalid or a weak measure of the relevant construct. Because consistency is calculated by rank-order correlations, low consistency may understate the association between a measure and its criterion (Perugini et al., 2010). However, a task with low internal consistency may not reliably make a distinction between different individuals (Hedge et al., 2018). Thus, while of minimal utility to predict any behaviours, the EPT may yet have potential to index the personality self-concept.

Future Research Directions

Given the novel finding relating to priming being facilitated when prime and target stimuli are presented in different colours, those in the field of priming may wish to replicate these seemingly novel findings. If they do emerge in other studies, researchers may consider recommending the use of different colour words for the prime and the target and to develop standard protocols for priming studies such as those created for the IAT by Greenwald et al. (2021).

Chapter 5: The Affect Misattribution Procedure

Dual process models of cognition propose a deliberate and controlled explicit system alongside a spontaneous, automatic implicit system (Gawronski & Bodenhausen, 2006). Correspondingly, it is possible that implicit tasks, such as the IAT, might better predict impulsive and spontaneous responses which relate to behavioural correlates of psychopathy. Contrastingly, self-reported psychopathy may better predict self-reported behaviours associated with psychopathy. This seems in line with the results from Chapter 3, where the IATs were only partly associated with self-reported aggression as expected, but the TriPM scales were more predictive of self-reported aggression.

This and the following two chapters, report the development of several behavioural tasks designed to measure more automatic and spontaneous behavioural correlates of psychopathy (diminished affective processing and elevated levels of impulsivity) to use alongside the IATs. These tasks aimed to invoke behaviours associated with psychopathy, rather than rely on individuals to self-report their levels of these: for example, for example by inducing and measuring a fear response (or rather in psychopathy, a lack of it).

This chapter describes the development and testing of two versions of an Affect Misattribution Procedure (AMP; Payne et al., 2005). The AMP is an adaptation of sequential priming. Participants are presented briefly with a prime image of either positive or negative valence followed by an ambiguous target item, such as a Chinese pictograph, and asked to provide a subjective, affective evaluation of the ambiguous target. Typically, research finds that while participants are asked to avoid being influenced by the primes, the valence of their judgment of the ambiguous target corresponds with that of the prime (Gawronski & Ye, 2014). It is claimed that participants misattribute the affect they experience from a prime onto the ambiguous target, against their intentions (Hazlett & Berinsky, 2018; Payne et al., 2005).

One AMP, the "Threat AMP" intended to evoke fear. This is relevant to triarchic Boldness, as a lack of affective reaction to threatening images would be expected for those who have TriPM Boldness traits. The second "Distress AMP" intended to evoke distress. This is relevant to triarchic Meanness, as a lack of affective reaction to distressing images would be expected for those who have TriPM Meanness traits. As triarchic Disinhibition is associated with impulsivity and a lack of behavioural restraint, alternative automatic and uncontrolled behavioural tasks to the AMP were explored to sit alongside the Disinhibition IAT and reported in Chapter 6.

Priming images were carefully selected from the International Affective Picture System (IAPS; Lang et al., 2008). Images for the Threat AMP were chosen which intended to invoke feelings of threat towards the self. These images included aggressive dogs, bears and tigers and those which

showed guns and knives aimed at the self. Images for the Distress AMP were chosen to invoke feelings of distress. These included scenes of mutilation and dead animals or humans. Chinese pictograms were used as the ambiguous stimuli that participants were to rate. As both Likert and categorial responses have been used in AMP studies, two versions of each AMP were created.

In addition to the AMPs, participants were asked to give their rating of the prime images while ignoring the Chinese symbols. For the purpose of this thesis, this procedure was termed the Affect Attribution Procedure (AAP). This was intended to capture intentional ratings of the stimuli, subject to conscious control. The intentional ratings could then be compared to those given on the AMP, to ascertain whether the AMP was capturing intentional or misattributed ratings.

A pilot study (*N* = 185) was undertaken with an online community sample. Both the Likert and categorical AMPs generated equivalent and robust AMP effects. Therefore, the Likert versions were selected for the main study to allow for greater response variation. In the AAPs, the distress and threat images were rated as respectively more distressing and threatening than neutral images.

A main study with an online community sample used the Boldness (*N* = 320) and Meanness (*N* = 317[11]) IATs with their relevant AMP and AAP, along with self-report measures including the TriPM and the BIDR-16 (Hart et al., 2015). Common to some other AMP research (see e.g., Bar-Anan & Nosek, 2012; Hazlett & Berinsky, 2018) issues of bimodality emerged in both AMP tasks, where there were two peaks in the distribution of scores on each AMP. For the Threat AMP, these were at around a score of zero and again at a score of 8 (out of 10) with a similar pattern emerging for the Distress AMP. These patterns suggest that there were two types of responders to the AMP task. For the responder group distributed around zero, ratings of neutral and affective (threat or distress) images were equivalent. For the other responder group, the peak AMP score corresponded well with the peak score on the AAP. Together, these findings suggest that the AMP is not, in fact,

[11] Sample sizes after data cleansing as the total sample of 1192 included those in Chapter 6, Study 2

measuring misattributed affect. One group appear uninfluenced by the primes, while the other group seem to not really be performing the AMP. This latter group might not have understood the task, or they may have been unconvinced by it, rating primes regardless of instructions. Due to these concerns, no interpretation of findings relating to the AMP was given.

Reproducing findings from Chapter 3, TriPM and IAT scores for the Meanness and Boldness conditions were positively associated. Moreover, the AAP performed as expected, with higher TriPM Boldness being associated with lower threat ratings of prime stimuli and higher TriPM Meanness being associated with lower distress ratings of prime stimuli. However, one interesting, and certainly unexpected, finding emerged; boldness-IAT scores were positively associated with explicit threat ratings of the primes, indexed by the AAP. This may suggest that implicit and explicit forms of Boldness hold different relationships with threat to the self.

Strengths and Limitations

A key strength of the AMPs created for this chapter, were that they produced effects in line with those seen in other AMP studies. However, due to the issues of bimodality, again evident in other AMP research, it is unclear to what extent the task is an implicit measure; given the apparent ability of responders to intentionally rate primes, it may not sufficiently meet the criteria of "automaticity" which is essential for an implicit task to be considered as such (Moors et al., 2010).

A further strength of this chapter is that the implicit (IAT) and explicit (TriPM) measures of psychopathy were associated as hypothesised, replicating the findings of Chapter 3. The boldness-IAT also produced some interesting findings, as it was positively associated with threat ratings of primes. This is a very interesting outcome from the study, as it may indicate that implicit and explicit forms of boldness hold different relationships with threat to the self. Explicit boldness is associated with poise, confidence and bravery, as well as self-enhancing behaviours, features shared with grandiose narcissism (Miller et al., 2020). In response to threat to the self, a bold individual may outwardly respond confidently and calmly. However, these findings indicate that implicitly, a bold

individual may feel proportionately more threat, perhaps because the self and protection of this is more central to their bold persona. This finding seems to relate more to fragile narcissism, which is linked with experiencing distress and fragility (Miller et al., 2017). However, studies typically illustrate that Boldness is negatively associated with fragile narcissism (see e.g. Miller et al., 2020). Yet, such associations emerge through the use of self-report measures of Boldness and narcissism. The findings from this study imply that perhaps implicit Boldness may share some aspects of fragile narcissism, while explicit Boldness is more consistent with grandiose narcissism. This merits further investigation to explore whether similar findings emerge when using other tasks that induce fear in response to a threat to the self.

Chapter 6: Behavioural Tasks as External Correlates for Disinhibition

Triarchic Disinhibition is thought to be underpinned by an inability to inhibit pre-potent (dominant or automatic) responses (Munro et al., 2007; Young et al., 2009). Therefore, Disinhibition is associated with behavioural impulsivity, rather than a lack of affective response which is associated with Boldness and Meanness. As such, this chapter reports the exploration of automatic and uncontrolled behavioural tasks which index response inhibition as alternatives to the affect driven AMPs developed in Chapter 5.

Two such response inhibition tasks were developed as possible behavioural correlate measures to use alongside the Disinhibition IAT from Chapter 3: a go/no-go task and a classic Stroop task (Stroop, 1935). In the go/no-go task, participants are required to either give a response to a stimuli ("go" trial), or withhold a response ("no-go" trial). In the classic Stroop task, colour words (e.g., *blue*) are shown in coloured ink which is either the same or different colour; participants are required to name the colour of ink, not the word itself. Both tasks require response inhibition which involves the activation of the anterior cingulate cortex (ACC). Atypical functionality of the ACC has been linked with psychopathy (Munro et al., 2007). A review of the literature found that while both types of task have been explored with respect to psychopathy, inconsistent findings have emerged.

Some, but not all go/no-go studies have found increased levels of errors on no-go trials in those with psychopathy. Similarly, a relationship between psychopathy and Stroop interference has emerged in some studies and not others.

A third task was also developed; a variant on the Stroop, the separated or "box" Stroop (Hiatt et al., 2004). In this task, the colour to be named is represented as a colour box around the distractor colour word which is shown in black. This task aims to index attentional focus as the incongruent information (word) is peripheral to the focus of the task (box colour) (Hamilton et al., 2014). This task is particularly useful to explore the attentional deficit theory of psychopathy. If there is an additional deficit underpinning psychopathy, those with psychopathic traits might experience less interference than control participants as they would fail to process the distractor word due to being over-focused on the goal of naming the colour of the box frame (Hamilton et al., 2014). Again here, mixed findings have emerged.

The first study reported in this chapter was an online study (N = 510) with a community sample who completed all three behavioural tasks (go/no-go, classic Stroop, box Stroop) and the TriPM, to ascertain which, if any of the tasks, showed any association with triarchic psychopathy.

As predicted, triarchic Disinhibition was associated with higher commission errors (no-go trials) on the go/no-go task. Also as hypothesised, Disinhibition was also related to increased Stroop interference, in line with some prior research. Lastly, while no hypothesis was made regarding an association between the Box Stroop task and Disinhibition, no evidence emerged to suggest less interference on this task for those with higher levels of this psychopathic domain. Thus, this study provided evidence that both the go/no-go and Stroop task may be suitable to index response inhibition as a possible external correlate for Disinhibition. Given the lack of association between the box Stroop task performance and Disinhibition, the results offered little support for the attentional deficit theory of psychopathy.

While both the Stroop and go/no-go had potential utility as a behavioural task to use alongside the Disinhibition IAT for the second study in this chapter, only one behavioural task was chosen in efforts to minimise participant fatigue and ensure effort. The go/no-go task was selected to carry forward into Study 2 as it is a commonly used measure of response inhibition and (unlike the Stroop), no gender effect emerged.

A main study *(N* = 312[12]*)* included the go/no-go task alongside the disinhibition-IAT. It was selected in preference to the Stroop, as it is a commonly used measure of response inhibition (Gillespie et al., 2022). No association emerged between the disinhibition-IAT and the go/no-go task. Furthermore, no associations emerged between TriPM Disinhibition and no-go trial errors or reaction times. Moreover, the disinhibition-IAT was not associated with TriPM Disinhibition.

Strengths and Limitations

Study 1, which used the classic Stroop task (Stroop, 1935) and a go-no/go task and found that both were associated with TriPM Disinhibition, adds to the extant literature, offering support to studies that have found similar associations between performance on response inhibition tasks and disinhibition. Thus, both the tasks show potential as experimental tasks to index behavioural correlates of disinhibition. As the Stroop was not carried forward into the main study, there was no opportunity to reproduce this finding. Therefore, it merits further exploration as the evidence here suggests that the Stroop may too be a useful behavioural task for triarchic Disinhibition.

While the Stroop and go/no-go task demonstrated potential utility as behavioural correlates for Disinhibition in Study 1, the results from Study 2 were quite different. Counter to Study 1, the go/no-go task was not associated with TriPM Disinhibition, and counter to Chapter 3, the disinhibition-IAT was not associated with TriPM Disinhibition scores. The lack of association between the go/no-go task and triarchic Disinhibition might be accounted for by unknown factors such as

[12] Sample size after data cleansing as the total sample of 1192 included those in Chapter 5, Main Study

participant demand or a more general issue with the sample itself. This seems likely, particularly given the lack of predicted associations across all tasks and measures, which had previously emerged in Study 1 and Chapter 3.

Nonetheless, the inconsistent relationship between the disinhibition-IAT and its respective self-report measure merits consideration given that the boldness-IAT and meanness-IAT did not suffer from the same issue. It seems unlikely that the disinhibition-IAT has been poorly constructed, given that its construction followed the same process as that for the other IATs, ensuring conceptual correspondence. Moreover, in Chapter 3, it demonstrated concurrent validity, discriminant validity and internal consistency. Perhaps instead, this inconsistent relationship between the implicit and explicit measures of Disinhibition relates to the nature of this particular domain of psychopathy. The IATs created here aimed to index the personality self-concept. However, Disinhbition is not a personality construct per se; the domain largely reflects behaviours rather than cognitions. The development of the implicit self-concept is thought to arise from a series of automatic behavioural responses which together activate a trait (Back et al., 2009; De Cuyper et al., 2017). This relies on a repeated series of events where a linkage is made between the self and, for example, being disinhibited. If an individual has insight that they have behaved in a disinhibited manner, it seems feasible that they would develop an implicit self-concept in line with this. However, some individuals who are disinhibited may not implicitly view themselves as such; behaviours associated with disinhibition may occur without intent, driven by impulse control issues (Drislane et al., 2014; Patrick et al., 2009). If an individual engages in disinhibited behaviours but considers them to be situationally or externally driven, such as aggression in response to provocation by another, or temptation by others leading to immediate gratification, it is conceivable that the theorised implicit link between the self and the trait are not made. Thus, the implicit self-concept might not fully represent a relation between the self and the attribute of disinhibition, or at least not for all individuals. This variation might account for Disinhibition being associated with the disinhibition-IAT in some instances, but not all, in line with the differing results from Chapters 3 and 5.

Future Research Directions

While mixed, the findings here point to the suitability of both the Stroop and go/no-go task as behavioural correlates of disinhibition, indicating the utility of further research to explore this potential. Moreover, the nature of the implicit self-concept of disinhibition merits further exploration. There may be a relationship between accepting responsibility for one's disinhibited actions and implicit disinhibition. Those who have insight and take responsibility would be likely to have higher scores on the disinhibition-IAT as they have developed an implicit self-concept of "being disinhibited". Conversely, those who are disinhibited but who lack insight, and fail to take responsibility for their actions would score lower on the disinhibition-IAT because the implicit link between the self and being disinhibited has not developed. This could easily be tested by adding in a measure of locus of control (e.g., Locus of Control of Behaviour; Craig, Franklin & Andrews, 1984) to understand whether this mediates the association between the disinhibition-IAT and TriPM Disinhibition.

Chapter 7: Attentional Blink and Psychopathy

The final experimental chapter of the thesis describes the exploration of a single experimental task as a possible external correlate of all triarchic domains of psychopathy: the attentional blink (Chun & Potter, 1995; Raymond et al., 1992). In an attentional blink paradigm, a series of images is presented in rapid succession at the same location on a computer screen. The participant is required to look for targets occurring within this stream of images. Typically, when a second target occurs within the stimuli stream within 100 – 600 ms after the first target, identification is problematic as interference and attentional suppression is thought to occur (Raymond et al., 1992).

This task was selected because if an overfocus on attention does underpin psychopathy as a broader construct, an attentional task could be a single potential implicit behavioural measure associated with all three domains. This hypothesis was not supported using the box Stroop, reported

in Chapter 6 where task performance was unrelated to any of the triarchic psychopathy domains. Others have used attentional blink paradigms in psychopathic samples previously. However, mixed predictions have been made, and mixed findings have emerged. Some have found that those higher in psychopathy are less susceptible to distractor stimuli (Wolf et al., 2012), while others have found higher levels of task distraction in those with greater levels of externalising behaviour which is associated with impulsivity-antisociality on the PCL-R (Baskin-Sommers et al., 2012).

A standard attentional blink task based on the methodology of Chun and Potter (1995) was developed and piloted with a small sample (*N* = 16). A robust attentional blink was demonstrated where the identification of second targets following the correct identification of a first target showed a deficit when T2 appeared around 200-500ms after T1.

As the task performed in line with expectations, it was included alongside the TriPM in a main study (*N* = 202) to explore hypothesised associations with psychopathy. However, a measure of working memory/intelligence was also included (forwards, backwards and sequencing digit span tasks), as the magnitude of the attentional blink has been linked with measures of working memory/intelligence in some studies (e.g., Baskin-Sommers et al., 2012; Klein et al., 2011; Wolf et al., 2012).

The data suggest that there is no effect of psychopathy on first target identification in the attentional blink, but that working memory, indexed by the sequencing digit-span, is positively associated with greater first target identification. Overall, despite strong attentional blink effects, it appears that neither psychopathy nor working memory moderated the magnitude of the attentional blink.

No evidence emerged that the magnitude of the attentional blink was related to any of the three triarchic domains of psychopathy. While this was a correlation between explicit psychopathy (TriPM) and a behavioural task (the attentional blink), some association would be expected, given previous studies which have also used explicit measures of psychopathy.

Strengths of the Research

The task performed as anticipated and consistent with the attentional blink literature, displaying a typical "U" shaped curve (Chun & Potter, 2005). Thus, seemed to be indexing the attentional blink. However, the results do not suggest that the attentional blink is related to psychopathy.

Future Directions

While the attentional blink task did not function as a behavioural correlate for psychopathy, the emotional attentional blink task (EAB; Most et al., 2005) might be an alternative to pursue. As with the attentional blink, this task again uses rapid serial visual presentation. However, instead of measuring the ability to identify a second target after the presentation of the first, the EAB measures detection rates of a single target after the presentation of an emotional distractor image. Importantly, this task allows for a comparison of the response modulation (Baskin-Sommers et al., 2011) and emotional dysfunctional theories of psychopathy (Cleckley, 1950; Lykken, 1957). If the former is correct, those with all forms of psychopathic traits will be able to ignore any type of emotional distractor as they are focusing on detecting the target image. Thus, better performance would be expected on distressing or threatening versions of the task, across all psychopathic traits and domains. Conversely, if the emotional dysfunctional theories of psychopathy are accurate, reduced emotion-induced blindness in those with higher levels of Boldness when the distractors are fear-inducing images, and reduced emotion-induced blindness in those with higher levels of Meanness when the distractors are distressing images would be expected. While a version of this task was developed using the distress and threat images from the two AMP tasks, due to technical issues with delivering the task via the web, it was not possible to use it with a participant sample.

Implications: Practical and Theoretical

Practical Implications

This research has illustrated that the IAT has some utility in indexing the psychopathic personality self-concept, as conceptualised in the TriPM. With substantial further development and validation, there is the potential for the IATs, or some future form of them, to be useful across research, clinical and forensic settings, and places of work. In research, the IATs may have potential as an adjunct to self-report measures to index psychopathic traits of boldness and meanness. The disinhibition-IAT may also offer a novel method to identify a lack of behavioural insight and failure to take responsibility for actions. Again, with more development, the IATs may also have utility in executive recruitment. Ruthlessness, charm and a lack of conscience may be viewed as advantageous traits to hold for senior executive positions, but individuals with these traits can contribute towards a toxic work environment with high levels of employee turnover (Hill & Scott, 2019; Mathieu & Babiak, 2016; Mathieu et al., 2014; Sheehy et al., 2021). Thus, administering some form of IATs which index these traits, could give organisations a more accurate and rounded view of an individual's traits and their suitability for a role. As the IATs are constructed around the triarchic model, they may already be well-suited to indexing implicit psychopathy in the workplace as boldness maps to more adaptive aspects of psychopathy, such as leadership, while meanness maps to more maladaptive behaviours (Smith & Lilienfeld, 2013).

However, it is crucial to note, that any practical application of the IATs here, or any future forms of them, requires much more work as well as close adherence to ethical standards. This thesis merely demonstrates the potential utility of the IAT to measure the implicit psychopathic self-concept. However, these IATs, and future ones are unlikely to be sufficient as measures of psychopathy on their own. In fact, the use of these tools to index psychopathic personality traits and make decisions and judgments in line with this would raise ethical concerns. As Jost (2019) highlights, it is unethical to hold someone to account for their attitudes rather than their deeds. Thus, IATs may never be suitable as a replacement for e.g., the PCL-R in clinical or forensic settings for this reason alone. However, if a PCL-R version of the IAT was developed and well-validated, there is a

potential for such an IAT to be a supplementary psychopathy assessment used in conjunction with the PCL-R.

Theoretical Implications

One theoretical point which stands out from the studies presented here is the lack of evidence in support of an attentional deficit underpinning psychopathy. In the separated "box" Stroop task (Hiatt et al., 2004), there was no association between performance on the task and any of the triarchic domains of psychopathy. It might be expected here that as psychopathy increases, Stroop interference reduces. However, this did not materialise. Furthermore, in the attentional blink task, there was no association with psychopathy. Again, this was counter to what might be predicted by the response modulation hypothesis: either a reduced attentional blink, as those with psychopathy can focus on the goal of identifying T2 after T1 (Wolf et al., 2012), or an exaggerated blink, as psychopaths are over-focused on T1 at the expense of identifying T2 (Tillem et al., 2021). Given that nothing emerged in either of these studies to support the theorised attentional deficit underpinning psychopathy, perhaps alternative tasks might need to be devised or sought to test this.

The finding that implicit boldness may be associated with enhanced fear when facing threat to the self, hints at different implicit and explicit representations of the self in psychopathy. Similarly, the idea that implicit disinhibition may take more than one form, depending on insight and the locus of control that an individual places on their disinhibited behaviours. Together, these findings point to the implicit psychopathic self-concept being in some ways, qualitatively different to the explicit psychopathic self-concept. This has implications for gaining a better understanding of some of the drivers of more impulsive and automative behaviours associated with psychopathy.

General Limitations of the Thesis

Data Collection

Each study in the thesis was conducted online, a data collection method with potential limitations as well as strengths. However, the decision to use online samples was necessitated due to the PhD commencing in October 2020, when limitations on face-to-face contact and hence, research, were in place due to COVID-19 restrictions (Uittenhove et al., 2023; Watermeyer et al., 2021). Permission was originally given to Jennifer Pink to test offenders in HMP Grendon, but this was not possible due to COVID-19 restrictions.

While online data collection offers the opportunity to gain large datasets relatively quickly, concerns have been raised about the quality of data gained through online research. The concerns include a potential lack of control over participant effort and attentional focus, as well as variations in the computer equipment and software used by participants (Uittenhove et al., 2023). However, while these are especially pertinent concerns for the studies presented in this thesis due to the nature of the tasks developed here, recent research comparing modalities of experimental testing on a complex cognitive paradigm offers encouraging findings. Using a working memory task, Uittenhove et al. (2023) identified small but acceptable differences in reaction times and benchmark effects (e.g. primacy effect) between students who were monitored in a lab, and students who completed the task unmonitored online. Moreover, they compared the performance of participants recruited via Prolific against their students tested in the lab and students tested unmonitored online. They found comparably small levels of extreme-value or poor accuracy data, and no effect of testing modality on the primacy effect in the task. Thus, the use of online platforms to deliver experimental research as well as the use of Prolific to recruit participants (Chapter 7) does not mean that data gathered in this manner, from these samples is necessarily of lower quality that that gained through face-to-face testing.

Community Samples

All the research completed in the thesis used community participants, where the prevalence of psychopathy in the general population is estimated to be anywhere between 0.6% and 4.5% (Coid

et al., 2009; Sanz-García et al., 2021). This prevalence is much lower than those reported in forensic samples and in samples of senior executive professionals (Sanz-García et al., 2021). Thus, one potential criticism is that the participant samples through this thesis were not sufficiently psychopathic. This criticism presumes that psychopathy is a categorical rather than dimensional construct, a point unsupported in the literature. Research unequivocally demonstrates that psychopathy is dimensional (see e.g., Guay et a., 2007; Sellbom & Drislane, 2021; Walters et al., 2007) rather than categorical. Thus, the use of community participants is not problematic as the construct can be assessed with lower levels of psychopathic traits within a sample. Similar principles apply to other personality traits, such as extraversion, which is again dimensional; this concept can be explored without having a highly extraverted sample. In support of this, the IATs were able to index implicit boldness and meanness in a sample with relatively low levels of psychopathic traits. Nonetheless, the efficacy of these IATs should be explored in samples with higher levels of psychopathic traits to explore how they perform with forensic and clinical populations, as well as within professional executive samples.

Final Concluding Comments

In summary, this thesis makes several contributions to the literature. It demonstrates the potential utility of the IAT to index the psychopathic self-concept and considers the possible future practical applications of such an implicit measure. It adds further evidence to the extant literature that both the Stroop and go/no-go tasks are suitable to index response inhibition associated with triarchic Disinhibition. The data also points to some exciting future directions for research, indicating that the implicit psychopathic self-concepts of Disinhibition and Boldness may differ from that represented by self-report measures.

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Appendices

Appendix A: Ethical Application, Documents and Approval Letter, Chapter 3

1 March 2021

Dear HEATHER GILMOUR, CATRIN HANCOCK, Joshua Rabosa, Georga De Freitas Ludlow, Linny Jacob, Francisca Aiyejuro, Connor Goodall, Holly Rees, Laurinda Dodoo, Katiana Marrero-Lapinell, , Professor Nicola Gray, JENNIFER PINK,

Re: 5034 , Implicit Measure of Psychopathy

Your application - https://swansea.forms.ethicalreviewmanager.com/ProjectView/Index/5034 - has been reviewed and approved by the Department of Psychology Ethics Committee.

The list of additional students (if any) are included in the table below:

Other student applicant - first name	Other student applicant - Surname	Other student applicant - email
CATRIN	HANCOCK	[redacted]
Joshua	Rabosa	
Georga	De Freitas Ludlow	
Linny	Jacob	
Francisca	Aiyejuro	
Connor	Goodall	
Holly	Rees	
Laurinda	Dodoo	
Katiana	Marrero-Lapinell	

additional researcher or student - first name	additional researcher or student - surname	additional researcher or student - email

The conditions of this approval are as follows:

1. To conduct your study strictly in accordance with the proposal that has been approved by the committee, including any approved amendments
2. To advise the ethics committee chair of any complaints or other issues that may warrant ethical review of the project
3. To submit for approval any changes to the approved protocol before implementing any such changes
4. To keep any information obtained from your participants absolutely confidential

Please note that failure to comply with these conditions of approval may result in the withdrawal of approval for the project.

To advertise your study on the departmental Participant Pool: You will need to send send a request for your study to be made visible, via the link on the Experiment Management System website (see Researcher Documentation for details). Please ensure that you attach this letter to your request. (If you are unable to attach the Ethics approval, send it in a separate email to Dr. Phil Tucker [redacted].

For students: Please ensure that the signed copy of this Ethical Approval, together with any other paperwork associated with your research, is included in your final write up.

Yours Sincerely,

Dr John Towler (Reviewer of Application)

Dr Gabriela Jiga-Boy (Committee Chair)

Security information

Data Protection Privacy Notice

You are logged into the Ethical Review Manager (ERM), the system provided by Infonetica Ltd that will process the application on behalf of Swansea University. Your contact details will be stored by Infonetica Ltd and used by the University for the purpose of managing your application for ethics review.

Please be mindful that each application, submitted via the University's Ethical Review Manager (ERM), costs the University money due to the number of people required to process, review and approve your application, many of whom are senior academics within the University. Please respect this fact and ensure that you carefully follow the guidance provided to complete your application appropriately (and choose the correct route of ethical review).

Please do not proceed unless you are content to comply with this.

The data controller is Swansea University and the legal basis on which this task is being performed is public interest. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and may be contacted using b.y.buckley@swansea.ac.uk.

Filter

Does your application require NHS research ethics approval?

- ○ Yes
- ◉ No

Are you a member of the CHHS?

- ◉ Yes
- ○ No

Which department are you from?

Psychology

Project Title

Short project title [This could be an acronym.]

Implicit TriPM

Long project title

Implicit Measures of Psychopathy

What is the location of the proposed research?

- ☐ Swansea University
- ☐ Other University
- ☐ Hospital
- ☐ School
- ☑ Other

What is the location other than Swansea University?

Online via Gorilla platform

What is the proposed start date for your project?

21/02/2021

What is the estimated project completion date?

30/09/2021

Is this student or staff research?

MSc - Abnormal and Clinical Psychology

Applicant

Name of Applicant

Title	First Name	Surname
	HEATHER	GILMOUR

Email [redacted]

Should any other student be listed on this application?

- (•) Yes
- ( ) No

Title	First Name	Surname
	CATRIN	HANCOCK

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Joshua	Rabosa

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Georga	De Freitas Ludlow

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Linny	Jacob

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Francisca	Aiyejuro

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Connor	Goodall

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Holly	Rees

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Laurinda	Dodoo

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Katiana	Marrero-Lapinell

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Supervisor

Title	First Name	Surname
Professor	Nicola	Gray

Email [redacted]

Title	First Name	Surname
	JENNIFER	PINK

Email [redacted]

Risk Assessment

Does the research fall under ANY of the following categories? [Click all that apply]

- ☐ Interventions and therapies, including clinical and non-clinical trials
- ☐ Collection of bodily fluids such as blood, saliva etc
- ☐ Research on children
- ☐ People highly dependent on medical care who may be unable to give consent
- ☐ People with a cognitive impairment, intellectual disability, or a mental illness
- ☐ Topics that may cause distress to participants due to past traumatic experiences
- ☐ Limited disclosure involving active concealment and/or planned deception
- ☐ Study or exposure of illegal activity, or research that is likely to discover illegal activity
- ☐ Research that could jeopardize a participant's employment
- ☐ Research that involves travel overseas
- ☐ Research that poses a risk to the physical or emotional safety or welfare of a Swansea University student researcher

- ☑ None of the above

Methods

Click all methods that apply:

- ☑ Computer-based testing
- ☐ Secondary-data analysis
- ☐ Observational methods
- ☑ Research on the internet
- ☐ Interviews
- ☑ Questionnaire-based methods
- ☐ Neuroimaging (MRI, PET etc)
- ☐ Psychophysiology (EEG, ERPs etc)
- ☐ tDCS
- ☐ Human tissue collection

Briefly (max 200 words) describe the research you wish to undertake: Include study rationale, main theoretical constructs, and hypotheses. Please use non-technical language wherever possible.

The proposed research project aims to develop an implicit test for psychopathy.

It is difficult to rely on explicit measures of psychopathy as they are often self-report. One of the key characteristics of the psychopathic personality is dishonesty, and therefore it is likely that any self-report measures from these individuals can be unreliable due to a motivation to deceive or dissimulate. Another issue is that explicit measures are based on the individual's own insight into the motivation and attitudes behind their behaviour, which in turn fail to take implicit cognitions into account.

In order to overcome this, we will develop three implicit association tasks (IATs) and three implicit Priming Tests. Each IAT/Priming test will relate to a different dimension of psychopathy described within the Triarchic Psychopathy Measure (TriPM; Patrick, 2009). These dimensions are Boldness, Meanness and Disinhibition.

The three IATS and three Priming tests will allow us to explore how the novel implicit measures correlate with explicit measures of the TriPM questionnaire; as well as how implicit and explicit measures of psychopathy correlate with other behaviours known to be strongly associated with the psychopathic personality. These behaviours include proactive and reactive aggression, pro-social vs anti-social behaviour, and a false or distorted presentation of the self via social desirability. These outcome measures will be measured using questionnaires.

What is your research design? What variables will be manipulated or measured?

The study is a mixed methods design. Participants will either be assessed on tasks of Implicit Boldness, Implicit Meanness, or Implicit Disinhibition. For each psychopathy dimension participants will complete both the Implicit Association Task (IAT) and Priming task, in counterbalanced order.

Following the implicit tasks all participants will complete all questionnaire measures. No variables will be manipulated.

The dependent variables are detailed below:

1. Scores on each of the three Implicit Association Tests (IATs):
*Boldness IAT will measure the association between the concepts of BOLD and WARY with the attributes of ME and NOT ME.
*Meanness IAT will measure the association between the concepts of CRUEL and KIND with the attributes of ME and NOT ME.
*Disinhibition IAT will measure the association between the concepts of RECKLESS and SENSIBLE with the attributes of ME and NOT ME.

The concepts will be presented as words that represent the key concept of interest in each IAT. Attributes (ME vs NOT ME) will also be represented as words. Participants need to categorise the words into either ME or NOT ME or CONCEPT 1 or CONCEPT 2 as quickly as possible. When the pairings of concepts and attributes are associated with one another and therefore congruent, response times are predicted to be both shorter and more accurate.

IAT scores will be calculated from the reaction times in milliseconds and the number of errors during each completed IAT.

2. Scores on each of the three Priming Tests (IATs):
*Boldness Priming task will measure the association between the concepts of ME and NOT ME and these stimuli will be preceded by either BOLD and WARY words.
*Meanness Priming Task will measure the association between the concepts of ME and NOT ME and these stimuli will be preceded by either CRUEL and KIND words.
*Disinhibition Priming Task will measure the association between the concepts of ME and NOT ME and these stimuli will be preceded by either RECKLESS and SENSIBLE words.

The word stimuli used on the Priming Task will be the same as for the IAT task. Thus, a direct comparison can be made between the two different methodologies.

The concepts will be presented as words that represent the key concept of interest in each Priming test. Attributes (ME vs NOT ME) will also be represented as words. Participants need to categorise the words into either ME or NOT ME as quickly as possible. When the ME or NOT ME words are preceded by a concept that is congruent with the implicit belief of the participant about the self (e.g. Brave - ME) the reaction times will be faster and more accurate than when the ME or NOT ME is preceded by an Incongruent concept (e.g. Timid - ME).

Priming scores will be calculated from the reaction times in milliseconds and the number of errors during each completed Priming task.

3. Scores on the following self-report measures:

Triarchic Psychopathy Measure (TriPM; Patrick, 2010) – Psychopathy
Reactive Proactive Questionnaire (RPQ; Cima, Raine, Meesters & Pompa, 2013) - Type of aggression
Social Desirability Scale-17 (SDS-17; Stöber, J., 2001) - measure of social desirability
Pro-socialness scale for adults (PSS-A; Caprara, G. V., Steca, P., Zelli, A., & Capanna, C., 2005) - measure of pro-social and anti-social behaviour
6 x feeling thermometers (explicit measure) will capture the relevance of each of the 6 concepts to the self.

The reaction times for each IAT and Priming Task will be correlated with participant scores on the three Tri-PM dimensions. These are boldness, meanness and disinhibition. They will also be correlated with each of the feeling thermometers. Correlations will also be calculated between the Tri-PM, feeling thermometers and measures of known behaviours associated with psychopathy (reactive and proactive aggression, pro-social vs anti-socal behaviour, social desirability).

References
Caprara, G. V., Steca, P., Zelli, A., & Capanna, C. (2005). A new scale for measuring adults' prosocialness. European Journal of psychological assessment, 21(2), 77-89.
Cima, M., Raine, A., Meesters, C., & Popma, A. (2013). Validation of the Dutch Reactive Proactive Questionnaire (RPQ): Differential correlates of reactive and proactive aggression from childhood to adulthood. Aggressive Behaviour, 39(2), 99-113.
Patrick, C. (2010) Triarchic psychopathy measure (TriPM). PhenX Toolkit Online assessment catalogue.
Stöber, J. (2001) The Social Desirability Scale-17 (SDS-17): Convergent validity, discriminant validity, and relationship with age. European Journal of Psychological Assessment, 17 (3). pp. 222-232.

What procedures will be carried out on the participants? What will happen to your participants?

Participants will be given a Participant Information Sheet (Appendix 1) to read setting out the aims and instructions for the study. Should participants wish to continue, they will be asked to give informed consent on the Consent Form (Appendix 2) by clicking a box on their screen before clicking an arrow to the next screen. It will also be made clear to them that they have the right to withdraw their participation in the study at any time, without penalty or the need to justify their decision.

Before participants begin the study, they will be asked for personal and demographic information (Appendices 3 & 4). The personal information that was provided on the Personal Information Form (Appendix 4) will be programmed into the computer as part of the "ME/NOT ME" component of the IAT Participants will be informed that this information will be disposed of after completion of testing so that their anonymity is assured. Participants will also be asked to select appropriate NOT ME words from a selection which they do not relate to (i.e. have no personal significance for them), for later use in the IAT and Priming Tasks (Appendix 5).

The Triarchic Psychopathy Measure (Appendix 6) will then be completed by participants.

The participants will be given definitions of the concepts relating to the Tri-PM domains (Boldness, Meanness, Disinhibition) to read in order to ensure that they understand them (Appendix 7).

Participants will then be randomly split into three between-subject groups: [1] Bold-Wary; [2] Cruel-Kind; [3] Reckless-Sensible. Participants will only complete ONE of these experimental branches in a between-subject design. This will ensure that participants do not become fatigued or bored by having to complete too many experimental tasks. Each branch of the design will include an IAT and a Priming Task, presented in counter-balanced order. For example, the Boldness group will complete the BOLD-WARY IAT and Priming Task, presented in counter-balanced order.

Before being able to complete their particular IAT and Priming task, participants will rate how much each of the 6 concepts associated with the TriPM relates to them through completing a series of Feeling Thermometers (Appendix 8). They will complete the thermometer ratings for BOLD and WARY, CRUEL and KIND, and RECKLESS and SENSIBLE before the Disinhibition IAT.

Next they will be shown the words from their respective IAT and Priming Tasks (e.g. Bold-Wary; OR Cruel-Kind OR Reckless-Sensible; Appendix 9), and asked to sort these into the 2 concept categories. This is to ensure that there is no confusion regarding the words and what they represent.

The words that were included in each of the IATs/Priming Tasks are attached to this application as Appendix 9 (Boldness, Meanness & Disinhibition).

Once they have completed the IAT and Priming Task, participants will complete the following measures in this order:

a. Reactive-Proactive Aggression Questionnaire (Appendix 10)
b. Social Desirability Scale-17 (Appendix 11)
c. Pro-socialness scale for adults (Appendix 12)

After completion of these outcome measures participants will be thanked for taking part in the research before reading a Debrief Form (Appendix 13) that details the study aims. They will then be reminded that their information is anonymous and will remain anonymous. Participants will be given contact details of the support services available to them should the need arise.

Student participants will receive 6 credits for their participation.

All community participants will be offered the opportunity to be entered into a prize draw to win a £50 Amazon voucher.

The study will be advertised via email, social media and posters (Appendices 13-15).

Please indicate which of the following will be used for storing data:

- ☐ Manual files (e.g. paper documents or X-rays)
- ☑ Home or other personal computer
- ☑ University computer
- ☐ Private company or work-based computer
- ☑ Laptop computer
- ☐ Other

Please explain how files on your home or personal computer will be secured:

All data will be stored in a password-protected folder. Access to the computer will be password protected.

Please explain how files on your university computer will be secured:

All data will be stored in a password-protected folder. Access to the computer will be password protected.

Please explain how files on your laptop computer will be secured:

All data will be stored in a password-protected folder. Access to the laptop will be password protected.

Risks to participants

What potential risks to the participants do you foresee and how do you propose to ameliorate/deal with potential risks?

No potential physical risks will be imposed on any individual undertaking the experiment. Participants may be concerned about whether their information is kept anonymous and will be informed that the information they provide within the experiment will not be traced back to them and will be kept anonymous throughout the whole of the study participation. All participants will be given a unique number with no trace of their identity. Participants will be informed that their data will be stored in a password-protected document and will only be accessed by the researchers as well as the supervisors. And nobody else will have access to this password. No identifiable information such as personal names will be stored within the documents and each participant will be referred to by their own unique participant number. Personal data collected at the beginning of the study for the IATs will be destroyed. The research team have used this methodology routinely in IAT and other studies of implicit methodologies.

The topic of the experiment may elicit negative feelings or memories, so all participants will be informed that they do not need to answer any questions which make them feel uncomfortable. Participants will also be told that they are able to withdraw from the study at any time with no explanation.

When participants are given their debrief sheet, participants will be asked whether they would like to discuss anything involved within the study or any concerns they would like to address. They will also be given links to support services available, including Wellbeing@campuslife and GP services local to the participants and also, links to a Mental health helpline via Mind Cymru (0300 123 3393).

Participants will be informed that their data will be stored anonymously and each individual's information will be referred to as a unique number so once data has been collected, participants will be anonymous to the researchers and cannot be deleted as the researchers will be unable to detect which data associates with each participant.

Will participants be informed of the right to withdraw without penalty?

- [x] Yes
- [ ] No

Do you have doubts about participants' abilities to give informed consent?

- [ ] Yes
- [x] No

How do you propose to ensure participants' confidentiality and anonymity?

Confidentiality and anonymity will be ensured as no identifying information will be collected from participants, only demographics will be recorded with regards to age and gender for the purpose of the task. From the commencement of the study, each participant will be given an alphanumeric code which relates to their data and throughout the whole of the experiment, they will be referred to by their code. Some personal information will need to be gathered for the programming of the IAT task, for example, their first name and star sign. Once the IAT task has been completed and reaction time and error data are collected the personal data will be deleted.

All questionnaires and documents completed within the experiment will be stored away in a password-protected document. They will only be accessed by the researchers' and their supervisors.

How will you ensure that participants will not be coerced to participate in your study?

All participants will be given an information sheet which explains the purposes and aims of the study and what is required of them to do. They will all be given the opportunity to ask any questions if they deem necessary and if they need any clarification. Participants will also be informed that they do not have to take part in the study if they don't want to. Participants will be told that they can withdraw from the study at any point without any explanation or justification.

Risks to researchers

What potential risks to the interests of the researchers do you foresee and how will you ameliorate/deal with potential risks?

No potential risks to the researchers are predicted.

If the participants would like to discuss any information in the experiment that they found sensitive, they will be advised to use the supportive services provided to them where these matters can be addressed. Participants will be informed to not ask the researchers about these issues and to use the services available. The supervisor has completed previous studies which are similar in the past and participants do not usually wish to discuss such information. Any concerns will be immediately taken to the research supervisor.

Participants

What is your estimated sample size, and how was this size determined?

N=1200.

To calculate the required sample size we assumed an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%), which revealed a sample of N=160 per group.

In order to account for drop-outs, which in previous online experiments have been approximately 20%, we will gather a sample of 200 people per condition (6 conditions).

As we require both a male and female group in 3 different between-subject conditions (Boldness, Meanness, Disinhibition) this equals 6 x 200 = 1200.

There are ten MSc students working on this project, so each student will be expected to collect approximately 120 online data-sets.

Will any participant be under the age of 18?

- ☐ Yes
- ☑ No

Describe your participants: give the age range, gender, inclusion and exclusion criteria, and any particular characteristics pertinent to the research project.

Participants will be males and females between the ages of 18 and 55. This age range hopes to account for any affects of cognitive decline or slower reaction time due to the aging process. Participants will be those in the general population as well as students at Swansea University.

How will the participants be selected and recruited?

- ☑ Department's electronic subject pool
- ☑ University population
- ☑ General public
- ☐ Other

Will payments or subject pool credits be made to participants?

- ☑ Yes
- ☐ No

Please specify quantities involved. Please ensure payment or credits awarded do not represent an inducement to participate in your study:

6 credits will be awarded to students of Swansea University. If they wish, community participants will be entered into a prize draw for a chance to win a £50 shopping voucher.

Will you be providing participants with a Participant Information Sheet?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Information Sheet. [Please base your P.I.S. on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 1 Participant Information Sheet 080221	Appendix 1 Participant Information Sheet 080221.docx	08/02/2021	2	48.7 KB

Will written informed consent be sought from participants?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Consent Form. [Please base your consent form on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 2 Participant Consent Form 080221	Appendix 2 Participant Consent Form 080221.docx	08/02/2021	2	18.9 KB

How will you advertise your study?

- [x] Email
- [x] Poster
- [x] Social media
- [ ] Other
- [ ] I won't be advertising my study

Please upload a copy of your email based on the standard template. [See help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 14 Email Advert	Appendix 14 Email Advert.docx	11/02/2021	1	16.7 KB

Please upload a copy of your poster based on the standard template. [See help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 16 Poster	Appendix 16 Poster.docx	12/02/2021	1	336.8 KB

Please upload a copy of your advertisement for social media.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 15 Social Media Adverts	Appendix 15 Social Media Adverts.docx	11/02/2021	1	958.2 KB

Will you be providing participants with a debrief statement?

- [x] Yes
- [ ] No

Please attach a copy of your debrief statement that will be given to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Debrief Statement	Appendix 13 Participant Debrief	Appendix 13 Participant Debrief.docx	08/02/2021	2	114.0 KB

Please upload all questionnaires that you intend on distributing to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 6 The Triarchic Psychopathy Measure	Appendix 6 The Triarchic Psychopathy Measure.pdf	08/02/2021	1	43.3 KB
Default	Appendix 10 Reactive and Proactive Questionnaire (RPQ)	Appendix 10 Reactive and Proactive Questionnaire (RPQ).doc	08/02/2021	1	23.0 KB
Default	Appendix 4 Personal Information Data Capture Form 080221	Appendix 4 Personal Information Data Capture Form 080221.docx	08/02/2021	1	25.2 KB
Default	Appendix 3 Demographics Form 080221	Appendix 3 Demographics Form 080221.docx	08/02/2021	2	261.0 KB
Default	Appendix 8 Semantic Differentials-FeelingThermometers 080221	Appendix 8 Semantic Differentials-FeelingThermometers 080221.docx	08/02/2021	2	123.3 KB
Default	Appendix 11 Social Desirability Scale (SDS-17)	Appendix 11 Social Desirability Scale (SDS-17).docx	08/02/2021	2	17.8 KB
Default	Appendix 12 Prosocialness Scale	Appendix 12 Prosocialness Scale.docx	08/02/2021	2	18.9 KB

If necessary, please upload any additional documents to support your application:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 5 Not Me Word Stimuli	Appendix 5 Not Me Word Stimuli.docx	08/02/2021	1	17.0 KB
Default	Appendix 7 Concept Definitions	Appendix 7 Concept Definitions.docx	08/02/2021	1	18.8 KB
Default	Appendix 9 Word Stimuli for IATs and Priming Tasks	Appendix 9 Word Stimuli for IATs and Priming Tasks.docx	08/02/2021	1	17.8 KB

Applicants signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by MRS JENNIFER PINK ([redacted]) on 15/02/2021 12:57

Co-applicants

Co-applicants signature [i.e. additional student]

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by HEATHER GILMOUR ([redacted]) on 15/02/2021 12:57

Co-applicants signature [i.e. additional student]

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by PROF Nicola Gray ([redacted]) on 15/02/2021 13:21

Supervisor

Supervisors signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my ability
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by PROF Nicola Gray ([redacted]) on 15/02/2021 13:43

Participant Information Sheet (2.0)

8th February 2021

Personality and Behaviour

You are being invited to take part in some research. Before you decide whether or not to participate, it is important for you to understand why the research is being conducted and what it will involve. Please read the following information carefully.

What is the purpose of the research?

We are conducting research to determine if there is a relationship between personality traits and behaviour. The aim of the study is to measure personality traits using explicit methods (questionnaires) and implicit methods (reaction time tests) to determine which type of measurement better predicts behaviour (e.g. pro-social behaviour or different forms of aggression). Your participation in this study will take approximately 45 minutes. Only participants who are native English speakers are eligible to take part in this research due to the need to respond to English words quickly. Please ensure that you are completing this on a laptop or desktop computer (not smart phone). You should be in a quiet place without any distractions for the entire duration of the study. Distractions may affect your reaction time and results.

Who is carrying out the research?

The data is being collected by Katiana Marrero, Connor Goodall, Catrin Hancock, Georga De Freitas Ludlow, Holly Rees, Francisca Tukema Aiyejuro, Laurinda Na Dodua Dodoo, Linny Mary Jacob, Joshua Earl Christian Encabo Rabosa and Heather Gilmour under the supervision of Professor Nicola Gray and Jennifer Pink, within the Psychology Department of the College of Human and Health Sciences at Swansea University. The research has been approved by the College of Human and Health Sciences Research Ethics Committee.

What happens if I agree to take part?

Firstly, we will ask you for some background information including your age, gender, ethnicity, and level of education. You will be asked to complete four short questionnaires on personality and behaviour. You will also complete two personality reaction time tasks. For these tasks you will be asked to sort words into categories as quickly as you can via key presses on your computer.

The whole experiment will be completed within 45 minutes. Only the research supervisor

and the researchers will have access to the information and everything will be kept confidential and anonymous.

Are there any risks associated with taking part?

There are no risks in taking part. However, this research includes topics that may be sensitive for some people (e.g. aggressive behaviour). Therefore, participation should be considered carefully. The research has been approved by the College of Human and Health Sciences Research Ethics Committee.

Data Protection and Confidentiality

Your data will be processed in accordance with the Data Protection Act 2018 and the General Data Protection Regulation 2016 (GDPR). All information collected about you will be kept strictly confidential. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file. The data we will collect for our study will be made anonymous at the start of the research. The data controller for this project will be Swansea University.

What will happen to the information I provide?

An analysis of the information will form part of our report at the end of the study and may be presented to interested parties and published in scientific journals and related media. Note that all information presented in any reports or publications will be anonymous and unidentifiable.

Is participation voluntary and what if I wish to later withdraw?

Your participation is entirely voluntary – you do not have to participate if you do not want to. Please note that the data we will collect for our study will be made anonymous at the start of the research; thus, it will not be possible to identify and remove your data at a later date, should you decide to withdraw from the study. Therefore, if at the end of this research, you decide to have your data withdrawn, please let us know before you leave the webpage.

Data Protection Privacy Notice

The data controller for this project will be Swansea University. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and can be contacted at the Vice Chancellors Office. Your personal data will be processed for the purposes outlined in this information sheet. Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you online. The legal basis that we will rely on to process your personal data will be processing is

necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the College of Human and Health Sciences Research Ethics Committee, Swansea University. The legal basis that we will rely on to process special categories of data will be processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will your information be held?

Data will be preserved and accessible for a minimum of 10 years after completion of the research. Records from studies with major health, clinical, social, environmental or heritage importance, novel intervention, or studies which are on-going or controversial should be retained for at least 20 years after completion of the study. It may be appropriate to keep such study data permanently within the university, a national collection, or as required by the funder's data policy. The supervisor will take responsibility for data destruction, and all collected identifiable data will be destroyed on or after September 2031 as it is a requirement of Swansea University Research Integrity Framework on Research Ethics and Governance that data should be kept for a minimum of ten years.

What are your rights?

You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights. Any requests or objections should be made in writing to the University Data Protection Officer: University Compliance Officer (FOI/DP), Vice-Chancellor's Office, Swansea University, Singleton Park, Swansea, SA2 8PP. Email: dataprotection@swansea.ac.uk.

How to make a complaint

If you are unhappy with the way in which your personal data has been processed you may in the first instance contact the University Data Protection Officer using the contact details above. If you remain dissatisfied, then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF; www.ico.org.uk.

What if I have other questions?

If you have further questions about this study, please do not hesitate to contact us:

Katiana Marrero

[redacted]

Connor Goodall

[redacted]

Catrin Hancock

[redacted]

Georga De Freitas Ludlow

[redacted]

Holly Rees

[redacted]

Francisca Tukema Aiyejuro

[redacted]

Laurinda Na Dodua Dodoo

[redacted]

Linny Mary Jacob

[redacted]

Joshua Rabosa

[redacted]

Heather Gilmour

[redacted]

Department of Psychology,

Swansea University

Jen Pink

Department of Psychology, Swansea University

[redacted]

Professor Nicola Gray

Department of Psychology, Swansea University

[redacted]

Participant Consent Form

PERSONALITY AND BEHAVIOUR

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1. I (the participant) confirm that I have read and understand the information sheet for the above study (dated February 2021) that was on the previous page.

---

2. I understand that my participation is voluntary and that I am free to withdraw at any time and leave this research website, without giving any reasons. I understand that the data will be made anonymous at the start of the research; thus, it will not be possible to identify and remove my data at a later date, should I decide to withdraw from the study. Therefore, if at the end of this research, I decide to withdraw, I will let the researchers know before I leave the webpage.

---

3. I understand what my role will be in this research and I understand who to contact if I have any questions.

---

4. I have been informed that the information I provide will be safeguarded.

---

5. I am happy for the information I provide to be used (anonymously) in academic papers and other formal research outputs.

---

6. I have read and understand the Participant Information Sheet.

---

7. I agree to the researchers processing my personal data in accordance with the aims of the study described in the Participant Information Sheet.

---

8. I confirm that I am aged 18 or over.

If you agree to all these statements, and want to continue with the research, please select YES below.

If you do not want to continue, please select NO

○ Yes

○ No

This study is being conducted by Swansea University, College of Human and Health Sciences.

Principle Researchers:

Katiana Marrero | [redacted]

Connor Goodall | [redacted]

Catrin Hancock | [redacted]

Georga De Freitas Ludlow | [redacted]

Holly Rees | [redacted]

Francisca Tukema Aiyejuro | [redacted]

Laurinda Na Dodua Dodoo | [redacted]

Linny Mary Jacob | [redacted]

Joshua Rabosa | [redacted]

Heather Gilmour | [redacted]

Jen Pink | [redacted]

Project Supervisor: Professor Nicola S Gray | [redacted]

Department of Psychology

Swansea University

Participant Debrief Form

Personality and Behaviour

8th February 2021

Thank you for taking part in our research. Now that you have completed the study, we will explain the rationale behind this work.

You have completed some questionnaires (self-report measures of personality and behaviour) and two sorting tasks (implicit measures), the Implicit Association Task and a priming task. These tasks have measured the level that you associate your self-concept with the personality traits of being either bold and wary, cruel and kind, or reckless and sensible.

The implicit tasks aim to overcome some of limitations associated with self-report measures. While these self-report measures, such as questionnaires, are useful in research, they can have certain limitations because they may fail to detect thoughts, feelings, or behaviours a person may be trying to conceal or does not realise they have.

This research has measured your implicit and explicit associations between your self-concept and certain personality traits (bold and wary, cruel and kind or reckless and sensible), to determine if one method better predicts proactive and reactive aggression, pro-social and antisocial behaviour, and tendencies to engage in social desirable responding.

Data collected for the study will be used to develop implicit tests of personality traits and to evaluate if this can be done reliably. All data is anonymous and will be retained for 10 years. Data will only be analysed by groups, not by individual.

If you feel affected by issues raised by this research and would like to discuss any concerns, please contact the research team or study supervisor on the details provided below. If you feel this piece of research may have health implications for you, we advise you

to contact your GP (family doctor) or Swansea University's Wellbeing services (Wellbeing Services, Horton Building, Swansea University, Singleton Park, Swansea, SA2 8PP, Tel : 01792 295592, www.swansea.ac.uk/wellbeing/). Alternatively you can contact a Wales-wide Mental Health Helpline for support such as Mind Cymru (0300 123 3393).

Katiana Marrero | [redacted]

Connor Goodall | [redacted]

Catrin Hancock | [redacted]

Georga De Freitas Ludlow | [redacted]

Holly Rees | [redacted]

Francisca Tukema Aiyejuro | [redacted]

Laurinda Naa Dodua Dodoo | [redacted]

Joshua Rabosa | [redacted]

Heather Gilmour [redacted]

Linny Mary Jacob | [redacted]

Department of Psychology, Swansea University

Jen Pink

Department of Psychology, Swansea University

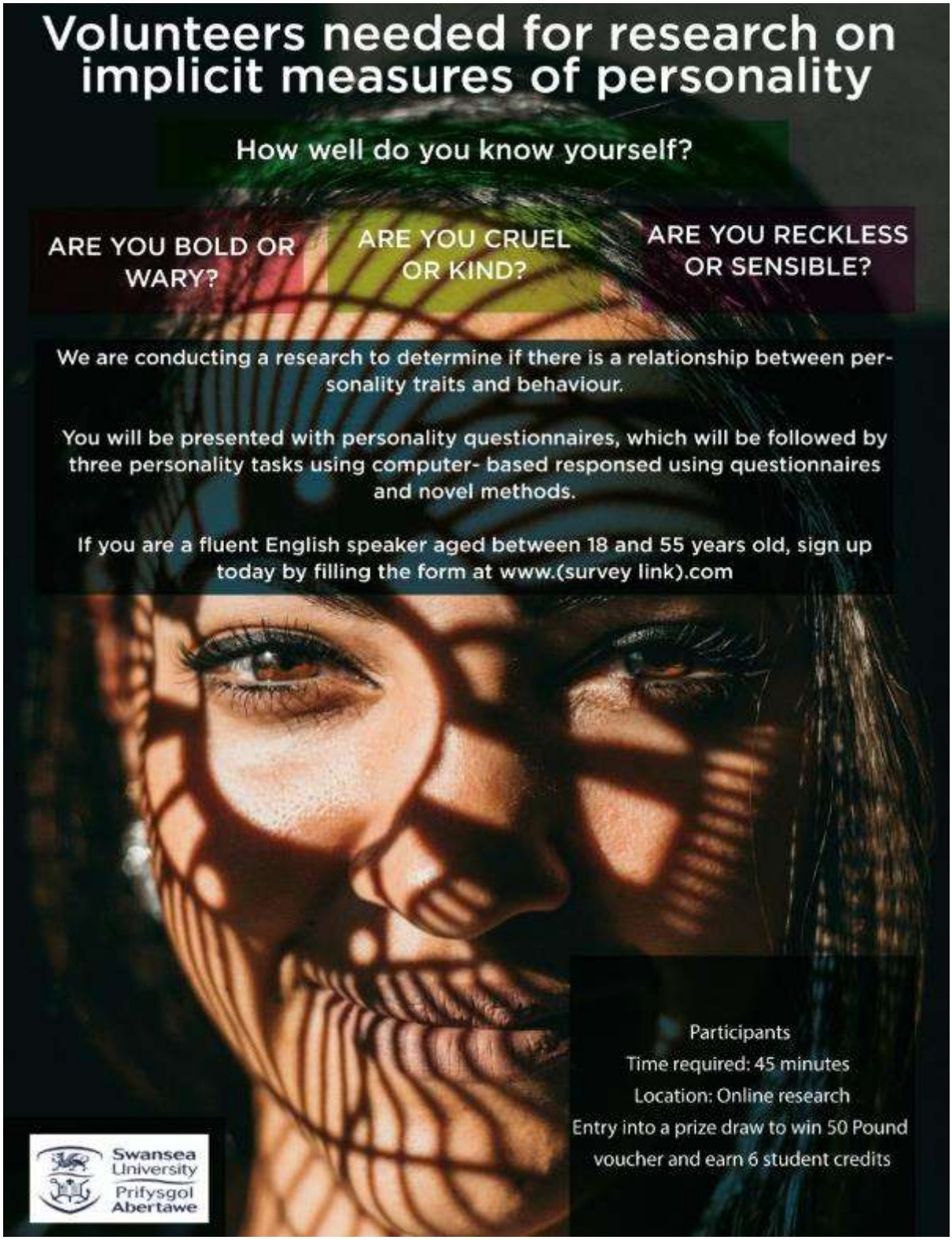
[redacted]

Professor Nicola S Gray

Department of Psychology, Swansea University

[redacted]

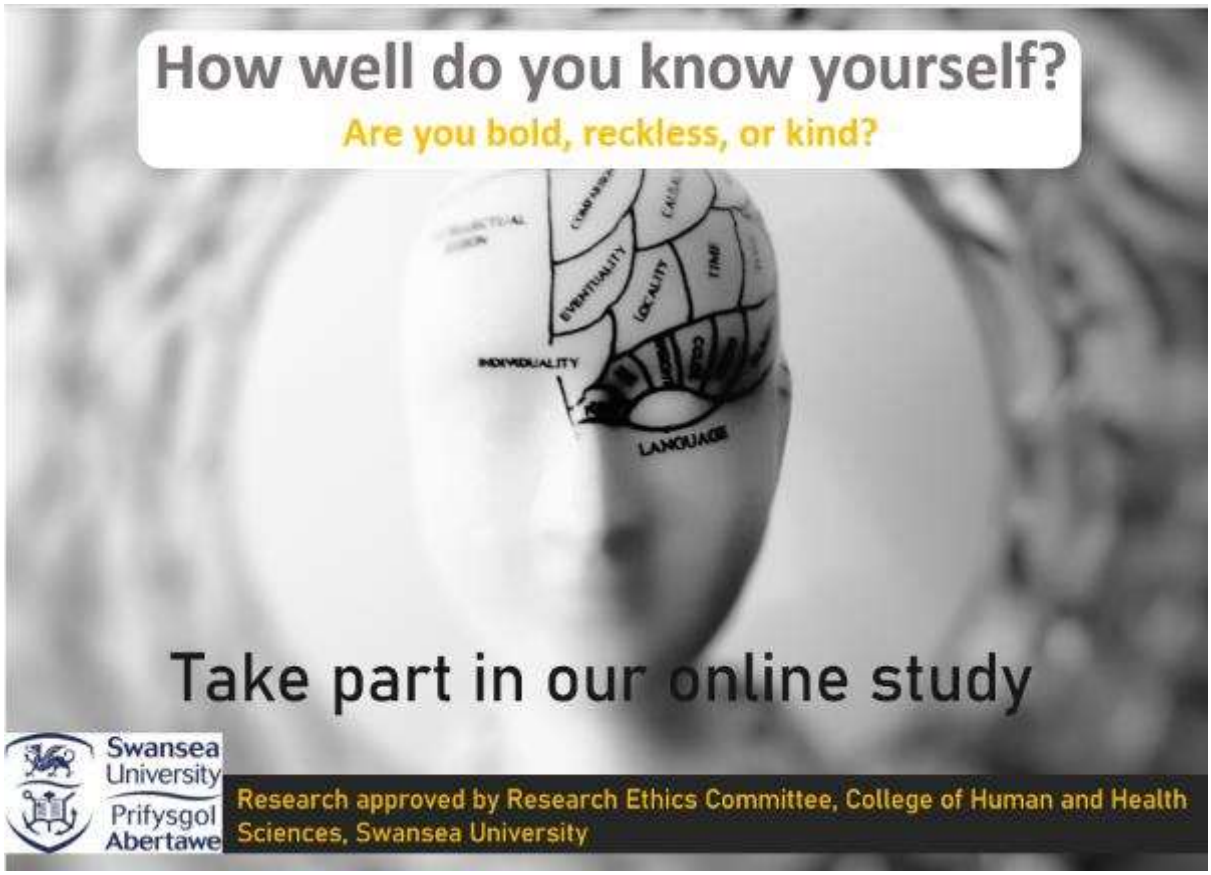
Participant Recruitment Poster



Social Media Adverts for Participants

Each of the social media adverts will comprise the following text in the post (typed into Facebook/Instagram/Twitter) accompanied by one of the 3 advert images below.

How well do you know yourself? If you are age 18-55 and a fluent English speaker, take part in our research about personality and behaviour. You could win a £50 gift card prize! Study access through Swansea University subject pool will gain 6 credits. Click the following link from a laptop to participate **<<link>>**. Study takes approx. 45 minutes. Contact <<Name>> (<<EMAIL ADDRESS>>@swansea.ac.uk) with any questions. #participate #research #psychology #swansea


How well do you know yourself?
Are you bold, reckless, or kind?
INDIVIDUALITY
LANGUAGE
Take part in our online study
Swansea University
Prifysgol Abertawe
Research approved by Research Ethics Committee, College of Human and Health Sciences, Swansea University


How well do you know yourself?
Are you bold, reckless, or kind?
Take part in our online study
Research approved by Research Ethics Committee, College of Human and Health Sciences, Swansea University
Swansea University
Prifysgol Abertawe

Participant Recruitment Email

How well do you know your own personality? Are you bold, reckless, or kind?

If you are a fluent English speaker aged 18-55, please consider taking part in our online research study. We are investigating how we might measure personality in different ways using questionnaires and novel methods.

To participate, click on the link from your laptop/desktop computer <<STUDY LINK>>.

You will be asked to complete a series of questionnaires and reaction time tests which will take approximately 45 minutes. Upon completion, you can be entered into a prize draw to win a £50 voucher or awarded 6 subject pool credits (Swansea University students via Participant Pool).

If you have any questions please contact <<STUDENT NAME>>: **studentemail@swansea.ac.uk**

This research has been approved by the Research Ethics Committee, College of Human and Health Sciences, Swansea University.

Triarchic Psychopathy Measure (Patrick, 2010)

Please indicate the degree to which you agree with each of the following items by circling the appropriate number. If you do not feel comfortable answering a question you may leave it blank.

		False	Mostly False	Mostly True	True
1	I'm optimistic more often than not.	1	2	3	4
2	How other people feel is important to me.	1	2	3	4
3	I often act on immediate needs.	1	2	3	4
4	I have no strong desire to parachute out of an airplane.	1	2	3	4
5	I've often missed things I promised to attend.	1	2	3	4
6	I would enjoy being in a high-speed chase.	1	2	3	4
7	I am well-equipped to deal with stress.	1	2	3	4
8	I don't mind if someone I dislike gets hurt.	1	2	3	4
9	My impulsive decisions have caused problems with loved ones.	1	2	3	4
10	I get scared easily.	1	2	3	4
11	I sympathize with others' problems.	1	2	3	4
12	I have missed work without bothering to call in.	1	2	3	4
13	I'm a born leader.	1	2	3	4
14	I enjoy a good physical fight.	1	2	3	4
15	I jump into things without thinking.	1	2	3	4
16	I have a hard time making things turn out the way I want.	1	2	3	4
17	I return insults.	1	2	3	4

		False	Mostly False	Mostly True	True
18	I've gotten in trouble because I missed too much school.	1	2	3	4
19	I have a knack for influencing people.	1	2	3	4
20	It doesn't bother me to see someone else in pain.	1	2	3	4
21	I have good control over myself.	1	2	3	4
22	I function well in new situations, even when unprepared.	1	2	3	4
23	I enjoy pushing people around sometimes.	1	2	3	4
24	I have taken money from someone's purse or wallet without asking.	1	2	3	4
25	I don't think of myself as talented.	1	2	3	4
26	I taunt people just to stir things up.	1	2	3	4
27	People often abuse my trust.	1	2	3	4
28	I'm afraid of far fewer things than most people.	1	2	3	4
29	I don't see any point in worrying if what I do hurts someone else.	1	2	3	4
30	I keep appointments I make.	1	2	3	4
31	I often get bored quickly and lose interest.	1	2	3	4
32	I can get over things that would traumatize others.	1	2	3	4
33	I am sensitive to the feelings of others.	1	2	3	4
34	I have conned people to get money from them.	1	2	3	4
35	It worries me to go into an unfamiliar situation without knowing all the details.	1	2	3	4
36	I don't have much sympathy for people.	1	2	3	4

		False	Mostly False	Mostly True	True
37	I get in trouble for not considering the consequences of my actions.	1	2	3	4
38	I can convince people to do what I want.	1	2	3	4
39	For me, honesty really is the best policy.	1	2	3	4
40	I've injured people to see them in pain.	1	2	3	4
41	I don't like to take the lead in groups.	1	2	3	4
42	I sometimes insult people on purpose to get a reaction from them.	1	2	3	4
43	I have taken items from a store without paying for them.	1	2	3	4
44	It's easy to embarrass me.	1	2	3	4
45	Things are more fun if a little danger is involved.	1	2	3	4
46	I have a hard time waiting patiently for things I want.	1	2	3	4
47	I stay away from physical danger as much as I can.	1	2	3	4
48	I don't care much if what I do hurts others.	1	2	3	4
49	I have lost a friend because of irresponsible things I've done.	1	2	3	4
50	I don't stack up well against most others.	1	2	3	4
51	Others have told me they are concerned about my lack of self-control.	1	2	3	4
52	It's easy for me to relate to other people's emotions.	1	2	3	4
53	I have robbed someone.	1	2	3	4
54	I never worry about making a fool of myself with others.	1	2	3	4
55	It doesn't bother me when people around me are hurting.	1	2	3	4
56	I have had problems at work because I was irresponsible.	1	2	3	4
57	I'm not very good at influencing people.	1	2	3	4
58	I have stolen something out of a vehicle.	1	2	3	4

Reactive Proactive Aggression Questionnaire (Raine et al., 2006)

There are times when most of us feel angry, or have done things we should not have done. Rate each of the items below by crossing the box around either never, sometimes or often. Do not spend a lot of time thinking about the items – just give your first response. Make sure you answer all the items.

How often have you …

	Never	Sometimes	Often
1. Yelled at others when they have annoyed you	☐	☐	☐
2. Had fights with others to show who was on top	☐	☐	☐
3. Reacted angrily when provoked by others	☐	☐	☐
4. Taken things from others	☐	☐	☐
5. Become angry when frustrated	☐	☐	☐
6. Vandalised something just for fun	☐	☐	☐
7. Had temper tantrums	☐	☐	☐
8. Damaged something because you felt mad	☐	☐	☐
9. Had a fight just to be cool	☐	☐	☐
10. Hurt others to win a game	☐	☐	☐
11. Become angry when you don't get your way	☐	☐	☐
12. Used force to get others to do what you want	☐	☐	☐
13. Become angry or mad when you lost a game	☐	☐	☐
14. Become angry when others threatened you	☐	☐	☐
15. Used force to obtain money or things from others	☐	☐	☐
16. Felt better after hitting or yelling at someone	☐	☐	☐
17. Threatened and bullied someone	☐	☐	☐
18. Made obscene phone calls for fun	☐	☐	☐
19. Hit others to defend yourself	☐	☐	☐
20. Got others to gang up on somebody else	☐	☐	☐
21. Carried a weapon to use in a fight	☐	☐	☐
22. Become angry or mad or hit others when teased	☐	☐	☐
23. Yelled at others so they would do things for you	☐	☐	☐

Personal Information Data Capture Form

Now we will ask you for some more personal information, but **this will not be stored**.

This information will be automatically deleted immediately after the study and is only used in programming the sorting tasks you will complete soon.

What is your first name?

What is your star sign?

Please Select...

What is your birth date (e.g. 15th)

Please Select...

What is your birth month?

Please Select...

What is your place of birth?

What is your nationality?

What is your occupation?

Demographics Data Capture Form

In this study we will ask you to provide some basic information about yourself, complete 4 personality questionnaires and do 2 sorting tasks.

First, we will ask you for some information about yourself.

Please complete the demographics information below.

---

1. What is your age?

2. Is English your first language?

   Yes

No

3. Please select your gender:

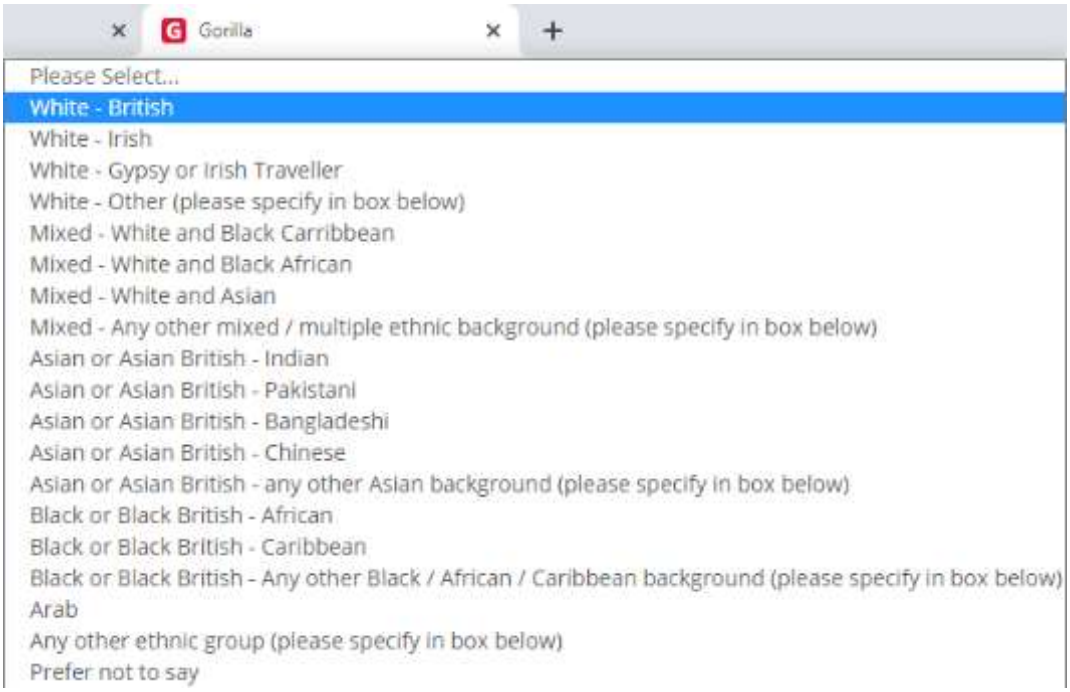
   Male

Female

Other

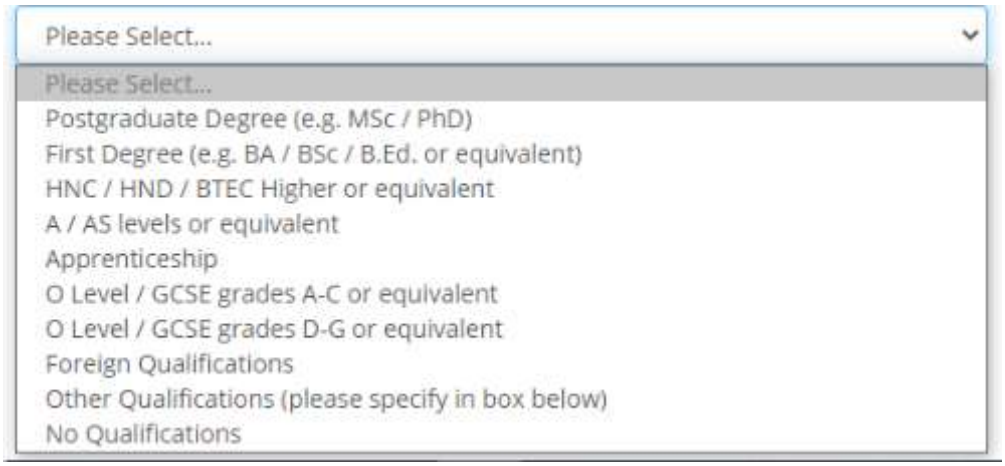
Prefer not to say

4. What is your ethnicity?



Other ethnic group - please specify if you wish

5. What is your highest formal qualification?



Other qualifications - please specify if you are happy to

Personality Thermometers

BOLD - WARY

Next we would like you to indicate how much you feel you are a bold person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 to 100 how bold you are.

People who are bold remain calm and focused in threatening or pressurised situations. They are confident and self-assured when faced with unfamiliar or novel scenarios or situations. Moreover, they are socially dominant and show leadership qualities, often influencing others, are resilient emotionally and can recover quickly from stressful events. They are self-assured, bold, brave, courageous, optimistic and assertive, have excellent social skills and can get what they want through charm, confidence, and assertiveness.

Next we would like you to indicate how much you feel you are an wary person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 to 100 how anxious you are.

People who are wary or timid are uneasy and nervous about new, threatening, or pressurised situations. They are cautious, anxious, worried, or lacking in confidence in unfamiliar or novel scenarios or situations and tend to avoid these. In addition, they are emotionally sensitive and vulnerable, and take a long time to recover from upsetting or stressful events. They are often lacking in self-confidence and are socially cautious, timid, apprehensive, and unassuming. They are quiet in social situations and often lack self-assurance, are pessimistic and insecure, preferring to stay in the background rather than assert themselves or lead a group.

CRUEL – KIND

Next we would like you to indicate how much you feel you are a cruel person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 to 100 how cruel you are.

People who are cruel and mean are cold hearted and uncaring. These people are unkind, sadistic, insulting and taunting in order to get what they want and have their needs met, without thinking about the impact on others. They have poor empathy towards others, are scornful, callous, and insensitive, and lack close bonds or attachments to many other people. They are unfeeling and exploitative, using people for their own gain, and seek empowerment through cruelty.

Next we would like you to indicate how much you feel you are a kind person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 to 100 how kind you are.

People who are kind are warm, empathic, and care about others. They are friendly, generous, and kind-hearted. These people are gentle and considerate and often put other people's needs before their own. They feel strong attachment and positive emotion towards others, being caring, sympathetic, and understanding of other people's needs and emotions. They are generous, helpful, and supportive of other people. They get pleasure and reward from acts of kindness.

RECKLESS – SENSIBLE

Next we would like you to indicate how much you feel you are a reckless person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 to 100 how reckless you are.

People who are reckless, fail to plan ahead, are impulsive, and show impaired regulation of emotion and urges. They act before thinking, are often unpredictable in their behaviour, have problems in the control of impulses, and are seen by others as daredevils. They often insist on immediate gratification. They focus on immediate gain or pleasure, rather than on longer term consequences or plans and are often unreliable. They show difficulties in holding back urges or restraining their behaviour and frequently engage in anti-social or irresponsible behaviour.

Next we would like you to indicate how much you feel you are a sensible person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 to 100 how cautious you are.

People who are sensible are cautious, careful, and restrained in their behaviour and think things through before acting or making decisions. They regulate their emotions well and are able to curb their urges. Their behaviour is usually predictable and restrained. They think about potential problems or dangers before acting, carefully weigh things up, and take a measured decision. They focus on long-term outcomes instead of immediate gains. They show good restraint in their behaviour and show pro-social, reliable, and responsible behaviour.

Social Desirability Scale (Stöber, 2001)

Below you will find a list of statements. Please read each statement carefully and decide if that statement describes you or not. If it describes you, check the word "true"; if not, check the word "false".

	True	False
1. I sometimes litter		
2. I always admit my mistakes openly and face the potential negative consequences.		
3. In traffic I am always polite and considerate of others.		
4. I have tried illegal drugs (for example, marijuana, cocaine, etc.).		
5. I always accept others' opinions, even when they don't agree with my own.		
6. I take out my bad moods on others now and then.		
7. There has been an occasion when I took advantage of someone else.		
8. In conversations I always listen attentively and let others finish their sentences.		
9. I never hesitate to help someone in case of emergency.		
10. When I have made a promise, I keep it--no ifs, ands or buts.		
11. I occasionally speak badly of others behind their back.		
12. I would never live off other people.		
13. I always stay friendly and courteous with other people, even when I am stressed out.		
14. During arguments I always stay objective and matter-of-fact.		
15. There has been at least one occasion when I failed to return an item that I borrowed.		
16. I always eat a healthy diet.		
17. Sometimes I only help because I expect something in return.		

Prosocialness Scale for Adults (Caprara et al., 2005)

The following statements describe a large number of common situations. There are no 'right' or 'wrong' answers; the best answer is the immediate, spontaneous one. Read carefully, each phrase and mark the answer that reflects your first reaction.

	Never/ Almost Never	Occasionally True	Sometimes True	Often True	Almost Always/ Always True
1. I am pleased to help my friends/colleagues in their activities					
2. I share the things that I have with my friends					
3. I try to help others					
4. I am available for volunteer activities to help those who are in need					
5. I am emphatic with those who are in need					
6. I help immediately those who are in need					
7. I do what I can to help others avoid getting into trouble					
8. I intensely feel what others feel					
9. I am willing to make my knowledge and abilities available to others					

	Never/ Almost Never	Occasionally True	Sometimes True	Often True	Almost Always/ Always True
10. I try to console those who are sad					
11. I easily lend money or other things					
12. I easily put myself in the shoes of those who are in discomfort					
13. I try to be close to, and take care of, those who are in need					
14. I easily share with friends any good opportunity that comes to me					
15. I spend time with those friends who feel lonely					
16. I immediately sense my friends' discomfort even when it is not directly communicated to me					

Appendix B: Ethical Application, Documents and Approval Letter, Chapter 4

Please note that this application includes additional personality measures which are not discussed within this thesis. As such, only relevant materials are included here for brevity. For a copy of the Triarchic Psychopathy Measure (Patrick, 2010) and Social Desirability Scale (Stöber, 2001), please refer to Appendix A, and for content relating to psychopathic/non-psychopathic priming words please refer to Chapter 3 as they were identical to those used within the IAT.

31 January 2022

Dear JENNIFER PINK, , , Professor Nicola Gray,

Re: 5153 , Implicit personality traits

Your application - https://swansea.forms.ethicalreviewmanager.com/ProjectView/Index/5153 - has been reviewed and approved by the Department of Psychology Ethics Committee.

The list of additional students (if any) are included in the table below:

Other student applicant - first name	Other student applicant - Surname	Other student applicant - email

additional researcher or student - first name	additional researcher or student - surname	additional researcher or student - email

The conditions of this approval are as follows:

1. To conduct your study strictly in accordance with the proposal that has been approved by the committee, including any approved amendments
2. To advise the ethics committee chair of any complaints or other issues that may warrant ethical review of the project
3. To submit for approval any changes to the approved protocol before implementing any such changes
4. To keep any information obtained from your participants absolutely confidential

Please note that failure to comply with these conditions of approval may result in the withdrawal of approval for the project.

To advertise your study on the departmental Participant Pool: You will need to send send a request for your study to be made visible, via the link on the Experiment Management System website (see Researcher Documentation for details). Please ensure that you attach this letter to your request. (If you are unable to attach the Ethics approval, send it in a separate email to Dr. Phil Tucker [redacted]).

For students: Please ensure that the signed copy of this Ethical Approval, together with any other paperwork associated with your research, is included in your final write up.

Yours Sincerely,

Dr Menna Price (Reviewer of Application)

Dr Menna Price (Committee Chair)

Security information

Data Protection Privacy Notice

You are logged into the Ethical Review Manager (ERM), the system provided by Infonetica Ltd that will process the application on behalf of Swansea University. Your contact details will be stored by Infonetica Ltd and used by the University for the purpose of managing your application for ethics review.

Please be mindful that each application, submitted via the University's Ethical Review Manager (ERM), costs the University money due to the number of people required to process, review and approve your application, many of whom are senior academics within the University. Please respect this fact and ensure that you carefully follow the guidance provided to complete your application appropriately (and choose the correct route of ethical review).

Please do not proceed unless you are content to comply with this.

The data controller is Swansea University and the legal basis on which this task is being performed is public interest. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and may be contacted using [redacted]

Filter

Does your application require NHS research ethics approval?

- ○ Yes
- ◉ No

Are you a member of the CHHS?

- ◉ Yes
- ○ No

Which department are you from?

Psychology

Project Title

Name of Applicant

Title	First Name	Surname
	JENNIFER	PINK

Email [redacted]

Should any other student be listed on this application?

- ○ Yes
- ◉ No

Supervisor

Title	First Name	Surname
Professor	Nicola	Gray

Email [redacted]

Risk Assessment

Does the research fall under ANY of the following categories? [Click all that apply]

- ☐ Interventions and therapies, including clinical and non-clinical trials
- ☐ Collection of bodily fluids such as blood, saliva etc
- ☐ Research on children
- ☐ People highly dependent on medical care who may be unable to give consent
- ☐ People with a cognitive impairment, intellectual disability, or a mental illness
- ☐ Topics that may cause distress to participants due to past traumatic experiences
- ☐ Limited disclosure involving active concealment and/or planned deception
- ☐ Study or exposure of illegal activity, or research that is likely to discover illegal activity
- ☐ Research that could jeopardize a participant's employment
- ☐ Research that involves travel overseas
- ☐ Research that poses a risk to the physical or emotional safety or welfare of a Swansea University student researcher

- ☑ None of the above

Methods

Click all methods that apply:

- [x] Computer-based testing
- [ ] Secondary-data analysis
- [ ] Observational methods
- [x] Research on the internet
- [ ] Interviews
- [x] Questionnaire-based methods
- [ ] Neuroimaging (MRI, PET etc)
- [ ] Psychophysiology (EEG, ERPs etc)
- [ ] tDCS
- [ ] Human tissue collection

Briefly (max 200 words) describe the research you wish to undertake: Include study rationale, main theoretical constructs, and hypotheses. Please use non-technical language wherever possible.

The proposed research project aims to develop implicit tests (priming and implicit association tests) that will index different personality traits from the Big 5 personality construct, the Eysenck Personality Questionnaire Revised (EPQ-R), and the three domains of psychopathy, conceptualised by the Triarchic Psychopathy Measure (Tri-PM): boldness, meanness and disinhibition.

Current personality assessment relies heavily upon self-report methods. However, these methods are open to positive impression management, of particular concern when indexing traits that may be considered negative and those associated with psychopathy, a disorder marked by deceit and manipulation. These methods are also problematic for individuals who lack insight into their attitudes and emotions.

To overcome this, I will develop priming and implicit association tests (IATs) to assess associations between the self and different personality traits. They will use word stimuli exemplars from the Tri-PM psychopathy domains, the EPQ and the Big 5 personality construct. The project will comprise both pilot and main studies, the former exploring different experimental conditions to induce maximal priming and IAT effect (e.g. stimuli choice, colour of stimuli, on-screen presentation length, number of trials and blocks).

The implicit tests will be correlated with the EPQ-R (Eysenck, Eysenck & Barrett, 1985), Brief Big 5 (Gosling, Rentfrow & Swann, 2003) and the Triarchic Psychopathy Measure (Tri-PM; Patrick, 2010) questionnaires, and semantic differentials. The relationship between scores on the implicit and explicit measures, will be analysed and the efficacy of the implicit tests assessed.

What is your research design? What variables will be manipulated or measured?

Pilot and main studies will vary; some will be within-subjects and others between-subjects. The experimental design will explore the various conditions including:

*choice of stimuli
*black or colour word stimuli
*different on-screen stimulus presentation length
*different numbers of trials/blocks
*different inter-trial interval
*IAT and/or priming task(s)

Following the implicit task(s), participants will be asked to complete the explicit measure which corresponds with the personality traits that have been included in their implicit tasks. This will either be the EPQ, the Big 5 or the Tri-PM. For example, if they completed IAT and/or priming tasks using stimuli based on the Tri-PM dimension of Boldness, they would complete the Tri-PM measure.

All participants will also complete semantic differentials asking how much they feel the personality constructs within their implicit tasks relate to themselves (e.g. "how BOLD are you" / "how WARY are you") and the Social Desirability Scale to index impression management. No variables will be manipulated.

The dependent variables are detailed below:

1. Scores on the IAT:

The IAT will measure the association between two personality attributes (e.g. BOLD and WARY) with the concepts of ME and NOT ME.

Both the attributes and concepts will be presented as words. Participants need to categorise the words into either ME or NOT ME or (e.g) BOLD or WARY as quickly as possible. When the pairings of concepts and attributes are associated with one another and therefore congruent, response times are predicted to be both shorter and more accurate.

IAT scores will be calculated from the reaction times in milliseconds and the number of errors during each completed IAT.

2. Scores on the Priming Task:

The Priming Task will measure the association between target concept words representing the self/other and the categories of ME and NOT ME. These target stimuli will be preceded by personality trait words (e.g. BOLD or WARY words).

Participants need to categorise target ME or NOT ME words into either ME or NOT ME as quickly as possible. When the ME or NOT ME words are preceded by a concept that is congruent with the implicit belief of the participant about the self (e.g. BOLD - ME) the reaction times will be faster and more accurate than when the ME or NOT ME is preceded by an incongruent concept (e.g. WARY - ME).

Priming scores will be calculated from the reaction times in milliseconds and the number of errors during the task.

3. Scores on the following self-report measures:

Semantic differentials/personality thermometers
Brief Big-5 (Gosling, Rentfrow & Swann, 2003)
Eysenck Personality Questionnaire Revised (Eysenck, Eysenck & Barrett, 1985)
Triarchic Psychopathy Measure (Patrick, 2010)
Social Desirability Scale (SDS-17; Stöber, 2001)

What procedures will be carried out on the participants? What will happen to your participants?

All data collection will be conducted on line using Gorilla.

Pilots and Main Studies will follow the same procedure. PIS, Consent Forms, Debrief Forms and Adverts will all be based on those included in this application; they may be amended to reflect specific personality traits of the EPQ (e.g. neuroticism), the Big 5 (e.g. extraversion) or Tri-PM (e.g. Boldness) for that particular pilot or main study, however there is no ethical implication envisaged with these amendments.

Participants will be presented onscreen with a Participant Information Sheet (Appendix 1) to read which sets out the aims and instructions for the study.

Should participants wish to continue, they will be asked to give informed consent on the Consent Form (Appendix 2) by clicking a box on their screen before clicking an arrow to the next screen. It will also be made clear to them that they have the right to withdraw their participation in the study at any time, without penalty or the need to justify their decision.

Before participants begin the study, they will be asked for personal and demographic information (Appendices 3 & 4). The personal information that is provided on the Personal Information Form (Appendix 4) will be programmed into the computer as part of the "ME/NOT ME" component of the IATs and Priming Tasks. Participants will be informed that this information will be disposed of after completion of testing so that their anonymity is assured. Participants will also be asked to select appropriate NOT ME words from a selection which they do not relate to (i.e. have no personal significance for them), for later use in the IATs and/or Priming Tasks (Appendix 5).

The participants will be given definitions of the concepts relating to their two concepts (e.g BOLD and WARY) to read in order to ensure that they understand them within the context of this study. Using these definitions, they will then indicate how well they feel each applies to them on a Likert scale from 0 (not at all) - 100 (very). Example definitions and semantic differentials are included as Appendix 6. These will be amended as necessary to reflect personality traits from the EPQ, Tri-PM and Big 5 for different versions of the pilot study. However, there are no ethical implications envisaged.

Next they will be shown the attribute words from the implicit tasks and asked to sort these into the 2 categories (e.g. BOLD and WARY). This is to ensure that there is no confusion regarding the words and what they represent. Example attribute words for the stimuli are included as Appendix 7. These will be selected as necessary to reflect personality traits from the EPQ, Tri-PM and Big 5 for different versions of the pilot study. However, there are no ethical implications envisaged.

Participants will next complete the IATs and/or Priming Tasks and then the relevant explicit measure (either the EPQ-R, the Brief Big 5 or the Tri-PM - Appendices 8a/b, 9 and 10). They will all complete the Social Desirability Scale (Appendix 11) to identify any possible impression management relating to self-report methods.

After completion of these outcome measures participants will be thanked for taking part in the research before reading a Debrief Form (Appendix 12) that details the study aims. They will then be reminded that their information is anonymous and will remain anonymous. Participants will be given contact details of the support services available to them should the need arise.

Swansea University student participants will receive between 2 and 6 credits for their participation, subject to it being a pilot (10-15 minutes) or a main study (30-45 minutes). If it is a main study, community participants will be offered the opportunity to be entered into a prize draw to win a £25 Amazon voucher.

The study will be advertised via email and social media (Appendices 13 & 14). Again, these may be amended as necessary to reflect particular personality traits from the EPQ, Tri-PM and Big 5 for different pilot/main studies. However, there are no ethical implications envisaged.

Please indicate which of the following will be used for storing data:

- ☐ Manual files (e.g. paper documents or X-rays)
- ☑ Home or other personal computer
- ☑ University computer
- ☐ Private company or work-based computer
- ☑ Laptop computer
- ☐ Other

Please explain how files on your home or personal computer will be secured:

All data will be stored in a password-protected folder. Access to the laptop will be password protected.

Please explain how files on your university computer will be secured:

All data will be stored in a password-protected folder. Access to the laptop will be password protected.

Please explain how files on your laptop computer will be secured:

All data will be stored in a password-protected folder. Access to the laptop will be password protected.

Risks to participants

What potential risks to the participants do you foresee and how do you propose to ameliorate/deal with potential risks?

No potential physical risks will be imposed on any individual undertaking the experiment. Participants may be concerned about whether their information is kept anonymous and will be informed that the information they provide within the experiment will not be traced back to them and will be kept anonymous throughout the whole of the study participation. All participants will be given a unique number with no trace of their identity. Participants will be informed that their data will be stored in a password-protected document and will only be accessed by the researchers as well as the supervisors. Nobody else will have access to this password. No identifiable information such as personal names will be stored within the documents and each participant will be referred to by their own unique participant number. Personal data collected at the beginning of the study for the priming tasks will be destroyed. The research team have used this methodology routinely in IAT and other studies of implicit methodologies.

Should the topic of the experiment elicit any negative feelings, all participants will be informed that they do not need to answer any questions which make them feel uncomfortable. Participants will also be told that they are able to withdraw from the study at any time with no explanation.

When participants are presented with the onscreen debrief sheet, they will be provided with the contact details for the researcher and her supervisor, should they like to discuss anything involved within the study or any concerns they would like to address. They will also be given links to support services available, including Wellbeing@campuslife, details for the Mind Cymru mental health helpline (0300 123 3393) and directed to their local GP if required.

Participants will be informed that their data will be stored anonymously and each individual's information will be referred to as a unique number so once data has been collected, participants will be anonymous to the researcher and cannot be deleted as the researchers will be unable to detect which data associates with each participant.

Will participants be informed of the right to withdraw without penalty?

- [x] Yes
- [ ] No

Do you have doubts about participants' abilities to give informed consent?

- [ ] Yes
- [x] No

How do you propose to ensure participants' confidentiality and anonymity?

Confidentiality and anonymity will be ensured as no identifying information will be collected from participants, only demographics will be recorded with regards to age, ethnicity, gender, and educational level for the purpose of the task. From the commencement of the study, each participant is automatically allocated an alphanumeric code which relates to their data and throughout the whole of the experiment, their data will be captured against this anonymous alphanumeric code. Some personal information will need to be gathered for the programming of the IATs and Priming Tasks, for example, their first name and star sign. However, once these tasks have been completed and reaction time and error data are collected the personal data will be deleted.

All questionnaires and documents completed within the experiment will be held in electronic form, in password-protected files. They will only be accessed by the researcher and her supervisors.

How will you ensure that participants will not be coerced to participate in your study?

All participants will be presented with an onscreen information sheet which explains the purposes and aims of the study and what is required of them to do. They will be given the opportunity to ask any questions to the researcher via email if they deem necessary and if they require further clarification. Participants will also be informed that they do not have to take part in the study if they don't want to. Participants will be told that they can withdraw from the study at any point without any explanation or justification.

Risks to researchers

What potential risks to the interests of the researchers do you foresee and how will you ameliorate/deal with potential risks?

No potential risks to the researcher are predicted.

If the participants would like to discuss any information in the experiment that they found sensitive, they will be advised to use the supportive services provided to them where these matters can be addressed. Participants will be informed to not ask the researcher about these issues and to use the services available. The supervisor has completed previous studies which are similar in the past and participants do not usually wish to discuss such information. Any concerns will be immediately taken to the research supervisor.

Participants

What is your estimated sample size, and how was this size determined?

For main studies N=250.

To calculate the required sample size I assumed an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%), which generated a sample of N=194. In order to account for missing data and excessive response errors, I will gather a sample of 250 participants

No sample size estimation has been calculate for pilot studies, but these are likely to be on the order of N=100 per study.

Will any participant be under the age of 18?

- ☐ Yes
- ☑ No

Describe your participants: give the age range, gender, inclusion and exclusion criteria, and any particular characteristics pertinent to the research project.

Participants will be males and females between the ages of 18 and 55. This age range hopes to account for any slower reaction time due to the aging process. Participants will be those in the general population as well as students including those from Swansea University.

How will the participants be selected and recruited?

- [x] Department's electronic subject pool
- [x] University population
- [x] General public
- [ ] Other

Will payments or subject pool credits be made to participants?

- [x] Yes
- [ ] No

Please specify quantities involved. Please ensure payment or credits awarded do not represent an inducement to participate in your study:

2-6 credits will be awarded to students of Swansea University, depending on the length of the study. For the main studies if they wish, community participants will be entered into a prize draw for a chance to win a £25 shopping voucher.

Documents

Will you be providing participants with a Participant Information Sheet?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Information Sheet. [Please base your P.I.S. on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 1 Participant Information Sheet Pilot 220321	Appendix 1 Participant Information Sheet Pilot 220321.docx	22/03/2021	1	48.3 KB

Will written informed consent be sought from participants?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Consent Form. [Please base your consent form on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 2 Participant Consent Form Pilot 220321	Appendix 2 Participant Consent Form Pilot 220321.docx	22/03/2021	1	24.9 KB

How will you advertise your study?

- [x] Email
- [ ] Poster
- [x] Social media
- [ ] Other
- [ ] I won't be advertising my study

Please upload a copy of your email based on the standard template. [See help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 14 Email Advert 220321	Appendix 14 Email Advert 220321.docx	23/03/2021	1	19.8 KB

Please upload a copy of your advertisement for social media.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 13 Social Media Advert Pilot 220321	Appendix 13 Social Media Advert Pilot 220321.pdf	23/03/2021	1	433.7 KB

Will you be providing participants with a debrief statement?

- [x] Yes
- [ ] No

Please attach a copy of your debrief statement that will be given to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Debrief Statement	Appendix 12 Participant Debrief Pilot 220321	Appendix 12 Participant Debrief Pilot 220321.docx	23/03/2021	1	113.1 KB

Please upload all questionnaires that you intend on distributing to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 3 Demographics Form Pilot 220321	Appendix 3 Demographics Form Pilot 220321.docx	22/03/2021	1	260.9 KB
Default	Appendix 8a EPQ-R questionnaire (long form)	Appendix 8a EPQ-R questionnaire (long form).docx	27/04/2021	1	29.6 KB
Default	Appendix 8b EPQ-R questionnaire (short form)	Appendix 8b EPQ-R questionnaire (short form).docx	27/04/2021	1	19.1 KB
Default	Appendix 9 Big Five Questionnaire Pilot 220321	Appendix 9 Big Five Questionnaire Pilot 220321.docx	23/03/2021	1	20.9 KB
Default	Appendix 10 Triarchic Psychopathy Measure Pilot 220321	Appendix 10 Triarchic Psychopathy Measure Pilot 220321.pdf	22/03/2021	1	43.3 KB
Default	Appendix 11 Social Desirability Scale (SDS-17)	Appendix 11 Social Desirability Scale (SDS-17).docx	23/03/2021	1	21.3 KB
Default	Appendix 6 Example Definitions and Semantic Differentials 120521	Appendix 6 Example Definitions and Semantic Differentials 120521.docx	18/05/2021	4	133.7 KB

If necessary, please upload any additional documents to support your application:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 4 Personal Information Data Capture Form Pilot 220321	Appendix 4 Personal Information Data Capture Form Pilot 220321.docx	22/03/2021	1	25.3 KB
Default	Appendix 5 Me and Not Me Stimuli Pilot 220321	Appendix 5 Me and Not Me Stimuli Pilot 220321.docx	22/03/2021	1	17.1 KB
Default	Appendix 7 Example Word Stimuli for Priming Tasks Pilot 180521	Appendix 7 Example Word Stimuli for Priming Tasks Pilot 180521.docx	18/05/2021	4	30.6 KB

If you have any further comments to make on this system, please add them to the text box below. If you have no comment to make, please simply add "N/A" to the text box:

N/A

Applicant

Applicants signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by MRS JENNIFER PINK ([redacted]) on 20/05/2021 09:07

Supervisor

Supervisors signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my ability
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by PROF Nicola Gray ([redacted]) on 20/05/2021 11:39

Ethical Amendment

Applicant Details

Name of Applicant

Title	First Name	Surname
	JENNIFER	PINK

Email [redacted]

Which department are you from?

Psychology

Supervisor Details

Title	First Name	Surname
Professor	Nicola	Gray

Email [redacted]

Project Information

Long project title

Development of implicit tests for Big-5 and psychopathy personality traits

What is the location of the proposed research?

- ☐ Swansea University
- ☐ Other University
- ☐ Hospital
- ☐ School
- ☑ Other

What is the location other than Swansea University?

The study will be delivered online, using the Gorilla.sc platform.

Amendments

What amendments would you like to make to this application?

- ☐ Add researcher or student to the project
- ☑ Modification to protocol
- ☐ Other

Please provide further details relating to your requested amendment:

Proposed task changes: In this main study, participants will be asked to complete one priming task split into two blocks to reduce fatigue. However, rather than covering only one of the psychopathy-trait domains of the Triarchic Psychopathy Measure (Boldness, Meanness and Disinhibition), it will include stimuli representing all three domains. This change is required to enable a within-participants design.

Proposed explicit measure changes: As the design has moved from between- to within-participants, participants will be asked to complete 6 personality thermometers (two for each Triarchic psychopathy domain), rather than 2 (for one Triarchic psychopathy domain). Additionally, participants will complete the Inventory of Triarchic Personality Traits (ITPT) which is a short new questionnaire we have developed as an additional explicit measure of triarchic psychopathy.

Proposed external validity measure changes: The Social Desirability Scale - 17 (Stober, 2001) will be replaced by the Balanced Inventory of Desirable Responding - 16 (Hart et al, 2015). This newer measure provides a separate scale for Self Deception in addition to indexing Impression Management.

Additional measures for external validity will be added as follows: Reactive-Proactive Aggression Questionnaire (Raine et al., 2006), the Short-form UPPS-P Impulsive Behaviour Scale (Cyders et al., 2014) and the Prosocialness Scale for Adults (Caprara et al., 2005). These have been added as they are known external correlates of psychopathic traits.

Proposed prize draw changes: As previously, community participants will be entered into a prize draw if they wish to win a £25 shopping voucher. There will be 4 x £25 shopping vouchers available. Email addresses of those wishing to take part in the draw will be captured via the Gorilla.sc platform. This will be downloaded as a separate file and will be deleted after the draw has taken place.

Please upload any supporting documentation, should you wish to do so:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Ethics Amendment - Inventory of Triarchic Psychopathy Traits	Ethics Amendment - Inventory of Triarchic Psychopathy Traits.docx	28/01/2022	1	17.9 KB
Default	Ethics Amendment - Reactive and Proactive Questionnaire (RPQ)	Ethics Amendment - Reactive and Proactive Questionnaire (RPQ).doc	28/01/2022	1	23.0 KB
Default	Ethics Amendment - UPPS-P_short_version	Ethics Amendment - UPPS-P_short_version.pdf	28/01/2022	1	206.9 KB
Default	Ethics Amendment - Prosocialness Scale for Adults	Ethics Amendment - Prosocialness Scale for Adults.docx	28/01/2022	1	19.3 KB
Default	BIDR_16	BIDR_16.doc	28/01/2022	1	26.0 KB

Participant Information Sheet

22nd March 2021

Implicit and Explicit Personality Traits

You are being invited to take part in some research. Before you decide whether or not to participate, it is important for you to understand why the research is being conducted and what it will involve. Please read the following information carefully.

What is the purpose of the research?

We are conducting research to determine how your self-concept relates to different personality traits. The aim of the study is to measure attributes of your self-concept alongside indexing different personality traits. We will use explicit methods (questionnaires) and implicit methods (word sorting tasks) and compare the two. Your participation in this study will take approximately 10-15 minutes. Only participants who are fluent English speakers are eligible to take part in this research due to the need to respond to English words quickly. Please ensure that you are completing this on a laptop or desktop computer (not smart phone). You should be in a quiet place without any distractions for the entire duration of the study. Distractions may affect your reaction time and results.

Who is carrying out the research?

The data is being collected by Jennifer Pink under the supervision of Professor Nicola Gray, within the Psychology Department of the College of Human and Health Sciences at Swansea University. The research has been approved by the College of Human and Health Sciences Research Ethics Committee.

What happens if I agree to take part?

Firstly, we will ask you for some background information including your age, gender, ethnicity, and level of education. You will be asked to complete short personality questionnaires and word sorting tasks. These will require you to sort different words into categories as quickly as you can, via key presses on your computer.

The whole experiment will be completed within 15 minutes. Only the research supervisor and the researcher will have access to the information, and everything will be kept confidential and anonymous.

Are there any risks associated with taking part?

There are no risks in taking part. However, this research includes topics that may be sensitive for some people (e.g. personality traits you may consider negative). Therefore, participation should be considered carefully. The research has been approved by the College of Human and Health Sciences Research Ethics Committee.

Data Protection and Confidentiality

Your data will be processed in accordance with the Data Protection Act 2018 and the General Data Protection Regulation 2016 (GDPR). All information collected about you will be kept strictly confidential. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file. The data we will collect for our study will be made anonymous at the start of the research. The data controller for this project will be Swansea University.

What will happen to the information I provide?

An analysis of the information will form part of our report at the end of the study and may be presented to interested parties and published in scientific journals and related media. Note that all information presented in any reports or publications will be anonymous and unidentifiable.

Is participation voluntary and what if I wish to later withdraw?

Your participation is entirely voluntary – you do not have to participate if you do not want to. Please note that the data we will collect for our study will be made anonymous at the start of the research; thus, it will not be possible to identify and remove your data at a later date, should you decide to withdraw from the study. Therefore, if at the end of this research, you decide to have your data withdrawn, please let us know before you leave the webpage.

Data Protection Privacy Notice

The data controller for this project will be Swansea University. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and can be contacted at the Vice Chancellors Office. Your personal data will be processed for the purposes outlined in this information sheet. Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you online. The legal basis that we will rely on to process your personal data will be processing is necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the College of Human and Health Sciences Research Ethics Committee, Swansea University. The legal basis that we will rely on to process special categories of data will be

processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will your information be held?

Data will be preserved and accessible for a minimum of 10 years after completion of the research. Records from studies with major health, clinical, social, environmental or heritage importance, novel intervention, or studies which are on-going or controversial should be retained for at least 20 years after completion of the study. It may be appropriate to keep such study data permanently within the university, a national collection, or as required by the funder's data policy. The supervisor will take responsibility for data destruction, and all collected identifiable data will be destroyed on or after September 2031 as it is a requirement of Swansea University Research Integrity Framework on Research Ethics and Governance that data should be kept for a minimum of ten years.

What are your rights?

You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights. Any requests or objections should be made in writing to the University Data Protection Officer: University Compliance Officer (FOI/DP), Vice-Chancellor's Office, Swansea University, Singleton Park, Swansea, SA2 8PP. Email: dataprotection@swansea.ac.uk.

How to make a complaint

If you are unhappy with the way in which your personal data has been processed you may in the first instance contact the University Data Protection Officer using the contact details above. If you remain dissatisfied, then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF; www.ico.org.uk.

What if I have other questions?

If you have further questions about this study, please do not hesitate to contact us:

Jennifer Pink

Department of Psychology, Swansea University

[redacted]

Professor Nicola Gray

Department of Psychology, Swansea University

[redacted]

Participant Consent Form

IMPLICIT AND EXPLICIT PERSONALITY TRAITS

1. I (the participant) confirm that I have read and understand the information sheet for the above study (dated March 2021) that was on the previous page.

2. I understand that my participation is voluntary and that I am free to withdraw at any time and leave this research website, without giving any reasons. I understand that the data will be made anonymous at the start of the research; thus, it will not be possible to identify and remove my data at a later date, should I decide to withdraw from the study. Therefore, if at the end of this research, I decide to withdraw, I will let the researchers know before I leave the webpage.

3. I understand what my role will be in this research and I understand who to contact if I have any questions.

4. I have been informed that the information I provide will be safeguarded.

5. I am happy for the information I provide to be used (anonymously) in academic papers and other formal research outputs.

6. I have read and understand the Participant Information Sheet.

7. I agree to the researchers processing my personal data in accordance with the aims of the study described in the Participant Information Sheet.

8. I confirm that I am aged 18 or over.

If you agree to all these statements, and want to continue with the research, please select YES below.

If you do not want to continue, please select NO

- Yes
- No

This study is being conducted by Swansea University, College of Human and Health Sciences.

Principle Researcher | Jen Pink | [redacted]

Project Supervisor | Professor Nicola S Gray | [redacted]

Department of Psychology

Swansea University

Participant Recruitment Email

How well do you know your own personality?

If you have 10 minutes to spare, are a fluent English speaker and aged 18-55, please consider taking part in this confidential online research study.

To participate, click on the link from your laptop/desktop computer <<STUDY LINK>>.

You will be asked to complete several short questionnaires and reaction time tests. These will take around 10-15 minutes. If you are a Swansea University student taking part via Participant Pool you will be awarded 2 subject pool credits.

If you have any questions please contact Jennifer Pink, PhD Student, Psychology: [redacted]

This research has been approved by the Research Ethics Committee, College of Human and Health Sciences, Swansea University.

Social Media Recruitment Advert

Each social media advert will comprise the following text in the post (typed into Facebook/Instagram/Twitter) accompanied by the advert image below.

If you have 10-15 minutes spare, are aged between 18-55 and a fluent English speaker, take part in our research where we explore your sense of self and different personality traits. Study access through Swansea University subject pool will gain 2 credits. Click the following link from a laptop to participate <>. Contact Jennifer Pink ([redacted]) with any questions. #participate #research #psychology #swansea #takepart

Participant Debrief Sheet

Implicit & Explicit Personality Traits

22nd March 2021

Thank you for taking part in our research. Now that you have completed the study, we will explain the rationale behind this work.

You have completed a series of questionnaires and word sorting tasks. These tasks have measured the level that you associate your self-concept with different personality traits.

The word sorting tasks are "implicit" measures which aim to overcome some of the limitations associated with self-report measures such as questionnaires. While self-report measures are useful in research, they can have certain limitations because they may fail to detect thoughts, feelings, or behaviours, a person may be trying to conceal or does not realise they have.

This research has measured the associations you have between your self-concept and different personality traits. Data collected for the study will be used to develop further implicit tests in this field of research and to evaluate if this method can reliably measure how the self-concept of an individual relates to different attributes and behaviours. All data is anonymous and will be retained for 10 years. Data will only be analysed by groups, not by individual.

If you feel affected by issues raised by this research and would like to discuss any concerns, please contact the research team or study supervisor on the details provided below. If you feel this piece of research may have health implications for you, we advise you to contact your GP (family doctor) or Swansea University's Wellbeing services (Wellbeing Services, Horton Building, Swansea University, Singleton Park, Swansea, SA2 8PP, Tel : 01792 295592, www.swansea.ac.uk/wellbeing/). Alternatively you can contact a Wales-wide Mental Health Helpline for support such as Mind Cymru (0300 123 3393).

Jennifer Pink | [redacted]

Department of Psychology, Swansea University

Professor Nicola S Gray | [redacted]

Department of Psychology, Swansea University

Demographics Questionnaire

Please complete the demographics information below.

---

1. What is your age?

2. Is English your first language?

Yes

No

3. Please select your gender:

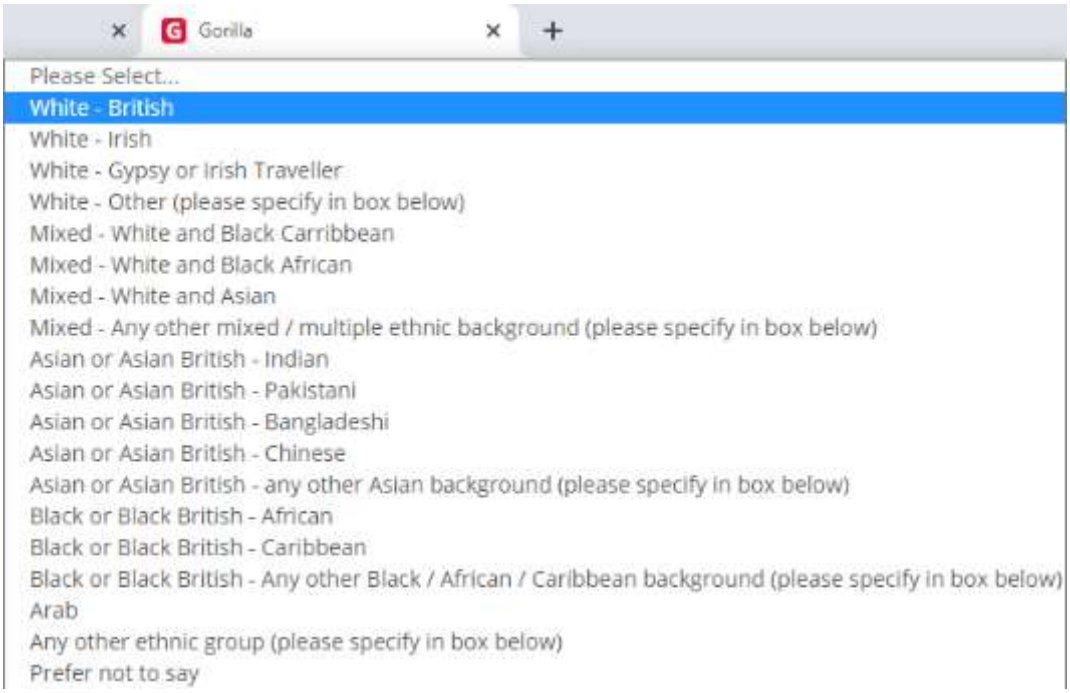
Male

Female

Other

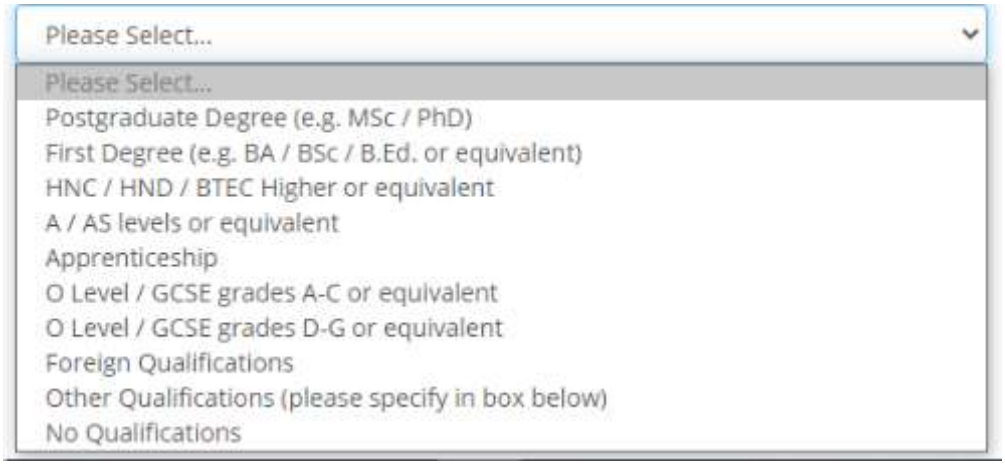
Prefer not to say

4. What is your ethnicity?



Other ethnic group - please specify if you wish

5. What is your highest formal qualification?



Other qualifications - please specify if you are happy to

Eysenck Personality Questionnaire (Eysenck, 1985)

Instructions: Please answer each question by putting a circle around the 'YES or the 'NO' following the question. There are no right or wrong answers, and no trick questions. Work quickly and do not think too long about the exact meaning of the questions.

1. Do you have many different hobbies?	Yes	No
2. Do you stop to think things over before doing anything?	Yes	No
3. Does your mood often go up and down?	Yes	No
4. Have you ever taken the praise for something you knew someone else had really done?	Yes	No
5. Do you take much notice of what people think?	Yes	No
6. Are you a talkative person?	Yes	No
7. Would being in debt worry you?	Yes	No
8. Do you ever feel 'just miserable' for no reason?	Yes	No
9. Do you give money to charities?	Yes	No
10. Were you ever greedy by helping yourself to more than your share of anything?	Yes	No
11. Are you rather lively?	Yes	No
12. Would it upset you a lot to see a child or an animal suffer?	Yes	No
13. Do you often worry about things you should not have done or said?	Yes	No
14. Do you dislike people who don't know how to behave themselves?	Yes	No
15. If you say you will do something, do you always keep your promise no matter how inconvenient it might be?	Yes	No
16. Can you usually let yourself go and enjoy yourself at a lively party?	Yes	No
17. Are you an irritable person?	Yes	No
18. Should people always respect the law?	Yes	No
19. Have you ever blamed someone for doing something you knew was really your fault?	Yes	No
20. Do you enjoy meeting new people?	Yes	No
21. Are good manners very important?	Yes	No
22. Are your feelings easily hurt?	Yes	No
23. Are all your habits good and desirable ones?	Yes	No
24. Do you tend to keep in the background on social occasions?	Yes	No
25. Would you take drugs which may have strange or dangerous effects?	Yes	No
26. Do you often feel 'fed-up'?	Yes	No
27. Have you ever taken anything (even a pin or button) that belonged to someone else?	Yes	No
28. Do you like going out a lot?	Yes	No
29. Do you prefer to go your own way rather than act by the rules?	Yes	No
30. Do you enjoy hurting people you love?	Yes	No
31. Are you often troubled about feelings of guilt?	Yes	No
32. Do you sometimes talk about things you know nothing about?	Yes	No
33. Do you prefer reading to meeting people?	Yes	No
34. Do you have enemies who want to harm you?	Yes	No
35. Would you call yourself a nervous person?	Yes	No
36. Do you have many friends?	Yes	No
37. Do you enjoy practical jokes that can sometimes really hurt people?	Yes	No
38. Are you a worrier?	Yes	No
39. As a child did you do as you were told immediately and without grumbling?	Yes	No
40. Would you call yourself happy-go-lucky?	Yes	No
41. Do good manners and cleanliness matter much to you?	Yes	No
42. Have you often gone against your parents' wishes?	Yes	No
43. Do you worry about awful things that might happen?	Yes	No
44. Have you ever broken or lost something belonging to someone else?	Yes	No
45. Do you usually take the initiative in making new friends?	Yes	No
46. Would you call yourself tense or 'highly-strung'?	Yes	No
47. Are you mostly quiet when you are with other people?	Yes	No
48. Do you think marriage is old-fashioned and should be done away with?	Yes	No
49. Do you sometimes boast a little?	Yes	No

50. Are you more easy-going about right and wrong than most people?	Yes	No
51. Can you easily get some life into a rather dull party?	Yes	No
52. Do you worry about your health?	Yes	No
53. Have you ever said anything bad or nasty about anyone?	Yes	No
54. Do you enjoy co-operating with others?	Yes	No
55. Do you like telling jokes and funny stories to your friends?	Yes	No
56. Do most things taste the same to you?	Yes	No
57. As a child were you ever cheeky to your parents?	Yes	No
58. Do you like mixing with people?	Yes	No
59. Does it worry you if you know there are mistakes in your work?	Yes	No
60. Do you suffer from sleeplessness?	Yes	No
61. Have people said that you sometimes act too rashly?	Yes	No
62. Do you always wash before a meal?	Yes	No
63. Do you nearly always have a 'ready answer' when people talk to you?	Yes	No
64. Do you like to arrive at appointments in plenty of time?	Yes	No
65. Have you often felt listless and tired for no reason?	Yes	No
66. Have you ever cheated at a game?	Yes	No
67. Do you like doing things in which you have to act quickly?	Yes	No
68. Is (or was) your mother a good woman?	Yes	No
69. Do you often make decisions on the spur of the moment?	Yes	No
70. Do you often feel life is very dull?	Yes	No
71. Have you ever taken advantage of someone?	Yes	No
72. Do you often take on more activities than you have time for?	Yes	No
73. Are there several people who keep trying to avoid you?	Yes	No
74. Do you worry a lot about your looks?	Yes	No
75. Do you think people spend too much time safeguarding their future with savings and insurance?	Yes	No
76. Have you ever wished that you were dead?	Yes	No
77. Would you dodge paying taxes if you were sure you could never be found out?	Yes	No
78. Can you get a party going?	Yes	No
79. Do you try not to be rude to people?	Yes	No
80. Do you worry too long after an embarrassing experience?	Yes	No
81. Do you generally 'look before you leap'?	Yes	No
82. Have you ever insisted on having your own way?	Yes	No
83. Do you suffer from 'nerves'?	Yes	No
84. Do you often feel lonely?	Yes	No
85. Can you on the whole trust people to tell the truth?	Yes	No
86. Do you always practice what you preach?	Yes	No
87. Are you easily hurt when people find fault with you or the work you do?	Yes	No
88. Is it better to follow society's rules than go your own way?	Yes	No
89. Have you ever been late for an appointment or work?	Yes	No
90. Do you like plenty of bustle and excitement around you?	Yes	No
91. Would you like other people to be afraid of you?	Yes	No
92. Are you sometimes bubbling over with energy and sometimes very sluggish?	Yes	No
93. Do you sometimes put off until tomorrow what you ought to do today?	Yes	No
94. Do other people think of you as being very lively?	Yes	No
95. Do people tell you a lot of lies?	Yes	No
96. Do you believe one has special duties to one's family?	Yes	No
97. Are you touchy about some things?	Yes	No
98. Are you always willing to admit it when you have made a mistake?	Yes	No
99. Would you feel very sorry for an animal caught in a trap?	Yes	No
100. When your temper rises, do you find it difficult to control?	Yes	No

Personality Thermometers

EPQ

Extraverted

First we would like you to indicate how much you feel you are an extraverted person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how much you feel you are an extraverted person.

People who are extraverts are lively individuals. They enjoy interacting with others in social situations, and like meeting new people. They prefer busy, exciting environments and seek stimulation. They can be hasty and are comfortable making quick decisions.

Introverted

Now we would like you to indicate how much you feel you are an introverted person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how much you feel you are an introverted person.

People who are introverts are quiet and reserved, preferring solitary activities to social situations. They may appear more serious and thoughtful than their extraverted counterparts and enjoy peaceful and quiet environments. They are cautious and think through things before making decisions.

Antisocial

Next we would like you to indicate how much you feel you are an antisocial person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how much you feel you are an antisocial person.

People who are antisocial are suspicious of others and can be difficult to deal with. They may sometimes be aggressive or manipulative. They care little about the feelings of others and can be unkind and rude. They can be rebellious and careless. Antisocial people may take risks or be irresponsible and impulsive.

Prosocial

Next we would like you to indicate how much you feel you are a prosocial person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how much you feel you are a prosocial person.

People who are prosocial are charitable individuals who are polite, friendly and kind to others. They are co-operative and are very trusting of others. They are punctual and organised, and generally law-abiding and sensible.

Neurotic

Now we would like you to indicate how much you feel you are a neurotic person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how much you feel you are a neurotic person.

People who are neurotic are sensitive to stress and can find it a challenge to cope with stressful situations. They may feel hopeless and can be highly-strung and anxious about many of life's challenges. Sometimes they are nervous or restless and can be a little moody or irritable. They are particularly sensitive to the opinions and actions of others.

Stable

Now we would like you to indicate how much you feel you are a stable person.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how much you feel you are a stable person.

People who are stable are level-headed in challenging situations. They are balanced and untroubled and are generally easy-going. They tend to be optimistic and do not let the opinions or actions of others worry them as they can be quite thick-skinned.

Big 5

1. Next we would like you to indicate how **extraverted** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please **mark from 0 (not at all)** to **100 (very) how extraverted** you are.

People who are extraverted are lively, enthusiastic, and impulsive. They are talkative and sociable and enjoy social occasions. They assert themselves and are confident. They can be impulsive.

2. Now we would like you to indicate how **introverted** you feel you are

Please take time to read the description of this personality type carefully.

According to the definition below please **mark from 0 (not at all)** to **100 (very) how introverted** you are.

People who are introverted are reserved and shy. They prefer solitary activities to social occasions and are deliberate and thoughtful in their actions. They shy away from aggression and tend to be more passive in their interactions.

3. Next we would like you to indicate how **agreeable** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please **mark from 0 (not at all)** to **100 (very) how agreeable** you are.

People who are agreeable are warm and compassion to others. They co-operate well and work well in teams. They demonstrate kindness and thoughtfulness towards others and are sincere. They are friendly and good-natured, being charitable to those in need. They are very trusting of others.

4. Next we would like you to indicate how **disagreeable** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please **mark from 0 (not at all)** to **100 (very) how disagreeable** you are.

People who are disagreeable may be suspicious or untrusting towards other people. They can be cruel and thoughtless towards others. They are hostile and unhelpful and can be dishonest or greedy. They demonstrate little warmth or compassion for others and are unsympathetic to those in need.

5. Now we would like you to indicate how **conscientious** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how conscientious you are.

People who are conscientious have an organised approach to their work and lives. They are well-disciplined, sometimes strict, and they tackle things in a systematic and thorough way. They are generally neat, thorough and, at times may be rather fussy. They are reliable and careful.

6. Now we would like you to indicate how **laid-back** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how laid-back you are.

People who are laid-back are rather relaxed about their work and lives. They may be disorganised or untidy and be a little lax or slapdash in their work ethic. Sometimes they live chaotic lives and can be unreliable and erratic.

7. Now we would like you to indicate how **stable** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how stable you are.

People who are stable are at ease with themselves. They are relaxed and easy-going. Generally, they remain unemotional in difficult situations and do not become overexcited. They are steady and consistent and are confident and assured in their dealings with others.

8. Now we would like you to indicate how **neurotic** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how neurotic you are.

People who are neurotic may be nervous or apprehensive in difficult situations. Sometimes they lack confidence when dealing with other people. They may be particularly sensitive to the actions and opinions of others and can be defensive when challenged. They might be a little irritable or moody at times.

9. Next we would like you to indicate how **open to experiences** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how open to experiences you are.

People who are open to experiences are bright, inquisitive, and keen to learn about new things. They may be gifted, creative, or imaginative. They often reject traditional ideas and views and are interested in new things or ways of doing. They embrace change and innovation.

10. Lastly we would like you to indicate how **traditional** you feel you are.

Please take time to read the description of this personality type carefully.

According to the definition below please mark from 0 (not at all) to 100 (very) how traditional you are.

People who are traditional prefer the predictable and status quo. They have traditional views and ideas and are indifferent to discovering new things. They may be rather unimaginative and might struggle with change and uncertainty.

Appendix C: Preparatory work for Affect Misattribution Procedure, Chapter 5

Initial Image Selection

Priming stimuli for use in the AMP tasks were chosen from the International Affective Picture System (IAPS; Lang et al., 2008) as affective norms of arousal and valence are provided for each image. Images intended to invoke feelings of threat towards the self were selected for the Threat AMP, and ones which invoked feelings of distress were required for the Distress AMP. To provide baselines within the AMP, a set of neutral primes for use in both AMP tasks was also chosen.

Ten primes of each type were required for each of the two AMPs to facilitate sufficient trials. However, as the IAPS system contains many potential stimuli, 20 of each type were selected, from which the final ten would be selected. Images intended to invoke feelings of threat towards the self for the Threat AMP were chosen from those depicting snakes, aggressive dogs, bears and tigers and those which showed guns and knives aimed at the self. Of these, the 20 images with the highest mean arousal ratings were selected. Valence ratings for animals were < 4.00 and < 3.10 for knives and guns. IAPS images depicting scenes of mutilation or dead animals/humans were selected to invoke feelings of distress for the Distress AMP. The 20 images with the highest arousal (>6.00) and lowest valence (<1.80) ratings were chosen. A further 20 neutral images were chosen, which depicted a range of household objects, buildings and landscape scenes. The arousal ratings for the neutral images were all less than 4.50, and all had valence ratings of less than 6.40. Table 1 gives the IAPS image numbers for those used in the pilot study.

Table XX: International Affective Picture System (IAPS; Lang et al., 2008) image numbers selected for rating by type of image.

Distress	Threat-to-self	Neutral
3000*	1120	7001*
3080	1050*	7014*
3010	1300	7019

3060*	1321*	7030*
9410*	1052	7032*
3069*	1525*	7039
3130	1932	7041*
3053*	1930*	7057*
3120	1304	7081*
3110	1726	7100*
3001	6230*	7150*
3131*	6510*	7504
3102	6260	5390
9183	6250.1*	5720
3100*	2811	5726
3059*	6231	5731
3064	6263*	5740
3063*	6300	7490
9570*	6370*	7500
9075	6244*	7547*

**Denotes final images selected following image rating exercise described below*

Image Rating

A rating exercise was completed to select the final ten images for each type of stimuli. Each image was rated by ten researchers. Additionally, as many of the IAPS images depict complex scenes, and given the short time that the primes would be displayed during the AMP, each rater indicated for each image if they could not make sense of it.

The rating exercise was completed using the online experimental platform Gorilla.sc (Anwyl-Irvine et al., 2019). This exercise captured ratings for each image of how pleasant, arousing, threatening, and distressing the researchers' experience of viewing it was. Each IAPS image was only presented briefly (for 150ms). This display time was chosen to create a similar experience of viewing the images to that which participants would have when they were presented as primes in the AMP

tasks. To mimic the presentation of images within the AMP, each image was preceded by a fixation cross (500ms) and followed by a blank screen (125ms), a Chinese pictogram (100ms), and a response screen with a Likert scale. Ratings were given using Likert scales (0 = *unpleasant* to 10 = *pleasant;* 0 = *non-threatening* to 10 = *threatening;* 0 = *not arousing* to 10 = *arousing;* 0 = *not distressing* to 10 = *distressing*). Those providing ratings were instructed to rate per their emotional reaction to the images, not what they thought the answer might be. For example, if they saw an image of a tiger, they were told to rate their reaction to that image rather than what they thought they should feel in response to the image. If the raters could not make sense of an image due to the short onscreen presentation time, they were instructed to indicate that they had not understood an image using a tick box on screen.

Final Image Selection for AMP Tasks

A series of exclusions was made using the ratings collated to reduce the 60 images to the final 30 for the AMP tasks. Firstly, images with less than 90% visibility across all participant ratings were removed. Next, to select those the most distressing and threatening images, distress images with ratings of <8.80 and threat images with ratings of <6.00 were removed. A difference score between threat and distress was calculated to differentiate between ratings (distress rating minus threat rating). All distress images with a difference score <3.00 were removed, which left 11 out of the 20 images. This was reduced to the final ten distress images by removing one of the two joint lowest difference score images. All threat images were removed with a difference score of >0.50, which left the final ten for the AMP. Any neutral images with too high ratings of arousal (>0.80), distress (>0.80) or pleasantness (>8.20) were removed to give the final ten neutral images. Table X shows the final images used in the AMP tasks, denoted by *.

AMP Instructions for Participants

Below are the instructions given for the categorical and Likert Distress AMPs. The Threat AMPs were identical aside from substitutions that guesses were to be made on whether the symbols represented threatening (rather than distressing) concepts, and how threatening (rather than distressing) they were.

Categorical Instructions: *In this task we will show you some Chinese symbols. Half represent distressing concepts (e.g., an injury), and half represent neutral concepts (e.g., house). We would like you to guess which of the Chinese symbols represent distressing concepts and which represent neutral concepts. We assume that you do not know the actual meaning of the symbols. However, we are interested in how well you can tell by intuition whether a symbol's meaning is distressing or neutral. Each symbol will be preceded by a real-life image. You should try your absolute best not to let the real-life images bias your intuition about the meaning of the symbol.*

This is not a reaction time task, so there is no need to react as quickly as possible. Just respond with the first intuitive answer, rather than thinking about it for too long. Remember, we want you to guess whether you feel the Chinese symbol represents a distressing concept, or a neutral concept. Don't forget to try your best not to let the real-life images bias your intuition about the meaning of the symbols.

Likert Instructions: *In this task we will show you some Chinese symbols. They represent a range of concepts from very distressing (e.g., an injury) to not distressing (e.g., house). We would like you to guess how distressing each of them is, using a scale. We assume that you do not know the actual meaning of the symbols. However, we are interested in how well you can tell by intuition how distressing the meaning of a symbol is. Each symbol will be preceded by a real-life image. You should try your absolute best not to let the real-life images bias your intuition about the meaning of the symbol.*

This is not a reaction time task, so there is no need to react as quickly as possible. Just respond with the first intuitive answer, rather than thinking about it for too long. Remember, we want you to guess how distressing the meaning of each Chinese symbol is. Don't forget to try your best not to let the real-life images bias your intuition about the meaning of the symbols.

AAP Instructions for Participants

We will now show you the 30 real-life images which were used in the previous task. We would like you to rate how distressing each of the real-life images is, using a scale. As in the previous task, each real-life image will be followed by a symbol. However, this time you should ignore the symbols and rate the images.

Appendix D: Ethical Application, Documents and Approval Letter, Chapter 5/Chapter 6 (Study 2)

Please note that this application includes several additional measures which are not analysed within this thesis. As such, only relevant materials are included here for brevity. For a copy of the TriPM, please refer to Appendix A. For content relating to IAT, please refer to Chapter 3/Appendix A.

29 April 2022

Dear ADISHA VAISHYA, ELLI-MAE JONES, SUNITA RAINA, SOPHIE HYDE, LOWRI MORRISON, MANNON NICHOLLS, JADE IRVINE, ELINOR HARRY, JENNIFER PINK, , Professor Nicola Gray,

Re: 5420 , Implicit measures of personality and their association with behaviours

Your application - https://swansea.forms.ethicalreviewmanager.com/ProjectView/Index/5420 - has been reviewed and approved by the Department of Psychology Ethics Committee.

Please not that some typos/inconsistencies you may want to address.

(i)This statement has an extra full stop and a space ". If a burglar broke into my house, I would immediately look for a weapon."

(ii) This statement ends in "FL5" "I can't help but feel terrified if I see a dangerous animal. FL5"

(iii) Some statements end with full stop and some are not, it would be nice to be consistent.

The list of additional students (if any) are included in the table below:

Other student applicant - first name	Other student applicant - Surname	Other student applicant - email
ELLI-MAE	JONES	[redacted]
SUNITA	RAINA	
SOPHIE	HYDE	
LOWRI	MORRISON	
MANNON	NICHOLLS	
JADE	IRVINE	
ELINOR	HARRY	
JENNIFER	PINK	

additional researcher or student - first name	additional researcher or student - surname	additional researcher or student - email

The conditions of this approval are as follows:

1. To conduct your study strictly in accordance with the proposal that has been approved by the committee, including any approved amendments
2. To advise the ethics committee chair of any complaints or other issues that may warrant ethical review of the project
3. To submit for approval any changes to the approved protocol before implementing any such changes
4. To keep any information obtained from your participants absolutely confidential

Please note that failure to comply with these conditions of approval may result in the withdrawal of approval for the project.

To advertise your study on the departmental Participant Pool: You will need to send send a request for your study to be made visible, via the link on the Experiment Management System website (see Researcher Documentation for details). Please ensure that you attach this letter to your request. (If you are unable to attach the Ethics approval, send it in a separate email to Dr. Phil Tucker[redacted].

For students: Please ensure that the signed copy of this Ethical Approval, together with any other paperwork associated with your research, is included in your final write up.

Yours Sincerely,

Dr George Zacharopoulos (Reviewer of Application)

Dr Menna Price (Committee Chair)

Security information

Data Protection Privacy Notice

You are logged into the Ethical Review Manager (ERM), the system provided by Infonetica Ltd that will process the application on behalf of Swansea University. Your contact details will be stored by Infonetica Ltd and used by the University for the purpose of managing your application for ethics review.

Please be mindful that each application, submitted via the University's Ethical Review Manager (ERM), costs the University money due to the number of people required to process, review and approve your application, many of whom are senior academics within the University. Please respect this fact and ensure that you carefully follow the guidance provided to complete your application appropriately (and choose the correct route of ethical review).

Please do not proceed unless you are content to comply with this.

The data controller is Swansea University and the legal basis on which this task is being performed is public interest. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and may be contacted using [redacted]

Filter

Does your application require NHS research ethics approval?

- ○ Yes
- ◉ No

Are you a member of the CHHS?

- ◉ Yes
- ○ No

Which department are you from?

Psychology

Project Title

Short project title [This could be an acronym.]

Implicit Measures of Personality

Long project title

Implicit Measures of Personality and their Association with Behaviours

What is the location of the proposed research?

- ☐ Swansea University
- ☐ Other University
- ☐ Hospital
- ☐ School
- ☑ Other

What is the location other than Swansea University?

Online via Gorilla platform

What is the proposed start date for your project?

15/04/2022

What is the estimated project completion date?

30/09/2022

Is this student or staff research?

MSc - Abnormal and Clinical Psychology

Applicant

Name of Applicant

Title	First Name	Surname
	ADISHA	VAISHYA

Email [redacted]

Should any other student be listed on this application?

- (•) Yes
- ( ) No

Title	First Name	Surname
	ELLI-MAE	JONES

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	SUNITA	RAINA

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	SOPHIE	HYDE

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	LOWRI	MORRISON

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	MANNON	NICHOLLS

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	JADE	IRVINE

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	ELINOR	HARRY

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	JENNIFER	PINK

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Supervisor

Title	First Name	Surname
Professor	Nicola	Gray

Email [redacted]

Risk Assessment

Does the research fall under ANY of the following categories? [Click all that apply]

- ☐ Interventions and therapies, including clinical and non-clinical trials
- ☐ Collection of bodily fluids such as blood, saliva etc
- ☐ Research on children
- ☐ People highly dependent on medical care who may be unable to give consent
- ☐ People with a cognitive impairment, intellectual disability, or a mental illness
- ☐ Topics that may cause distress to participants due to past traumatic experiences
- ☐ Limited disclosure involving active concealment and/or planned deception
- ☐ Study or exposure of illegal activity, or research that is likely to discover illegal activity
- ☐ Research that could jeopardize a participant's employment
- ☐ Research that involves travel overseas
- ☐ Research that poses a risk to the physical or emotional safety or welfare of a Swansea University student researcher

- ☑ None of the above

Methods

Click all methods that apply:

- ☑ Computer-based testing
- ☐ Secondary-data analysis
- ☐ Observational methods
- ☑ Research on the internet
- ☐ Interviews
- ☑ Questionnaire-based methods
- ☐ Neuroimaging (MRI, PET etc)
- ☐ Psychophysiology (EEG, ERPs etc)
- ☐ tDCS
- ☐ Human tissue collection

Briefly (max 200 words) describe the research you wish to undertake: Include study rationale, main theoretical constructs, and hypotheses. Please use non-technical language wherever possible.

The primary aim of the study is to develop a series of experimental tasks to serve as behavioural measures for triarchic psychopathy (Patrick et al., 2009). The triarchic model defines psychopathy as comprising three distinct domains: Boldness, Meanness and Disinhibition. Affect misattribution procedures (AMP; Payne et al., 2005) will be developed to measure Boldness and Meanness. A Go/No-Go task (similar to Albert et al., 2019) will be developed to measure Disinhibition.

Additionally, the study will compare the utility of explicit and implicit measures of psychopathy in predicting performance on each of these experimental tasks. It is crucial to explore implicit methods in relation to psychopathy; the disorder is associated with deception which may invalidate explicit measures. The study will use the Triarchic Psychopathy Measure (TriPM; Patrick, 2010) as the explicit measure of psychopathy, and three Implicit Association Tests (IAT; Greenwald et al., 1998) as implicit measures of each psychopathy domain. The three IATs have already been developed and tested in a similar community-based sample (Pink et al., in press).

Lastly, the study will explore the relationship between performance on the behavioural tasks and an explicit measure of borderline personality disorder (BPD). Some research suggests that features of psychopathy may be associated with BPD in women (Hicks, Vaidyanathan, & Patrick, 2010) and we aim to investigate the parallels between the two personality disorders in terms of boldness, meanness and disinhibition and the reactions to implicitly measured threat and distress.

What is your research design? What variables will be manipulated or measured?

The main study is a split-plot design, using between-subject conditions for the psychopathy features (Bold, Mean, Disinhibition) and a correlational research design between the explicit and implicit measures of each of these dimensions. Participants will be randomly allocated to one of three conditions: Boldness, Meanness or Disinhibition.

Each participant will complete one IAT, and the relevant behavioural measure (either the threat or distress AMP or the Go/No-Go task). All participants will complete the following questionnaires:
A: Triarchic Psychopathy Measure (TriPM; Patrick, 2010) – psychopathy traits
B: UPPS-P Impulsive Behavior Scale (UPPS-P; Cyders et al., 2014) – impulsivity
C: Balanced Inventory of Desirable Responding Short Form (BIDR-16, Hart et al., 2015) – impression management and self-deception
D: McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003) – borderline personality traits
E: Jackson-5 (Jackson, 2009) – aggressive behaviours

No variables will be manipulated. The dependent variables are listed below:

1.Scores on each of the three Implicit Association Test (IATs):
- Boldness IAT will measure the association between the concepts of BOLD and WARY with the attributes of ME and NOT ME.
- Meanness IAT will measure the association between the concepts of CRUEL and KIND with the attributes or ME and NOT ME.
- Disinhibition IAT will measure the association between the concepts of RECKLESS and SENSIBLE with the attributes of ME and NOT ME.
D-scoring protocol from Greenwald et al. (1998) will be used to calculate these associations.

2. Scores on each of the AMPs:
- Threat AMP (Boldness condition) will measure the feelings of fear experienced in response to threatening stimuli
- Distress AMP (Meanness condition) will measure the levels of distress experienced in response to distressing stimuli
Scoring protocol from Payne et al. (2005) will be used to calculate fear/distress responses for the two tasks.

3. Scores on the Go-No-Go task:
-The Go-No-Go task (Disinhibition condition) will measure the levels of impulsivity in participants. This will be determined by the number of omission and commission errors for the Go- No-Go stimuli and reaction time on trials.

4. Scores on the self-report measures listed above.

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What procedures will be carried out on the participants? What will happen to your participants?

All data will be collected online using the Gorilla.sc platform.

Before any participant testing is completed, there will be an Image Selection Pilot completed by the students named on this ethical application. They will be asked to rate 80 IAPS images (20 threat, 20 distress, 20 neutral and 20 exciting) for valence, arousal, distress and threat using Likert scales. The aim of this is to select the best IAPS images to use for the AMP tasks. The images will only be presented for 150ms to replicate the presentation time within the AMP tasks themselves. Those images that are rated as most threatening, distressing, and arousing will be selected for the main study.

Once the best 10 images from each of the 4 categories have been selected, a Pilot AMP Study will be run with student and community participants. The aim of the Pilot AMP Study is to test the AMP procedure, and ensure that an AMP effect is obtained prior to the main study. In this study, participants will complete the Threat AMP and Distress AMP along with the TriPM and the MSI-BPD measures. The order of AMPs will be counterbalanced. Half of the participants will use Likert Scale responses on the AMP (e.g., not threatening to very threatening) and half will make a categorical choice (e.g., threatening or not threatening).

All participants will be presented on screen with a Participant Information Sheet to read which sets out the aims of the study. If they are happy with its content they will click a Next button. An example of the PIS is included as Appendix 1. This will be altered to reflect the content of the study (Image Selection Pilot/AMP Pilot/Main Study). However, no ethical implications are envisaged from these alterations.

For the pilot and main studies, there will be a two-stage consent process to ensure participants are not exposed to images which they may find upsetting without prior warning and without giving fully informed consent to this exposure beforehand. Firstly, they will be informed that depending on which condition they are allocated to, the study may require them to view threat or distress images. They will be told that on subsequent screens there will be example neutral, threat, distress, and exciting images (in that order) presented very briefly (1 second) which are similar to those used in some of the tasks. It is highlighted to them on the PIS that the threat and distress images include attacking animals or people attacking others with weapons, images of dead animals and people, and mutilations. If they wish to exit the experiment at this point they are able to do so without seeing any images. If they wish to continue, they will give consent to proceed to the next set of screens which will show 4 small images of each category presented for 1 second. Throughout this presentation they are reminded that they can exit at any point by closing the webpage, and they are given advance notice prior to each category of image appearing on-screen. All images are presented in small, thumbnail, form and only briefly as a method to reduce any distress or upset caused by viewing the images, while also providing participants with knowledge of the type of images that will be used in the study. Screenshots of this presentation are included as Appendix 2. Once they have viewed these images they can either exit the experiment (and thereby refuse to provide consent to continue), or continue to complete the second (and full, standard) consent form (Appendix 3). It will be made clear to participants that they have the right to withdraw their participation in the study at any time, without penalty or the need to justify their decision.

Before participants begin the study, they will be asked for demographic information (Appendix 4). For the main study, they will also be asked to provide personal information (Personal Information Form, Appendix 5) which will be programmed into the computer as part of the "ME/NOT ME" component of the IATs. Participants will be informed that this information will be disposed of after completion of testing so that their anonymity is assured. Participants will also be asked to select appropriate NOT ME words from a selection which they do not relate to (i.e., have no personal significance for them), for later use in the IATs (Appendix 6). This procedure for the IAT has been used many times before without issue.

In the main study, participants will first complete the relevant IAT (Bold, Mean or Disinhibition). This will require them to first sort the attribute words used within the IAT into the 2 categories (e.g. BOLD and WARY). This is to ensure that there is no confusion regarding the words and what they represent. A full list of the attribute words is included as Appendix 7. Participants in the AMP Pilot will not complete the IAT.

Participants will next complete the behavioural measure(s). The AMP tasks will follow the same procedure for both conditions. In each trial, an image will be shown (Appendix 8 includes all images, by condition) very briefly (c. 150ms), then a blank screen (125ms) then a Chinese symbol (100ms) (examples are given in Appendix 9). Participants will be asked to rate how frightening/distressing the symbol is using either categorical decision or Likert scale (depending on the outcome of the pilot study). The Go/No-Go task comprises a series of trials where participants need to either press the space bar or refrain from pressing the space bar in response to certain letters appearing on screen in certain locations (M, N, W).

Once participants have completed the tasks, they will be asked to fill in each of the questionnaires. Participants in the AMP Pilot and Main Study will complete the TriPM (Appendix 10), then the MSI-BPD (Appendix 11). Those in the Main Study will also complete the UPPS-P (Appendix 12), the BIDR-16 (Appendix 13) and the Jackson-5 (Appendix 14).

After completion of these outcome measures participants will be thanked for taking part in the research before reading a Debrief Form (Appendix 15) that details the study aims. This document will be amended to reflect the content of the study (either Pilot or Main Study), however no ethical implications of this are envisaged. They will then be reminded that their information is anonymous and will remain anonymous. Participants will be given contact details of the support services available to them should the need arise. If they are community-based participants they will be given the opportunity to enter their email on this screen to take part in a prize draw to win one of 4 x £25 vouchers. Student participants via participant pool will receive 3 credits (the anticipated length of the study is a maximum of 45 minutes).

The studies will be advertised via email (Appendix 16), social media (Appendix 17) and posters (Appendix 18). Again, these will be amended to reflect the content of the study (either Pilot or Main Study), however no ethical implications of this are envisaged.

Please indicate which of the following will be used for storing data:

- ☐ Manual files (e.g. paper documents or X-rays)
- ☑ Home or other personal computer
- ☑ University computer
- ☐ Private company or work-based computer
- ☑ Laptop computer
- ☐ Other

Please explain how files on your home or personal computer will be secured:

All data will be stored in a password-protected folder. Access to the computer will be password protected.

Please explain how files on your university computer will be secured:

All data will be stored in a password-protected folder. Access to the computer will be password protected.

Please explain how files on your laptop computer will be secured:

All data will be stored in a password-protected folder. Access to the laptop will be password protected.

Risks to participants

What potential risks to the participants do you foresee and how do you propose to ameliorate/deal with potential risks?

Within the AMP, participants will be briefly presented (in the order of 150ms duration) with a range of images. There is a potential risk to participants that they may find some of these images distressing. To deal with this risk, we have proposed a two-stage consent process as set out in the procedure above. Before consenting to take part in the study, participants will be clearly informed that depending on which condition they are allocated to, the study may require them to view threat or distress images. They will be told that on the next screen, there will be some example threat/distress/neutral/exciting images similar to those used in some of the tasks. If they wish to exit the experiment at this point they are able to do so without seeing any distressing images. If they wish to continue, they will give consent to proceed to the next screen to view a series of small thumbnail threat/distress/neutral/exciting images briefly displayed on screen (1 sec). The images are presented in thumbnail form and briefly as a method to reduce any distress or upset caused by viewing the images, while also providing participants with knowledge of the type of images that will be used in the study. Once they have viewed these they can either exit the experiment, or continue to complete the second (and full, standard) consent form. In addition, participants will be made aware (in the information sheet and full consent form) of their right to withdraw from the study at any point with no explanation.

The AMP is a very well-known psychological procedure that has been used many times in the research literature without causing undue distress to participants. However, as this is the first time we have used this procedure in our lab, as set out in the procedure we will pilot it first to ensure we get the appropriate effect before using it within the main study. During the pilot study we will also require participants to rate the images on how much threat, distress, arousal, and excitement they elicit. The PIS, Consent Form and Debrief Form will be amended accordingly to reflect the pilot study (AMP, no IAT, an image rating task and self-report measures). However, no ethical implications are envisaged from this.

Should the topic of the experiment elicit any negative feelings, all participants will be informed that they do not need to answer any questions which make them feel uncomfortable.

When participants are presented with the onscreen debrief sheet, they will be provided with the contact details for the researchers and the supervisor, should they like to discuss anything involved within the study or if they have any concerns they would like to address. They will also be given links to support services available, including Wellbeing@campuslife, details for the Mind Cymru mental health helpline (0300 123 3393) and directed to their local GP if required.

Participants will be informed that their data will be stored anonymously, and each individual's information will be referred to as a unique number so once data has been collected, participants will be anonymous to the researchers and cannot be deleted as the researchers will be unable to detect which data is associated with each participant.

Will participants be informed of the right to withdraw without penalty?

- [x] Yes
- [ ] No

Do you have doubts about participants' abilities to give informed consent?

- [ ] Yes
- [x] No

How do you propose to ensure participants' confidentiality and anonymity?

Confidentiality and anonymity will be ensured as no identifying information will be collected from participants. Only demographic information of age, gender, ethnicity, fluency in English/Chinese and highest educational achievement will be collected. This information will be kept confidential. From the commencement of the study, each participant will be given an alphanumeric code which relates to their data and throughout the whole of the experiment, they will be referred to by their code. Some personal information will need to be gathered for the programming of the IAT task, for example, their first name and star sign. Once the IAT task has been completed and reaction time and error data are collected the personal data will be deleted. All questionnaires and documents completed within the experiment will be stored away in a password-protected document. They will only be accessed by the researchers and their supervisor.

How will you ensure that participants will not be coerced to participate in your study?

All participants will be presented with an onscreen information sheet which explains the purposes and aims of the study and what is required of them to do. They will be given the opportunity to ask any questions if they deem necessary and if they need any clarification. Participants will also be informed that they do not have to take part in the study if they don't want to. Participants will be told that they can withdraw from the study at any point without any explanation or justification.

Risks to researchers

What potential risks to the interests of the researchers do you foresee and how will you ameliorate/deal with potential risks?

No potential risks to the researchers are predicted.

If the participants would like to discuss any information in the experiment that they found sensitive, they will be advised to use the supportive services provided to them where these matters can be addressed. The supervisor has completed previous studies which are similar in the past and these sources of support have been provided with each online study. Contact details of the students and supervisor are also provided at the beginning and end of the study should participants need them.

Participants

What is your estimated sample size, and how was this size determined?

Main Study N=1200.

To calculate the required sample size we assumed an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%), which revealed a sample of N=160 per group.

In order to account for drop-outs, which in previous online experiments have been approximately 20%, we will gather a sample of 200 people per condition (6 conditions).

As we require both a male and female group in 3 different between-subject conditions (Boldness, Meanness, Disinhibition) this equals 6 x 200 = 1200 participants.

Will any participant be under the age of 18?

- ☐ Yes
- ☑ No

Describe your participants: give the age range, gender, inclusion and exclusion criteria, and any particular characteristics pertinent to the research project.

Participants will be a minimum age of 18 and will need to be fluent English language speakers due to the language-based nature of the IAT and the English-language questionnaires used. There are no gender exclusions. Data from participants who indicate that they are familiar with Mandarin (Chinese) will be removed after the study, if they have taken part in one of the two AMPs. This data removal is necessary as Chinese symbols are used in the AMP task, and these symbols need to be neutral to the participant. Participants who speak Mandarin will not know that their data is being removed as this will be done at the data cleaning stage. Participants will be those in the general population as well as students, including those from Swansea University.

How will the participants be selected and recruited?

- [x] Department's electronic subject pool
- [x] University population
- [x] General public
- [ ] Other

Will payments or subject pool credits be made to participants?

- [x] Yes
- [ ] No

Please specify quantities involved. Please ensure payment or credits awarded do not represent an inducement to participate in your study:

The task is estimated to take 45 minutes to complete. Participants from Swansea University participant pool will receive 3 credits, and community participants will have the option to be entered into a prize draw for a chance to win a £25 shopping voucher.

Documents

Will you be providing participants with a Participant Information Sheet?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Information Sheet. [Please base your P.I.S. on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 1 Participant Information Sheet V4 - 11April2022	Appendix 1 Participant Information Sheet V4 - 11April2022.docx	11/04/2022	4	53.1 KB

Will written informed consent be sought from participants?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Consent Form. [Please base your consent form on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 3 Full Consent Form -29March2022	Appendix 3 Full Consent Form -29March2022.docx	29/03/2022	1	19.1 KB

How will you advertise your study?

- [x] Email
- [ ] Poster
- [x] Social media
- [ ] Other
- [ ] I won't be advertising my study

Please upload a copy of your email based on the standard template. [See help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 16 Email Advertisement	Appendix 16 Email Advertisement.docx	11/04/2022	1	18.8 KB

Please upload a copy of your advertisement for social media.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 17 Social Media Advertisement	Appendix 17 Social Media Advertisement.docx	11/04/2022	1	151.2 KB

Will you be providing participants with a debrief statement?

- [x] Yes
- [ ] No

Please attach a copy of your debrief statement that will be given to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Debrief Statement	Appendix 15 Debrief Form -29March2022	Appendix 15 Debrief Form -29March2022.docx	29/03/2022	1	114.9 KB

Please upload all questionnaires that you intend on distributing to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 4 Demographics Form	Appendix 4 Demographics Form.docx	29/03/2022	1	263.3 KB
Default	Appendix 5 Personal Information Data Capture Form	Appendix 5 Personal Information Data Capture Form.docx	29/03/2022	1	25.5 KB
Default	Appendix 10 - Triarchic Psychopathy Measure	Appendix 10 - Triarchic Psychopathy Measure.pdf	29/03/2022	1	43.3 KB
Default	Appendix 11 - McLean Screening Instrument Borderline Personality Disorder	Appendix 11 - McLean Screening Instrument Borderline Personality Disorder.docx	29/03/2022	1	14.0 KB
Default	Appendix 12 - UPPS-P Short Form Cyders et al	Appendix 12 - UPPS-P Short Form Cyders et al.pdf	29/03/2022	1	206.9 KB
Default	Appendix 13 - Balanced Inventory of Desirable Reporting Measure Hart 2015	Appendix 13 - Balanced Inventory of Desirable Reporting Measure Hart 2015.doc	29/03/2022	1	26.0 KB
Default	Appendix 14 - Jackson-5 Measure	Appendix 14 - Jackson-5 Measure.docx	29/03/2022	1	15.3 KB

If necessary, please upload any additional documents to support your application:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 6 Not Me Word Stimuli for IAT	Appendix 6 Not Me Word Stimuli for IAT.docx	29/03/2022	1	17.3 KB
Default	Appendix 7 Word Stimuli for IATs	Appendix 7 Word Stimuli for IATs.docx	29/03/2022	1	18.1 KB
Default	Appendix 2 Image Presentation for Consent Process with Timings V2	Appendix 2 Image Presentation for Consent Process with Timings V2.pdf	11/04/2022	2	493.9 KB
Default	Appendix 8 IAPS Images for AMPs and Consent Process	Appendix 8 IAPS Images for AMPs and Consent Process.pdf	11/04/2022	1	3.5 MB
Default	Appendix 9 Example Chinese Symbols for AMP	Appendix 9 Example Chinese Symbols for AMP.pdf	11/04/2022	1	649.1 KB

The framework through which your ethics application is submitted and processed will cost the university a moderate annual fee. In your experience of using the system, do you request that the college and / or university continue to use this system?

- [x] Yes
- [ ] Undecided
- [ ] No

If you have any further comments to make on this system, please add them to the text box below. If you have no comment to make, please simply add "N/A" to the text box:

N/A

Applicant

Applicants signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by MISS ADISHA SUNDERLAL VAISHYA (2102059@swansea.ac.uk) on 11/04/2022 23:03

Co-applicants

Co-applicants signature [i.e. additional student]

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by MRS JENNIFER PINK ([redacted] on 12/04/2022 09:36

Supervisor

Supervisors signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my ability
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by PROF Nicola Gray ([redacted]) on 13/04/2022 19:30

Participant Information Sheet

Personality and Behaviour

April 2022

You are being invited to take part in some research. Before you decide whether or not to participate, it is important for you to understand why the research is being conducted and what it will involve. Please read the following information carefully.

What is the purpose of the research?

We are conducting research to determine if there is a relationship between different personality traits and behaviours. The study will use explicit methods (questionnaires) and implicit methods (reaction time tests) to measure personality traits, and a range of experimental tasks to measure behaviours. Only participants who are fluent in English may take part in the research, due to the need to respond quickly to English words. Participants are also required to be 18 or over, due to the nature of some of the stimuli. Please ensure that you are completing this on a laptop or desktop computer (not a smart phone or a table). You should be in a quiet place without any distractions for the entire duration of the study. Distractions may affect your reaction time and results.

Who is carrying out the research?

The data is being collected by Adisha Vaishya, Elinor Harry, Elli-Mae Jones, Jade Irvine, Lowri Morrison, Manon Nicholls, Sophie Hyde, Sunita Raina and Jennifer Pink under the supervision of Professor Nicola Gray, from the School of Psychology within the Faculty of Medicine, Health and Life Sciences at Swansea University. The research has been approved by the Faculty of Medicine, Health and Life Sciences Ethics Committee.

What happens if I agree to take part?

Before you agree to take part in any of the tasks, you will be asked if you are happy to view a series of small images which depict scenes of threat, distress, exciting activities and neutral scenes/objects. Depending on which tasks you are allocated by this software, you may be exposed to images of this nature. These images include scenes of attacking animals, people attacking others with weapons, dead animals or people, and mutilations. Some participants may find such scenes of threat or distress upsetting. If you feel that you might be affected by these types of images, please exit the

study now by clicking off the browser or by selecting the No – I do not want to proceed box at the end of this Information Sheet.

If you feel you are comfortable with viewing these types of images, you will need to select the Yes – I want to proceed and am comfortable viewing example scenes of threat or distress box at the end of this Information Sheet. We will then briefly (for 1 second each) show you a selection of small (thumbnail size) pictures which will be similar to those used in one of the tasks so that you can make an informed choice about whether to take part in the study.

After viewing these small example images, if you wish to continue further and start the study, you will be asked to give full consent for the study and then the experiment will commence.

You will then be asked to complete one reaction time task and a task where you are asked to rate the emotions depicted by a stimulus. You will also be asked to fill in five questionnaires which will ask you about a range of emotions and behaviours. The whole experiment will be completed within 45 minutes. Only the research supervisor and the researchers will have access to the information, and everything will be kept confidential and anonymous.

Are there any risks associated with taking part?

There is a potential risk that you may find some of the images used in the tasks distressing. There are also some topics included within the questionnaires (e.g., aggressive behaviours, self-harm and suicide) that may be sensitive for some people. Therefore, participation should be considered carefully. The research has been approved by the Faculty of Medicine, Health and Life Sciences Ethics Committee.

Data Protection and Confidentiality

Your data will be processed in accordance with the Data Protection Act 2018 and the General Data Protection Regulation 2016 (GDPR). All information collected about you will be kept strictly confidential. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file. The data we will collect for our study will be made anonymous at the start of the research. The data controller for this project will be Swansea University.

What will happen to the information I provide?

An analysis of the information will form part of our report at the end of the study and may be presented to interested parties and published in scientific journals and related media. Note that all information presented in any reports or publications will be anonymous and unidentifiable.

Is participation voluntary and what if I wish to later withdraw?

Your participation is entirely voluntary – you do not have to participate if you do not want to. Please note that the data we will collect for our study will be made anonymous at the start of the research; thus, it will not be possible to identify and remove your data at a later date, should you decide to withdraw from the study. Therefore, if at the end of this research, you decide to have your data withdrawn, please let us know before you leave the webpage.

Data Protection Privacy Notice

The data controller for this project will be Swansea University. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and can be contacted at the Vice Chancellors Office. Your personal data will be processed for the purposes outlined in this information sheet. Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you online. The legal basis that we will rely on to process your personal data will be processing is necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the School of Psychology and the Faculty of Medicine, Health and Life Sciences Ethics Committee, Swansea University. The legal basis that we will rely on to process special categories of data will be processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will your information be held?

Data will be preserved and accessible for a minimum of 10 years after completion of the research. Records from studies with major health, clinical, social, environmental or heritage importance, novel intervention, or studies which are on-going or controversial should be retained for at least 20 years after completion of the study. It may be appropriate to keep such study data permanently within the university, a national collection, or as required by the funder's data policy. The supervisor will take responsibility for data destruction, and all collected identifiable data will be destroyed on or after September 2032 as it is a requirement of Swansea University Research Integrity Framework on Research Ethics and Governance that data should be kept for a minimum of ten years.

What are your rights?

You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights. Any requests or objections should be made in writing to the University Data Protection Officer: University

Compliance Officer (FOI/DP), Vice-Chancellor's Office, Swansea University, Singleton Park, Swansea, SA2 8PP. Email: dataprotection@swansea.ac.uk.

How to make a complaint

If you are unhappy with the way in which your personal data has been processed, you may in the first instance contact the University Data Protection Officer using the contact details above. If you remain dissatisfied, then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF; www.ico.org.uk.

What if I have other questions?

If you have further questions about this study, please do not hesitate to contact us:

Adisha Vaishya

[redacted]

Elinor Harry

[redacted]

Elli-Mae Jones

[redacted]

Jade Irvine

[redacted]

Lowri Morrison

[redacted]

Manon Nicholls

[redacted]

Sophie Hyde

[redacted]

Sunita Raina

Professor Nicola Gray

[redacted]

School of Psychology, Swansea University

[redacted]

Jen Pink

[redacted]

School of Psychology,

Swansea University

To indicate your consent to view example images of threat and distress which you may be exposed to during one of the tasks in the experiment, please select this box to proceed:

Yes – I want to proceed and am comfortable viewing example thumbnail scenes of threat or distress ☐

If you do not wish to proceed further with this study, please select this box:

No – I do not want to proceed ☐

Participant Consent Form

Personality and Behaviour

April 2022

Please read and check the box for each of the consent statements below

1. I (the participant) confirm that I have read and understand the information sheet for the above study (dated April 2022) that was previously shown to me.☐

---

2. I understand that my participation is voluntary and that I am free to withdraw at any time and leave this research website, without giving any reasons. I understand that the data will be made anonymous at the start of the research; thus, it will not be possible to identify and remove my data at a later date, should I decide to withdraw from the study. Therefore, if at the end of this research, I decide to withdraw, I will let the researchers know before I leave the webpage. ☐

---

3. I understand what my role will be in this research, and I understand who to contact if I have any questions. ☐

---

4. I have been informed that the information I provide will be safeguarded. ☐

---

5. I am happy for the information I provide to be used (anonymously) in academic papers and other formal research outputs. ☐

---

6. I have read and understand the Participant Information Sheet. ☐

---

7. I agree to the researchers processing my personal data in accordance with the aims of the study described in the Participant Information Sheet. ☐

---

8. I confirm that I am aged 18 or over. ☐

---

9. I confirm that I have viewed the thumbnail images depicting scenes of threat and distress and I am happy to proceed with the experiment given that I may be exposed to some of this type of image in one of the tasks. ☐

If you agree to all these statements, and want to continue with the research, please select YES below.

If you do not want to continue, please select NO

- Yes
- No

This study is being conducted by Swansea University, Faculty of Medicine, Health and Life Sciences

Principle Researchers:

Adisha Vaishya - [redacted]

Elinor Harry - [redacted]

Elli-Mae Jones - [redacted]

Jade Irvine - [redacted]

Lowri Morrison [redacted]

Manon Nicholls - [redacted]

Sophie Hyde - [redacted]

Sunita Raina - [redacted]

Jen Pink - [redacted]

School of Psychology, Swansea University

Project Supervisor:

Professor Nicola S Gray - [redacted]

School of Psychology, Swansea University

Email Participant Recruitment Advert

How does personality affect behaviour?

If you have 45 minutes to spare, are 18+ and fluent in English, please consider taking part in this confidential online research study.

You will be asked to complete several short questionnaires and reaction time type tasks.

To participate, please click the link from a laptop/desktop PC (phones/tablets will not work) <link>.

You could win one of 4 x £25 shopping vouchers. Swansea Uni students will receive 3 credits instead. The study takes approximately 45 minutes, for any queries email <student email>

Social Media Recruitment Advert

The image below will be used on all social media posts with the following wording:

Facebook, Instagram, LinkedIn: How does personality affect behaviour? If you are 18+ and fluent in English, you can complete the following study on a laptop by using the link <link>. You could win one of 4 x £25 shopping vouchers. Swansea Uni students will receive 3 credits instead. The study takes approximately 45 minutes, for any queries email <student email> #takepart #psychology #research

Twitter (shortened to fit tweet limit): How does personality affect behaviour? 18+ and English speaking? Take part in our study! Swansea Uni students will gain 3 credits. Click the link on a laptop to participate <link> or email <student email> #psychology #research

Participant Debrief

Personality and Behaviour

April 2022

Thank you for taking part in our research. Now that you have completed the study, we will explain the rationale behind this work.

You have completed an Implicit Association Test (IAT) and a behavioural task. These tasks were designed to measure how much you associate your self-concept with specific personality traits, and to index particular behaviours. Depending on which IAT and task you were allocated by the software, these would have indexed levels of impulsivity, boldness and kindness. You have also completed questionnaires which have captured a range of related personality traits and behaviours (e.g. reactions of flight, fight or fear to threat).

The tasks are implicit measures that aim to address some limitations that have been associated with self-report measures (such as questionnaires) of personality. Though useful for research, self-report measures may fail to detect thoughts, feelings and behaviours that an individual may not be aware of or are trying to conceal.

This research has measured both your implicit and explicit associations between your self-concept and particular personality traits in order to determine whether one method acts as a better prediction of behaviour.

Data collected for the study will be used to develop implicit tests of personality traits and to evaluate if this can be done reliably. All data is anonymous and will be retained for 10 years. Data will only be analysed by groups, not by individual.

If you feel affected by issues raised by this research and would like to discuss any concerns, please contact the research team or study supervisor on the details provided below. If you feel this piece of research may have health implications for you, we advise you to contact your GP (family doctor) or Swansea University's Wellbeing services (Wellbeing Services, Horton Building, Swansea University, Singleton Park, Swansea, SA2 8PP, Tel : 01792 295592, www.swansea.ac.uk/wellbeing/). Alternatively, you can contact a Wales-wide Mental Health Helpline for support such as Mind Cymru (0300 123 3393).

Adisha Vaishya

[redacted]

Elinor Harry

[redacted]

Elli-Mae Jones

[redacted]

Jade Irvine

[redacted]

Lowri Morrison

[redacted]

Manon Nicholls

[redacted]

Sophie Hyde

[redacted]

Sunita Raina

[redacted]

Jen Pink

[redacted]

School of Psychology, Swansea University

Professor Nicola S Gray

[redacted]

School of Psychology,

Swansea University

Balanced Inventory of Desirable Responding (Hart et al., 2005)

Using the scale below as a guide, write a number beside each statement to indicate how much you agree with it.

Response scale: 1 (totally disagree) – 8 (totally agree)

Note that Paulhus has also used 5-point or 7-point scales for the long version.

____ 1. I have not always been honest with myself.

____ 2. I always know why I like things.

____ 3. It's hard for me to shut off a disturbing thought.

____ 4. I never regret my decisions.

____ 5. I sometimes lose out on things because I can't make up my mind soon enough.

____ 6. I am a completely rational person.

____ 7. I am very confident of my judgments

____ 8. I have sometimes doubted my ability as a lover.

____ 9. I sometimes tell lies if I have to.

____ 10. I never cover up my mistakes.

____ 11. There have been occasions when I have taken advantage of someone.

____ 12. I sometimes try to get even rather than forgive and forget.

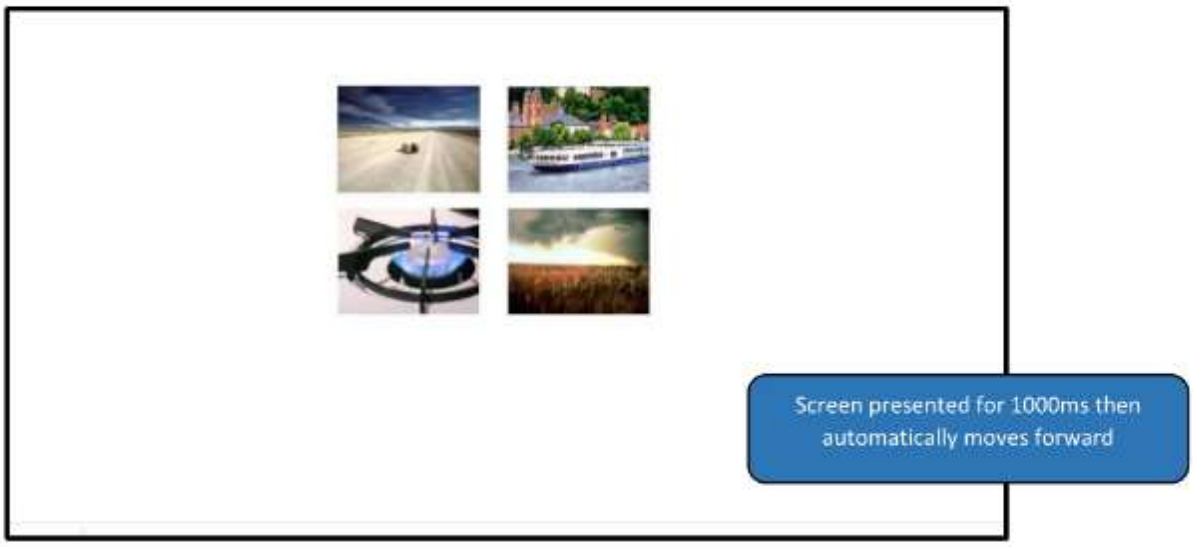
____ 13. I have said something bad about a friend behind his/her back.

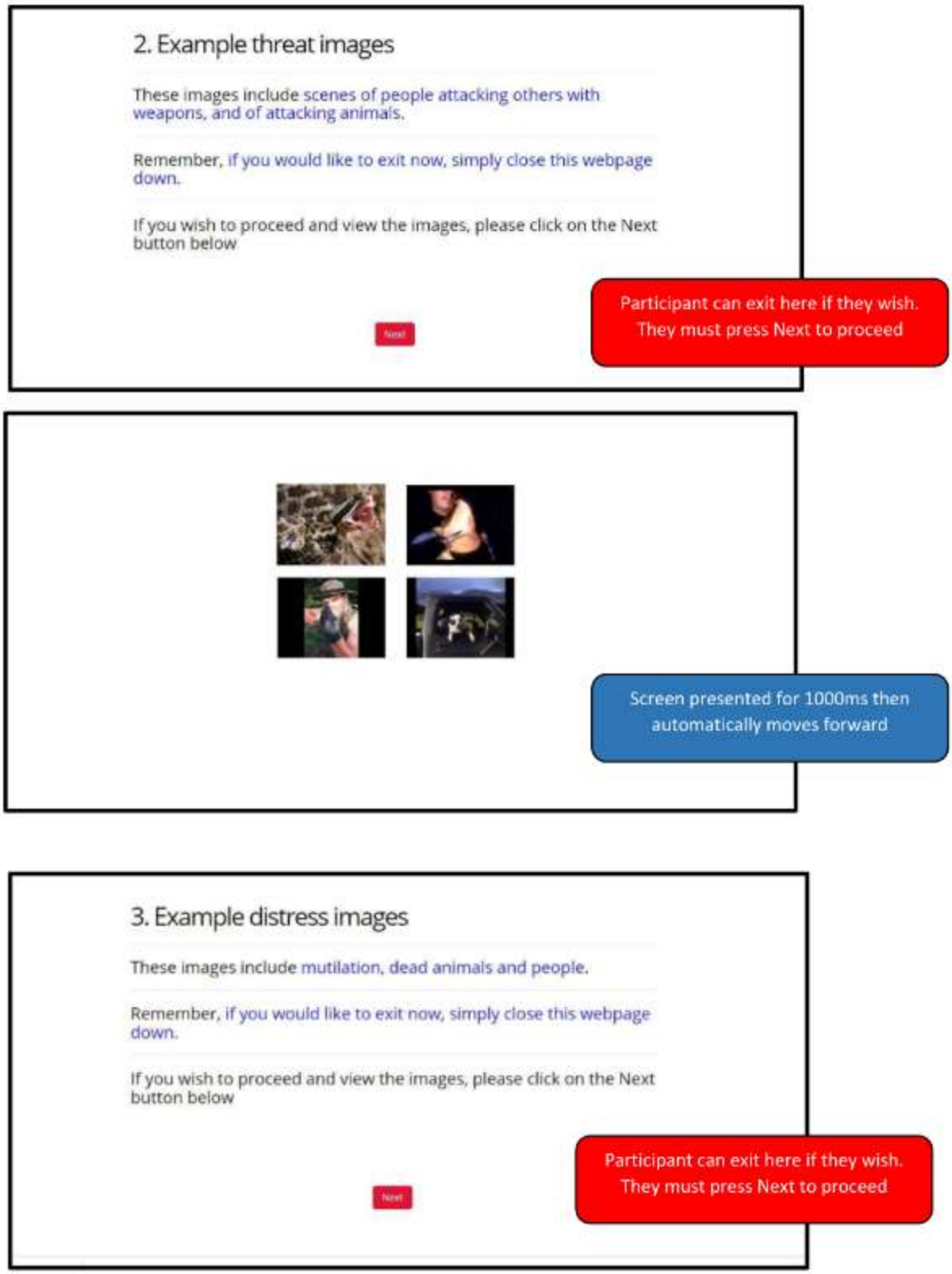
____ 14. When I hear people talking privately, I avoid listening.

____ 15. I never take things that don't belong to me.

____ 16. I don't gossip about other people's business.

Image Presentation for Consent Process




2. Example threat images
These images include scenes of people attacking others with weapons, and of attacking animals.
Remember, if you would like to exit now, simply close this webpage down.
If you wish to proceed and view the images, please click on the Next button below
Next
Participant can exit here if they wish. They must press Next to proceed
Screen presented for 1000ms then automatically moves forward
3. Example distress images
These images include mutilation, dead animals and people.
Remember, if you would like to exit now, simply close this webpage down.
If you wish to proceed and view the images, please click on the Next button below
Next
Participant can exit here if they wish. They must press Next to proceed

Screen presented for 1000ms then automatically moves forward

4. Example exciting images

These should not cause you any distress or emotion. They are images of sporting scenes (windsurfing, skiing, rock-climbing, cycling).

Remember, if you would like to exit now, simply close this webpage down.

If you wish to proceed and view the images, please click on the Next button below

Next

Participant can exit here if they wish. They must press Next to proceed

Screen presented for 1000ms then automatically moves forward

IAPS Images used in AMP Tasks

Threat IAPS Images

6230

6260

2811

6510

6250.1

6231

Threat IAPS Images

6263

6370

1120

6300

6244

1050

Threat IAPS Images

1300

1052

1932

1321

1525

1930

Threat IAPS Images

1304

1726

Distress IAPS Images

3130

3120

3001

3053

3110

3131

Distress IAPS Images

3000

3010

9410

3080

3060

3069

Distress IAPS Images

3102

3100

3064

9183

3059

3063

Distress IAPS Images

9570

9075

Example Chinese Symbols used in AMP Tasks

Appendix E: Ethical Application, Documents and Approval Letter, Chapter 6, Study 1

Please note that this application reflects a study which included a 3rd "puzzles" task and several additional measures which are not analysed within this thesis. As such, only relevant materials are included here for brevity. For a copy of the Triarchic Psychopathy Measure, please refer to Appendix A. For a copy of the Balanced Inventory of Desirable Responding, please refer to Appendix D.

3 May 2022

Dear Ms NIA HOWELL, Bhavi Gohil, Rhys John, Jennifer Pink, , Professor Nicola Gray,

Re: 5426 , Disinhibition of Psychopathy

Your application - https://swansea.forms.ethicalreviewmanager.com/ProjectView/Index/5426 - has been reviewed and approved by the Department of Psychology Ethics Committee.

The list of additional students (if any) are included in the table below:

Other student applicant - first name	Other student applicant - Surname	Other student applicant - email
Bhavi	Gohil	[redacted]
Rhys	John	
Jennifer	Pink	

additional researcher or student - first name	additional researcher or student - surname	additional researcher or student - email

The conditions of this approval are as follows:

1. To conduct your study strictly in accordance with the proposal that has been approved by the committee, including any approved amendments
2. To advise the ethics committee chair of any complaints or other issues that may warrant ethical review of the project
3. To submit for approval any changes to the approved protocol before implementing any such changes
4. To keep any information obtained from your participants absolutely confidential

Please note that failure to comply with these conditions of approval may result in the withdrawal of approval for the project.

To advertise your study on the departmental Participant Pool: You will need to send send a request for your study to be made visible, via the link on the Experiment Management System website (see Researcher Documentation for details). Please ensure that you attach this letter to your request. (If you are unable to attach the Ethics approval, send it in a separate email to Dr. Phil Tucker [redacted].

For students: Please ensure that the signed copy of this Ethical Approval, together with any other paperwork associated with your research, is included in your final write up.

Yours Sincerely,

Dr Jodie Davies-Thompson (Reviewer of Application)

Dr Menna Price (Committee Chair)

Security information

Data Protection Privacy Notice

You are logged into the Ethical Review Manager (ERM), the system provided by Infonetica Ltd that will process the application on behalf of Swansea University. Your contact details will be stored by Infonetica Ltd and used by the University for the purpose of managing your application for ethics review.

Please be mindful that each application, submitted via the University's Ethical Review Manager (ERM), costs the University money due to the number of people required to process, review and approve your application, many of whom are senior academics within the University. Please respect this fact and ensure that you carefully follow the guidance provided to complete your application appropriately (and choose the correct route of ethical review).

Please do not proceed unless you are content to comply with this.

The data controller is Swansea University and the legal basis on which this task is being performed is public interest. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and may be contacted using [redacted]

Filter

Does your application require NHS research ethics approval?

- ○ Yes
- ◉ No

Are you a member of the CHHS?

- ◉ Yes
- ○ No

Which department are you from?

Psychology

Project Title

Short project title [This could be an acronym.]

Implicit Measures of Personality

Long project title

Implicit Measures of Personality and their Associations with Behaviours

What is the location of the proposed research?

- ☐ Swansea University
- ☐ Other University
- ☐ Hospital
- ☐ School
- ☑ Other

What is the location other than Swansea University?

Online via Gorilla platform

What is the proposed start date for your project?

20/03/2022

What is the estimated project completion date?

30/09/2022

Is this student or staff research?

MSc - Abnormal and Clinical Psychology

Applicant

Name of Applicant

Title	First Name	Surname
Ms	NIA	HOWELL

Email [redacted]

Should any other student be listed on this application?

- (•) Yes
- ( ) No

Title	First Name	Surname
	Bhavi	Gohil

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Rhys	John

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Title	First Name	Surname
	Jennifer	Pink

Email [redacted]

Please ensure that a signature is added to this form (in Signature Section)

Supervisor

Title	First Name	Surname
Professor	Nicola	Gray

Email [redacted]

Risk Assessment

Does the research fall under ANY of the following categories? [Click all that apply]

- ☐ Interventions and therapies, including clinical and non-clinical trials
- ☐ Collection of bodily fluids such as blood, saliva etc
- ☐ Research on children
- ☐ People highly dependent on medical care who may be unable to give consent
- ☐ People with a cognitive impairment, intellectual disability, or a mental illness
- ☐ Topics that may cause distress to participants due to past traumatic experiences
- ☐ Limited disclosure involving active concealment and/or planned deception
- ☐ Study or exposure of illegal activity, or research that is likely to discover illegal activity
- ☐ Research that could jeopardize a participant's employment
- ☐ Research that involves travel overseas
- ☐ Research that poses a risk to the physical or emotional safety or welfare of a Swansea University student researcher

- ☑ None of the above

Methods

Click all methods that apply:

- ☑ Computer-based testing
- ☐ Secondary-data analysis
- ☐ Observational methods
- ☑ Research on the internet
- ☐ Interviews
- ☑ Questionnaire-based methods
- ☐ Neuroimaging (MRI, PET etc)
- ☐ Psychophysiology (EEG, ERPs etc)
- ☐ tDCS
- ☐ Human tissue collection

Briefly (max 200 words) describe the research you wish to undertake: Include study rationale, main theoretical constructs, and hypotheses. Please use non-technical language wherever possible.

The primary aim of the study is to develop a series of experimental tasks to serve as behavioural measures for disinhibition, one of the three domains of triarchic psychopathy (Patrick et al., 2009). Two Stroop tests (Stroop, 1935) will be developed, one conventional and the other with the colour-word and colour separated in space (see Hiatt, 2004). Additionally, a Go/No-Go task (similar to Albert et al., 2019) and a visual puzzle solving task will be developed. The study will assess the association of performance on these tasks with scores on the Triarchic Psychopathy Measure (TriPM; Patrick, 2010), the self-report measure of the triarchic model of psychopathy, and in particular the disinhibition scale. We will also include a measure of Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003).

It is hypothesised that higher TriPM disinhibition scores will be associated with greater commission errors on the Go/No Go task in line with previous research (e.g., Lapierre, Braun & Hodgins, 1995). On the visual puzzle task, it is hypothesised that those with higher disinhibition scores will respond more quickly and with less accuracy (showing classic impulsive responses). It is predicted that there will be a greater Stroop interference on the conventional Stroop task for those higher in disinhibition when compared to those lower in disinhibition (see Young et al., 2009). Conversely, it is hypothesised that there will be no difference in interference between those lower and higher in disinhibition for the separated Stroop task.

The study will also explore the relationship between performance on the experimental tasks and an explicit measure of borderline personality disorder (BPD). Some research suggests that features of psychopathy in men may be associated with BPD in women (Hicks, Vaidyanathan, & Patrick, 2010) and we aim to investigate the parallels between the two personality disorders in terms of disinhibition and impulsive behaviour.

What is your research design? What variables will be manipulated or measured?

This study is a within-subjects correlational design. All participants will complete each of the three tasks (Stroop, Puzzles, Go/No-Go). They will all complete the following self report measures:

A: Triarchic Psychopathy Measure (TriPM; Patrick, 2010) – psychopathy traits
B: UPPS-P Impulsive Behavior Scale (UPPS-P; Cyders et al., 2014) – impulsivity
C: Balanced Inventory of Desirable Responding Short Form (BIDR-16, Hart et al., 2015) – impression management and self-deception
D: McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003) – borderline personality traits
E: Jackson-5 (Jackson, 2009) – aggressive behaviours, which are associated with psychopathy

No variables will be manipulated. The dependent variables are listed below:

1. Performance on the Stroop Task
- Interference indexed by incorrect responses and speed of response as indexed by reaction times on trials

2. Scores on the Go-No-Go task:
-The Go-No-Go task will measure the levels of impulsivity in participants. This will be determined by the number of omission and commission errors for the Go- No-Go stimuli and reaction time on trials.

3. Performance on the puzzles task:
- Planning time to select solution
- Action time to complete solution
- Number of incorrect (2-piece rather than target 3-piece) solutions given – termed 'jump to the wrong solution'.

4. Scores on the self-report measures listed above.

References:
Cyders, M. A., Littlefield, A. K., Coffey, S., & Karyadi, K. A. (2014). Examination of a short English version of the UPPS-P Impulsive Behavior Scale. Addictive behaviors, 39(9), 1372-1376.
Hart, C. M., Ritchie, T. D., Hepper, E. G., & Gebauer, J. E. (2015). The balanced inventory of desirable responding short form (BIDR-16). Sage Open, 5(4), 2158244015621113.
Jackson, C. J. (2009). Jackson-5 scales of revised Reinforcement Sensitivity Theory (r-RST) and their application to dysfunctional real world outcomes. Journal of Research in Personality, 43(4), 556-569.
Patrick, C. (2010) Triarchic psychopathy measure (TriPM). PhenX Toolkit Online assessment catalogue
Zanarini, M. C., Vujanovic, A. A., Parachini, E. A., Boulanger, J. L., Frankenburg, F. R., & Hennen, J. (2003). A screening measure for BPD: The McLean screening instrument for borderline personality disorder (MSI-BPD). Journal of personality disorders, 17(6), 568-573.

What procedures will be carried out on the participants? What will happen to your participants?

All data will be collected online using the Gorilla.sc platform.

Participants will be presented onscreen with a Participant Information Sheet (Appendix 1) to read which sets out the aims of the study. If they are happy with its content they will click a Next button. They will be presented with an onscreen Consent Form (Appendix 2) for them to either consent to take part or exit the study at this point. It will be made clear to participants that they have the right to withdraw their participation in the study at any time, without penalty or the need to justify their decision.

Before participants begin the study, they will be asked for demographic information (Appendix 3).

Participants will then complete the three experimental tasks in a counterbalanced order. The Go/No-Go task comprises a series of trials where participants need to either press the space bar or refrain from pressing the space bar in response to certain letters appearing on screen in certain locations (M, N, W). This version of the classic Stroop task comprises a series of trials with the words PINK and BLUE presented in either pink or blue font. The separated Stroop task comprises trials with the words PINK and BLUE presented in grey font with either a pink or blue colour border. The puzzles task is a series of 24 puzzles, presented over 2 blocks of 12 trials. Participants will be presented with a shape at the top of the screen and asked to select three puzzle pieces from six options, to make the top shape. Examples of several puzzle trials are given in Appendix 4.

Once participants have completed the tasks, they will be asked to fill in each of the questionnaires. First will be the TriPM (Appendix 5), then the MSI-BPD (Appendix 6), then the UPPS-P (Appendix 7), the BIDR-16 (Appendix 8) and the Jackson-5 (Appendix 9).

After completion of these outcome measures participants will be thanked for taking part in the research before reading a Debrief Form (Appendix 10) that details the study aims. They will then be reminded that their information is anonymous and will remain anonymous. Participants will be given contact details of the support services available to them should the need arise. If they are community-based participants they will be given the opportunity to enter their email on this screen to take part in a prize draw to win one of 4 x £25 vouchers. Student participants via participant pool will receive 3 credits (the anticipated length of the study is a maximum of 45 minutes).

The study will be advertised via email (Appendix 11), social media (Appendix 12) and posters (Appendix 13).

Please indicate which of the following will be used for storing data:

- ☐ Manual files (e.g. paper documents or X-rays)
- ☑ Home or other personal computer
- ☑ University computer
- ☐ Private company or work-based computer
- ☑ Laptop computer
- ☐ Other

Please explain how files on your home or personal computer will be secured:

Data will be stored in a password-protected file. The computer which stores this data will be password-protected too.

Please explain how files on your university computer will be secured:

Data will be stored in a password-protected file. The computer which stores this data will be password-protected too.

Please explain how files on your laptop computer will be secured:

Data will be stored in a password-protected file. The computer which stores this data will be password-protected too.

Risks to participants

What potential risks to the participants do you foresee and how do you propose to ameliorate/deal with potential risks?

No potential risks will be imposed on any individual undertaking the experiment. All participants will be given a unique number with no trace to their identity. Participants will be informed that their data will be stored in a password-protected document and will only be accessed by the researchers as well as the supervisor. Nobody else will have access to this password.

Should the topic of the experiment elicit any negative feelings, all participants will be informed that they do not need to answer any questions which make them feel uncomfortable. Participants will also be told that they are able to withdraw from the study at any time with no explanation.

When participants are presented with the onscreen debrief sheet, they will be provided with the contact details for the researchers and their supervisor, should they like to discuss anything involved within the study or any concerns they would like to address. They will also be given links to support services available, including Wellbeing@campuslife, details for the Mind Cymru mental health helpline (0300 123 3393) and directed to their local GP if required.

Participants will be informed that their data will be stored anonymously, and each individual's information will be referred to as a unique number so once data has been collected, participants will be anonymous to the researcher and cannot be deleted as the researchers will be unable to detect which data associates with each participant.

Will participants be informed of the right to withdraw without penalty?

- [x] Yes
- [ ] No

Do you have doubts about participants' abilities to give informed consent?

- [ ] Yes
- [x] No

How do you propose to ensure participants' confidentiality and anonymity?

Confidentiality and anonymity will be ensured as no identifying information will be collected from participants. Only demographic information of age, gender, ethnicity, fluency in English and highest educational achievement will be collected. This information will be kept confidential. From the commencement of the study, each participant will be given an alphanumeric code which relates to their data and throughout the whole of the experiment, they will be referred to by their code. All questionnaires and documents completed within the experiment will be stored away in a password-protected document. They will only be accessed by the researchers and their supervisor.

How will you ensure that participants will not be coerced to participate in your study?

All participants will be presented with an onscreen information sheet which explains the purposes and aims of the study and what is required of them to do. Participants will also be informed that they do not have to take part in the study if they don't want to. Participants will be told that they can withdraw from the study at any point without any explanation or justification.

Risks to researchers

What potential risks to the interests of the researchers do you foresee and how will you ameliorate/deal with potential risks?

No potential risks to the researchers are predicted.

If the participants would like to discuss any information in the experiment that they found sensitive, they will be advised to use the supportive services provided to them where these matters can be addressed. The supervisor has completed previous studies which are similar in the past and these sources of support have been provided with each online study. Contact details of the students and supervisor are also provided at the beginning and end of the study should participants need them.

Participants

What is your estimated sample size, and how was this size determined?

N=400.

To calculate the required sample size, we assumed an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%), which revealed a sample of N=160 per group (men and women).

In order to account for drop-outs, which in previous online experiments have been approximately 20%, we will gather a sample of 200 people per gender group.

As we require both a male and female group this equals 2 x 200 = 400 participants.

Will any participant be under the age of 18?

- ☐ Yes
- ☑ No

Describe your participants: give the age range, gender, inclusion and exclusion criteria, and any particular characteristics pertinent to the research project.

Participants will be a minimum age of 18 and will need to be fluent English language speakers due to the English-language questionnaires used. There are no gender exclusions. Participants will be those in the general population as well as students, including those from Swansea University.

How will the participants be selected and recruited?

- ☑ Department's electronic subject pool
- ☑ University population
- ☑ General public
- ☐ Other

Will payments or subject pool credits be made to participants?

- ☑ Yes
- ☐ No

Please specify quantities involved. Please ensure payment or credits awarded do not represent an inducement to participate in your study:

The task is estimated to take 45 minutes to complete. Participants from Swansea University participant pool will receive 3 credits, and community participants will have the option to be entered into a prize draw for a chance to win a £25 shopping voucher.

Documents

Will you be providing participants with a Participant Information Sheet?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Information Sheet. [Please base your P.I.S. on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 1 Participant Information Sheet -6April2022	Appendix 1 Participant Information Sheet -6April2022.docx	13/04/2022	1	50.7 KB

Will written informed consent be sought from participants?

- [x] Yes
- [ ] No

Please upload a copy of your Participant Consent Form. [Please base your consent form on the standard template; see the help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 2I Consent Form -6April2022	Appendix 2I Consent Form -6April2022.docx	13/04/2022	1	18.9 KB

How will you advertise your study?

- [x] Email
- [x] Poster
- [x] Social media
- [ ] Other
- [ ] I won't be advertising my study

Please upload a copy of your email based on the standard template. [See help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 11 Email Advertisement V2	Appendix 11 Email Advertisement V2.docx	27/04/2022	2	16.9 KB

Please upload a copy of your poster based on the standard template. [See help popup for more information.]

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 13 Poster Advertisement	Appendix 13 Poster Advertisement.pdf	27/04/2022	2	6.5 MB

Please upload a copy of your advertisement for social media.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 12 Social Media Advertisement	Appendix 12 Social Media Advertisement.docx	27/04/2022	2	3.0 MB

Will you be providing participants with a debrief statement?

- [x] Yes
- [ ] No

Please attach a copy of your debrief statement that will be given to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Debrief Statement	Appendix 10 Debrief Form -6April2022	Appendix 10 Debrief Form -6April2022.docx	13/04/2022	1	114.3 KB

Please upload all questionnaires that you intend on distributing to participants:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 3 Demographics Form	Appendix 3 Demographics Form.docx	13/04/2022	1	261.4 KB
Default	Appendix 5 - Triarchic Psychopathy Measure	Appendix 5 - Triarchic Psychopathy Measure.pdf	13/04/2022	1	43.3 KB
Default	Appendix 6 - McLean Screening Instrument Borderline Personality Disorder	Appendix 6 - McLean Screening Instrument Borderline Personality Disorder.docx	13/04/2022	1	14.0 KB
Default	Appendix 7 - UPPS-P Short Form Cyders et al	Appendix 7 - UPPS-P Short Form Cyders et al.pdf	13/04/2022	1	206.9 KB
Default	Appendix 8 - Balanced Inventory of Desirable Reporting Measure Hart 2015	Appendix 8 - Balanced Inventory of Desirable Reporting Measure Hart 2015.doc	13/04/2022	1	26.0 KB
Default	Appendix 9 - Jackson-5 Measure	Appendix 9 - Jackson-5 Measure.docx	13/04/2022	1	15.3 KB

If necessary, please upload any additional documents to support your application:

Documents

Type	Document Name	File Name	Version Date	Version	Size
Default	Appendix 4 Example Puzzle Trials	Appendix 4 Example Puzzle Trials.docx	13/04/2022	1	414.1 KB

User Experience Survey

Please rate your experience of using this system:

- [x] Positive
- [ ] Neutral
- [ ] Negative

The framework through which your ethics application is submitted and processed will cost the university a moderate annual fee. In your experience of using the system, do you request that the college and / or university continue to use this system?

- [x] Yes
- [ ] Undecided
- [ ] No

If you have any further comments to make on this system, please add them to the text box below. If you have no comment to make, please simply add "N/A" to the text box:

N/A

Applicant

Applicants signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by MISS BHAVI GOHIL ([redacted] on 28/04/2022 14:03

Co-applicants

Co-applicants signature [i.e. additional student]

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my knowledge
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by MRS JENNIFER PINK ([redacted]) on 27/04/2022 14:27

Supervisor

Supervisors signature

By signing below, I certify that:

- The answers to the questions given above are true and accurate to the best of my ability
- No participant will suffer any undue physical or psychological discomfort (unless specified and justified in methodology)

Signed: This form was signed by PROF Nicola Gray ([redacted]) on 29/04/2022 11:16

Participant Information Sheet

Personality Traits and Behaviour

April 2022

You are being invited to take part in some research. Before you decide whether or not to participate, it is important for you to understand why the research is being conducted and what it will involve. Please read the following information carefully.

What is the purpose of the research?

We are conducting research to determine if there is a relationship between different personality traits and behaviours. The study will use explicit methods (questionnaires) to measure personality traits and experimental tasks (reaction time tasks and puzzles) to measure behaviours. Only participants who are fluent in English may take part in the research, due to the English-language questionnaires used in the study. Participants must also be 18 or over to take part. Please ensure that you are completing this on a laptop or desktop computer (not a smart phone or a tablet). You should be in a quiet place without any distractions for the entire duration of the study. Distractions may affect your reaction time and results.

Who is carrying out the research?

The data is being collected by Bhavi Gohil, Nia Howell, Rhys John and Jennifer Pink under the supervision of Professor Nicola Gray, from the School of Psychology within the Faculty of Medicine, Health and Life Sciences at Swansea University. The research has been approved by the Faculty of Medicine, Health and Life Sciences Ethics Committee.

What happens if I agree to take part?

Firstly, we will ask you for some information about you, including your age, gender, ethnicity, and level of education. Next we will need you to complete three behavioural tasks and complete a series of questionnaires about your emotions, personality and behaviour.

The whole experiment will take a total of 45 minutes. Only the supervisors and researchers of this experiment will have access to the information and data of this study. Everything will be kept confidential and anonymous.

Are there any risks associated with taking part?

There are some topics included within the questionnaires (e.g., aggressive behaviours, self-harm and suicide) that may be sensitive for some people. Therefore, participation should be considered carefully. The research has been approved by the Faculty of Medicine, Health and Life Sciences Ethics Committee.

Data Protection and Confidentiality

Your data will be processed in accordance with the Data Protection Act 2018 and the General Data Protection Regulation 2016 (GDPR). All information collected about you will be kept strictly confidential. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file. The data we will collect for our study will be made

anonymous at the start of the research. The data controller for this project will be Swansea University.

What will happen to the information I provide?

An analysis of the information will form part of our report at the end of the study and may be presented to interested parties and published in scientific journals and related media. Note that all information presented in any reports or publications will be anonymous and unidentifiable.

Is participation voluntary and what if I wish to later withdraw?

Your participation is entirely voluntary – you do not have to participate if you do not want to. Please note that the data we will collect for our study will be made anonymous at the start of the research; thus, it will not be possible to identify and remove your data at a later date, should you decide to withdraw from the study. Therefore, if at the end of this research, you decide to have your data withdrawn, please let us know before you leave the webpage.

Data Protection Privacy Notice

The data controller for this project will be Swansea University. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and can be contacted at the Vice Chancellors Office. Your personal data will be processed for the purposes outlined in this information sheet. Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you online. The legal basis that we will rely on to process your personal data will be processing is necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the School of Psychology and the Faculty of Medicine, Health and Life Sciences Ethics Committee, Swansea University. The legal basis that we will rely on to process special categories of data will be processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will your information be held?

Data will be preserved and accessible for a minimum of 10 years after completion of the research. Records from studies with major health, clinical, social, environmental or heritage importance, novel intervention, or studies which are on-going or controversial should be retained for at least 20 years after completion of the study. It may be appropriate to keep such study data permanently within the university, a national collection, or as required by the funder's data policy. The supervisor will take responsibility for data destruction, and all collected identifiable data will be destroyed on or after September 2032 as it is a requirement of Swansea University Research Integrity Framework on Research Ethics and Governance that data should be kept for a minimum of ten years.

What are your rights?

You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights. Any requests or objections should be made in writing to the University Data Protection Officer: University Compliance Officer (FOI/DP), Vice-Chancellor's Office, Swansea University, Singleton Park, Swansea, SA2 8PP. Email: dataprotection@swansea.ac.uk.

How to make a complaint

If you are unhappy with the way in which your personal data has been processed, you may in the first instance contact the University Data Protection Officer using the contact details above. If you remain dissatisfied, then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF; www.ico.org.uk.

What if I have other questions?

If you have further questions about this study, please do not hesitate to contact us:

Bhavi Gohil

[redacted]

Nia Howell

[redacted]

Rhys John

[redacted]

Jen Pink

[redacted]

School of Psychology,

Swansea University

Professor Nicola Gray

[redacted]

School of Psychology, Swansea University

Participant Consent Form

Personality Traits and Behaviour

April 2022

Please read and check the box for each of the consent statements below

I (the participant) confirm that I have read and understand the information sheet for the above study (dated April 2022) that was previously shown to me.☐

I understand that my participation is voluntary and that I am free to withdraw at any time and leave this research website, without giving any reasons. I understand that the data will be made anonymous at the start of the research; thus, it will not be possible to identify and remove my data at a later date, should I decide to withdraw from the study. Therefore, if at the end of this research, I decide to withdraw, I will let the researchers know before I leave the webpage. ☐

I understand what my role will be in this research, and I understand who to contact if I have any questions. ☐

I have been informed that the information I provide will be safeguarded. ☐

I am happy for the information I provide to be used (anonymously) in academic papers and other formal research outputs. ☐

I have read and understand the Participant Information Sheet. ☐

I agree to the researchers processing my personal data in accordance with the aims of the study described in the Participant Information Sheet. ☐

I confirm that I am aged 18 or over. ☐

If you agree to all these statements, and want to continue with the research, please select YES below.

If you do not want to continue, please select NO

- Yes
- No

This study is being conducted by Swansea University, Faculty of Medicine, Health and Life Sciences

Principle Researchers:

Bhavi Gohil

[redacted]

Nia Howell

[redacted]

Rhys John

[redacted]

Jen Pink

[redacted]

School of Psychology, Swansea University

Project Supervisor:

Professor Nicola S Gray - [redacted]

School of Psychology, Swansea University

Recruitment Email for Participants

How impulsive are you?

If you are 18+ and fluent in English, please consider taking part in our online research study. We are investigating ways of measuring impulsivity.

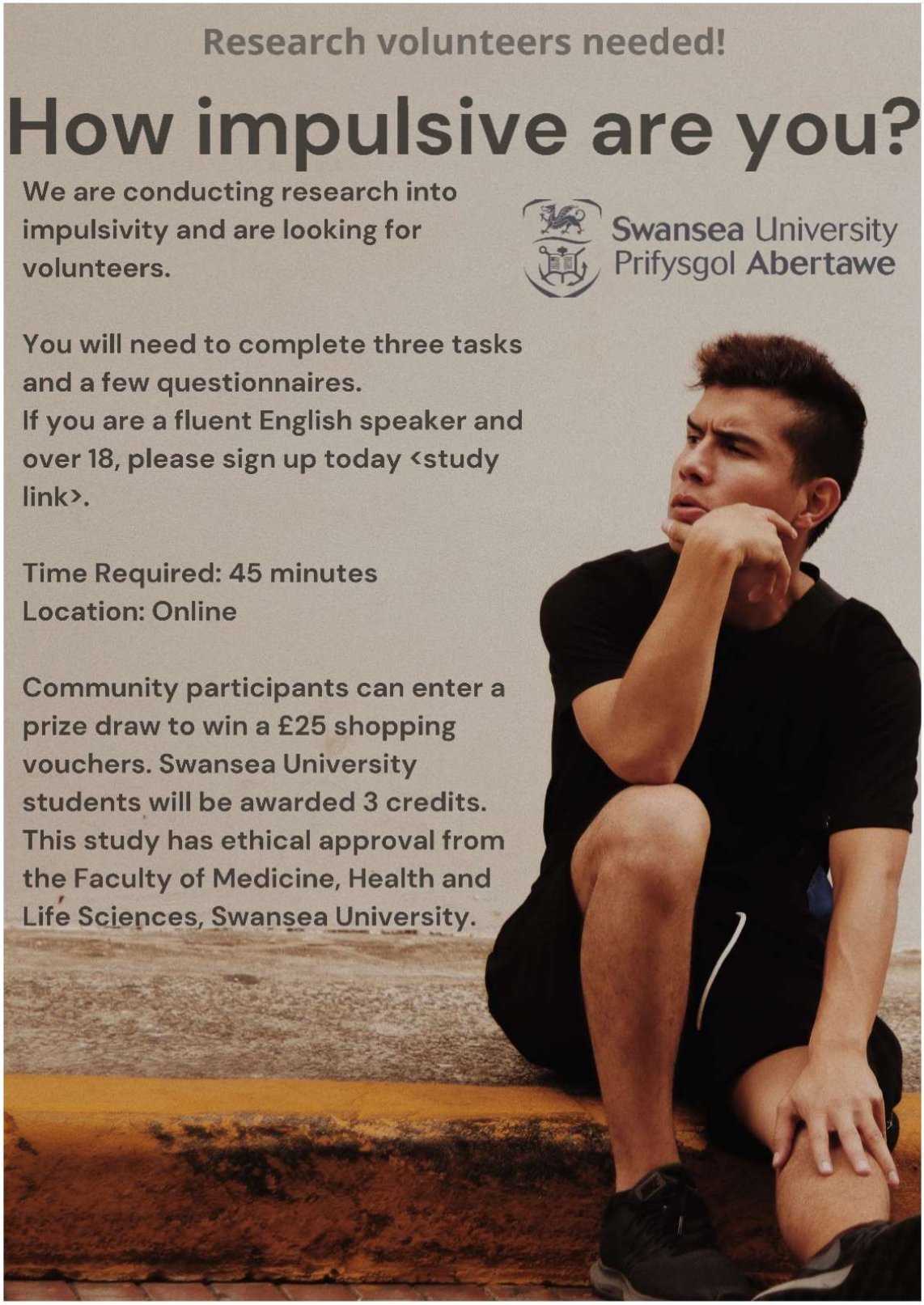
To participate, click on the link from your laptop/desktop computer (no phones/tablets) <<STUDY LINK>>.

You will be asked to complete a series of questionnaires along with three different behavioural tasks, this will take approximately 45 minutes. Swansea University Participant Pool students will be awarded 3 credits. All other participants can be entered into a prize draw to win one of four £25 Amazon gift cards.

If you have any questions, please contact <<Student Name>> (<<Studentemail@swansea.ac.uk>).

This study has ethical approval from the Faculty of Medicine, Health and Life Sciences, Swansea University.

Recruitment Poster for Participants



Social Media Participant Recruitment Adverts

Each of the social media adverts will comprise the following text in the post (typed into Facebook/Instagram/Twitter) accompanied by one of the 3 advert images below.

How impulsive are you? If you are age 18+ and fluent in English, take part in our research about impulsivity. You could win one of four £25 shopping vouchers! Click the following link from a laptop or computer (no tablets/phones) to participate **<<link>>**.

Study takes approx. 45 minutes. Swansea University students will be awarded 3 credits.

Contact <<student name>> (studentemail@swansea.ac.uk) with any questions. #participate #research #forensic #psychology #swansea


How Impulsive Are You?
TAKE PART IN OUR ONLINE STUDY
Swansea University
Prifysgol Abertawe


How Impulsive Are You?
TAKE PART IN OUR ONLINE STUDY
Swansea University
Prifysgol Abertawe

Participant Debrief Form

Personality Traits and Behaviour
April 2022

Thank you for taking part in our research. Now that you have completed the study, we will explain the rationale behind this work.

You have completed an several behavioural tasks which were designed to measure levels of impulsivity. You have also completed questionnaires which have captured a range of related personality traits and behaviours (e.g. reactions of flight, fight or fear to threat).

This research has aimed to examine whether any of these tasks might serve as behavioural measures of impulsivity, and to assess how the performance on these tasks relates to different personality traits.

Data collected for the study will be used to develop implicit tests of personality traits and to evaluate if this can be done reliably. All data is anonymous and will be retained for 10 years. Data will only be analysed by groups, not by individual.

If you feel affected by issues raised by this research and would like to discuss any concerns, please contact the research team or study supervisor on the details provided below. If you feel this piece of research may have health implications for you, we advise you to contact your GP (family doctor) or Swansea University's Wellbeing services (Wellbeing Services, Horton Building, Swansea University, Singleton Park, Swansea, SA2 8PP, Tel : 01792 295592, www.swansea.ac.uk/wellbeing/). Alternatively, you can contact a Wales-wide Mental Health Helpline for support such as Mind Cymru (0300 123 3393).

Bhavi Gohil
[redacted]
Nia Howell
[redacted]
Rhys John
[redacted]
Jen Pink
[redacted]
School of Psychology, Swansea University

Professor Nicola S Gray
[redacted]
School of Psychology, Swansea University

Demographics Questionnaire

1. What is your age?

2. Are you fluent in English?

Yes

No

3. Please select your gender:

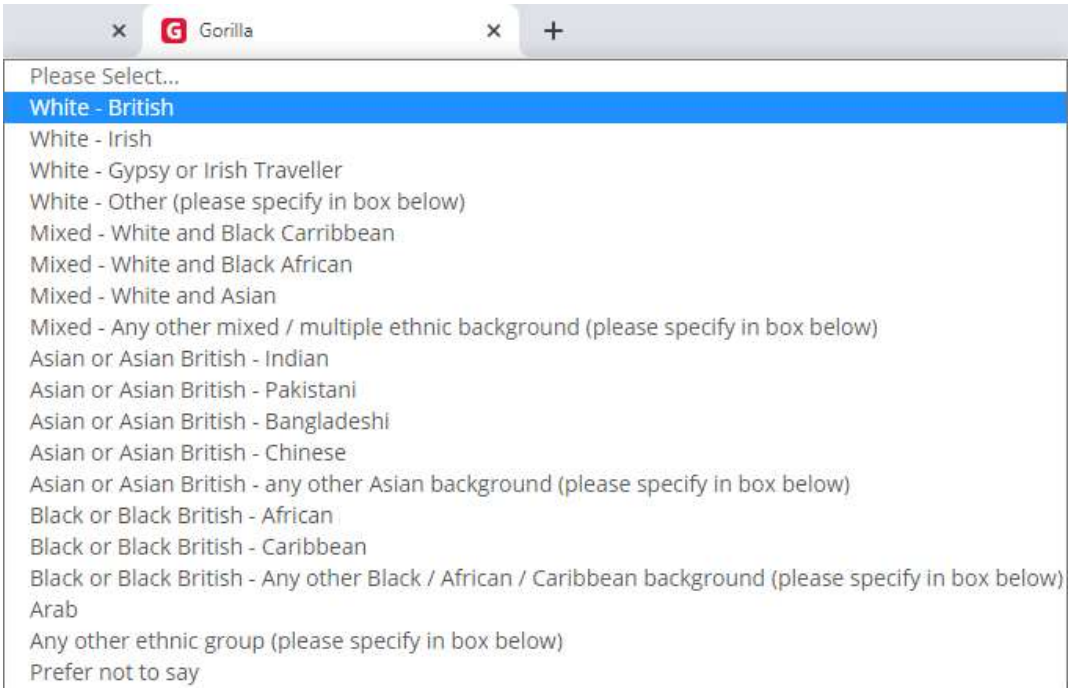
Male

Female

Other

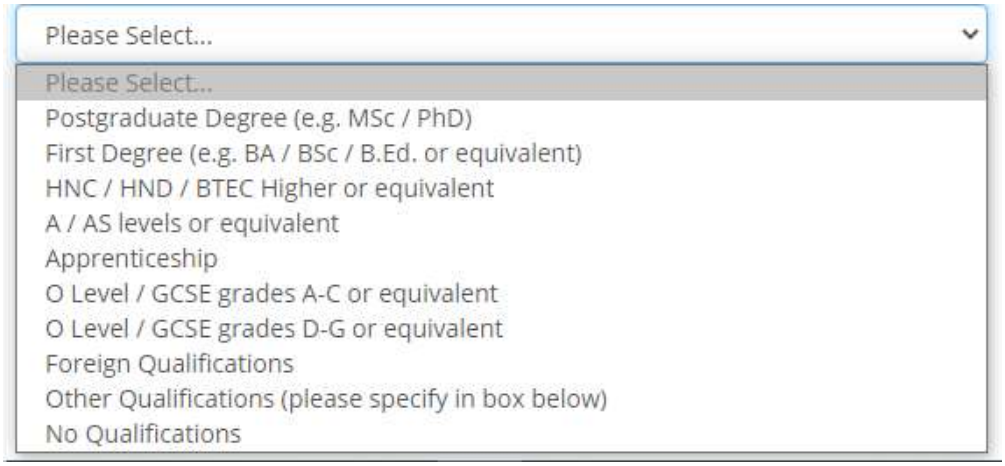
Prefer not to say

4. What is your ethnicity?



Other ethnic group - please specify if you wish

5. What is your highest formal qualification?



Other qualifications - please specify if you are happy to

Appendix F: Ethical Application, Documents and Approval Letter, Chapter 7

Please note that this application reflects a larger study, including an Emotional Attentional Blink task (EAB) alongside the Implicit Association Tests (IATs) from Chapter 3. Due to technical issues, it was not possible to deliver the EAB. The results of the Attentional Blink only did not merit exploration with the IATs. As only an Attentional Blink task was used, only the materials for this are included here. For a copy of the Triarchic Psychopathy Measure, please refer to Appendix A.

Swansea University
Prifysgol Abertawe

Approval Date: 15/08/2023

Research Ethics Approval Number: 1 2023 5998 6368

Thank you for completing a research ethics application for ethical approval and submitting the required documentation via the online platform.

Project Title	Psychopathy and the Attentional Blink
Applicant name	MRS JENNIFER PINK
Submitted by	MRS JENNIFER PINK /
Full application form link	https://swansea.forms.ethicalreviewmanager.com/Project/Index/9021

The Psychology ethics committee has approved the ethics application, subject to the conditions outlined below:

Approval conditions

1. The approval is based on the information given within the application and the work will be conducted in line with this. It is the responsibility of the applicant to ensure all relevant external and internal regulations, policies, and legislations are met.
2. This project may be subject to periodic review by the committee. The approval may be suspended or revoked at any time if there has been a breach of conditions.
3. Any substantial amendments to the approved proposal will be submitted to the ethics committee prior to implementing any such changes.

Specific conditions in respect of this application:

The application has been classified as Low Risk to the University.

No additional conditions.

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees. It complies with the guidelines of UKRI and the concordat to support Research Integrity.

Psychology Research and Ethics Chair

Swansea University.

If you have any queries regarding this notification, then please contact your research ethics administrator for the faculty.

- For Science and Engineering contact FSE-Ethics@swansea.ac.uk
- For Medicine, Health and Life Science contact FMHLS-Ethics@swansea.ac.uk
- For Humanities and Social Sciences contact FHSS-Ethics@swansea.ac.uk

Welcome

Welcome to the University Ethical Review Manager. The system is provided by Infonetica Ltd. who will process and store your contact details and responses for use by the University in managing and approving your application for ethics review. You can view the terms and conditions for use and the Privacy statement for Infonetica here. Infonetica is a data processor for the purposes of the UK GDPR, processing personal data on behalf of Swansea University. This relationship is managed in line with the University's obligations outlined in Article 28 of the UK GDPR. The system is designed to provide a platform for the ethical review of research projects undertaken by Swansea University staff and students.

Research ethics system statement.

Please be mindful that each application, submitted via the system, uses considerable resources for the University, due to the number of people required to process, review, and approve your application. Please respect this fact and ensure that you carefully follow the guidance provided to complete your application appropriately. In case of any queries, students should, in the first instance, contact their supervisors; staff should, in the first instance, contact their Faculty Ethics Administrator.

Science and Engineering email FSE-Ethics@swansea.ac.uk

Medicine, Health and Life Science email FMHLS-Ethics@swansea.ac.uk

Humanities and Social Sciences email FHSS-Ethics@swansea.ac.uk

Non-Faculty enquiries email researchintegrity@swansea.ac.uk

We expect you to adhere to all relevant University policies and especially our values of caring, professionalism, and working together with trust and respect.

Please do not proceed unless you are content to comply with this statement.

The data controller is Swansea University and the legal basis on which this task is being performed is public interest. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and may be contacted using dataprotection@swansea.ac.uk. Information is available here.

Health and Safety is outside of the remit of research ethics. However, it is important for you to follow the guidance of the health and safety department and to complete any necessary risk assessments required for your research. See guidance here

Research Integrity

We hope you have read the Information on Research Integrity; see the link here, especially the policy document from Page 9 onwards.

If you are not familiar with the guidelines, rules and regulations governing research integrity, ethics, and governance, please **STOP** and **read it** and then continue with your application.

Training available

The University provides training and advice on Research Ethics.

Please refer to the training and advice on the intranet.

Training and advice - Swansea University

Let's get started…

Once you have completed your details, including the project description, you will be presented with a series of questions.

Once you have completed the questions, click 'submit' and your application will be complete.

IMPORTANT before proceeding

NHS

If you are working with the NHS (including nursing homes) involving patients, drugs, medical devices, ionising radiation, or social care then please check the NHS Ethics approval toolkit and student research toolkit to see if you need to complete an application with the NHS.

NHS toolkit - Do I need NHS Ethics approval?

Student research Toolkit

Student research - Health Research Authority (hra.nhs.uk)

You may not need to undertake a Swansea University Ethics review if you are required to complete an online NHS Ethics approval.

Human Samples

If you are storing purchased or collected relevant material under the Human Tissue Act then you need to check if you require either an NHS ethics review or a Swansea University Ethics review and approval to store the samples under the University Human Tissue Authority (HTA) licence.

Please use the decision tree here

For Human Tissue Act enquiries, process or licence applications please contact the HTA Governance Officer

or check out the website

Note: You can store HTA samples if you have NHS approval but would still need to apply for storage space.

Ministry of Defence

If you are working with the MoD, they have their own ethics review. Please use their system to gain your ethics approval.

Ministry of Defence Research Ethics Committee - GOV.UK (www.gov.uk)

If you are undertaking a review with the MoD, you do not need to undertake the SU Ethical review.

1.1 Main Applicant

Main Applicant

Title

MRS

First Name

JENNIFER

Surname

PINK

Email

[redacted]

Student ID

[redacted]

1.1.2. Faculty / Service

Medicine, Health and Life Science

1.1.3a Department/Subject Area

Psychology

1.1.4 Are you completing this application as a?

Post Graduate Research Student (e.g.PhD, MPhil)

Supervisor

If you do not have a supervisor assigned, this application cannot be processed. Please contact your Student Information and Support Officer for assistance. Contact details for who to email to change your supervisor details are in the support section of the Help under Frequently Asked Questions. This can be found in the black bar at the top of your screen.

Title

PROF

First Name

Nicola

Surname

Gray

Email

[redacted]

1.2 Have you undertaken the Research Integrity online training?

- (•) Yes
- ( ) No

2.1 Project Information

2.1.1 Project Title

Psychopathy and the Attentional Blink

What is the expected start date for your study?

27/02/2023

What is the expected end date for your study?

30/09/2023

2.1.2 Is another organisation/institution leading the research and undertaking the ethical review.

- ( ) Yes
- (•) No

2.1.3 Does the study make use of **or** generate data?

- (•) Yes
- ( ) No

2.1.4 Does the study only make use of data which is already in the public domain?

- ○ Yes
- ◉ No

2.1.4.1 Does the study use secondary data not available in the public domain?

- ○ Yes
- ◉ No

2.1.5 Does your research involve security sensitive data or materials?

- ○ Yes
- ◉ No

2.1.6 Environmental Risks
Could your study pose a detrimental impact upon the physical environment, above and beyond that which might be expected to occur during the course of day to day life?

- ○ Yes
- ◉ No

2.1.7 Does your study involve a living non-human vertebrate or cephalopod?

- ○ Yes
- ◉ No

2.1.8 Does your study involve humans as the focus of research or make use of data collected from human subjects?

- ◉ Yes
- ○ No

2.1.9 Is this research on Artificial Intelligence?

- ○ Yes
- ◉ No

2.1.10 Are there any conflicts of interest to be declared relevant to this project?

- ○ Yes
- ◉ No

2.1.11 Does your research involve any of the following: Please tick any that apply

- ☐ Pedagogic Research
- ☐ Covid Research

2.2 Does the proposed research involve any of the following?

2.2.1 Tick all that apply
or
the box " none of the above."

☐ Vulnerable people or participants unable to give informed consent.

Vulnerable populations could include children and young people under the age of 16, those with a learning disability, cognitive impairment (outside of normal age-related decline), those who lack the capacity to give informed consent, refugees and asylum seekers, victimised groups, those who have significantly limited capacity to understand the language in which the consent information is provided.

The official definition from the NHS of vulnerable adult is "unable to take of themselves or protect themselves from exploitation"

Please note if you are dealing with people with learning disabilities, in particular people who lack capacity, falling under the Mental Capacity Act 2005, they must be reviewed by the NHS ethics review. Please do not continue as you need to complete an NHS ethics review.

☐ Deception, misrepresentation, or covert research.

Deception, misrepresentation, and/or covert research may not pose significant ethical concerns if all the following apply:

- The true nature of the research is disclosed to participants immediately after data collection.
- The researcher is confident that no participant would have declined to take part had they known the true nature of the research at the outset (i.e. deception, misrepresentation and/or covert research must never be used as means to avoid securing informed consent).
- The retrospective consent of research participants is secured. All participants will have the right to withdraw from the study without sanction.
- All participants will have the right to withdraw from the study without sanction.

☑ Any risk of harm, damage, or distress to anyone.

This would include non-trivial harm, distress, or damage.

- Including harm to the researchers, the research participants and other people including groups, communities, and institutions.
- Consider the natural or built environment.
- Consider the reputations of people or organisations.

☑ Collection of personal or sensitive personal data as defined by GDPR.

The data controller is Swansea University and the legal basis on which this task is being performed is public interest. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and may be contacted using dataprotection@swansea.ac.uk. Information is available here.

Note: **Personal and sensitive personal data**

Personal data is information relating to an "identified or identifiable natural person"

Examples include:

- Name and surname.
- Email address.
- Internet Protocol (IP) address.
- Photograph.
- Location data.

Sensitive personal data includes:

- Racial or ethnic origin.
- Political opinions.
- Religious beliefs or similar beliefs.
- Trade Union membership.
- Physical or mental health condition.

- Sexual life.
- Commission or alleged commission of any offence.
- Any proceedings for any offence committed or alleged to have been committed, the disposal of such proceedings or the sentence of any court in such proceedings.

Where appropriate, it is strongly recommended that data is anonymised at the time of collection so that researchers neither hold nor process (sensitive) personal data. Student researchers should only possess and process (sensitive) personal data in exceptional circumstances.

☑ Data collection from participants that requires consent

Informed consent normally requires an information sheet and consent form

☐ The sharing of data or confidential information beyond the initial consent given.

Note: The information sheet should provide details about any plans for sharing the data

☐ A lack of anonymity for research participants.(i.e. it will identify participants)

Note: Not ensuring anonymity of research participants and/or confidentiality of their data is acceptable if it is done with the informed and expressed consent of the participants.

☐ Interventions and therapies, including clinical and non-clinical trials.

Note: This would include the administration of drugs, placebos, or other substances or invasive or harmful procedures.

☐ Study or exposure of illegal activity, or research that is likely to discover illegal activity.

☐ Financial inducements offered to participants.

Note: Recovery of expenses is not classed as a financial inducement.

☐ Involve sensitive objects or artefacts or topics

Race, ethnicity, political opinion, trade union membership, religious, spiritual, or other beliefs, physical or mental health conditions, sexual orientation or sex life, gender identity, abuse (child, adult), nudity and the body, criminal or illegal activities, political asylum, conflict situations, personal violence, personal finances, genetics, biometrics (where this is used to identify someone)

☐ Collection or purchase of human samples including bodily fluids e.g., blood, saliva

Note: The collection or purchase of human samples may fall under the terms of the Human Tissue Act 2004.

Do you need to do an NHS Review? Have you checked to see if you need to undertake an NHS review **here**?

If you require help the HTA contacts can be found **here**.
Researchers working on human tissue are expected to follow best practices on handling, transport, storage, and consent. The compliance and codes of practice and standards for research can be found here. The HTA defines human tissue as "material that has come from a human body and consists of or includes human cells" and is frequently referred to in the Act as "relevant material." Refer HTA site for more information on **relevant materials**. Relevant material must be stored on licensed premises. Only 3 areas on the Singleton campus are licensed to store materials currently (ILS1, CNH ILS 2, and Grove building). The Bay Campus is not a licensed premise at present for the storage of materials.

You can complete an NHS ethics review which will cover you for the storage of HTA samples under HTA rules even if one is technically not required, but you will

still need to arrange storage with the university.

☐ Other aspects that pose significant concerns

Note:

- Coercion.
- Conflicts of interest.
- Research in countries where research integrity cannot be ensured.
- Data security.
- Use of administrative or secure data.
- Inappropriate inducements.
- Poor practice.

☐ None of the above

2.3 Describing the Project

2.3.1. Full Description of the Project

Please give a full description of your project – ideally no more than 300 words.

Two attentional blink (AB) tasks will be developed and administered alongside self-report measures(s) of psychopathy and impulsivity, and psychopathy implicit association tests (IATs). The IATs have previously been given ethical approval at Swansea University (2021-5034-4155 and 2022-5420-4647).

One AB task will use rapid serial visual presentation (RSVP) of digit and letter streams (Chun & Potter, 1995). Participants identify two target letters within the RSVP stream, while ignoring digit distractors. The second task is an emotional AB task (EAB; Most et al., 2005). Participants identify which way a landscape/architectural target image within an RSVP stream is rotated (90°). A distressing or threatening image is used as an emotional distractor within the RSVP stream prior to the target.

In a pilot study, participants will complete both AB tasks, and self-report psychopathy questionnaires. Depending on the pilot study results, in the main study, AB and/or EAB tasks will be administered alongside the IATs. Self-report measures of psychopathy and impulsivity will also be administered.

This study tests the "response modulation hypothesis" which proposes that psychopathic traits and behaviours largely stem from an attentional bottleneck. This study will use these tasks to explore the hypothesis, and ascertain whether AB tasks might be useful as implicit measures of psychopathy alongside the IATs.

You can upload a Project Brief (Note: This is optional)

2.3.3. Objectives of the Research Project

Briefly state what the project is designed to achieve. (One or two precise statements, including a brief statement on the benefits of the research).

AB tasks may provide an implicit measure of psychopathy which, unlike self-report methods, is robust to manipulation and impression management.

2.3.4 Project Funding

Is the research funded, or is funding anticipated?

- (•) Yes
- ( ) No

2.3.4.1. Please provide funding sources **OR** provide Award Management system (AMS) application number.

ESRC DTP PhD funding for Jennifer Pink.

2.3.5 **Location of study**

Where will the research be undertaken?

Online via the gorilla.sc platform.

3.1 Partner Organisations

3.1.1 Is the research being undertaken with other partner organisations/institutions?

- ( ) Yes
- (•) No

3.2 Research Team

3.2.1 Are you working with any other researchers on the project?

- ( ) Yes
- (•) No

5.1 Study Design

Note:

At a minimum, answer the following questions; however, ensure that you include sufficient detail for the reviewer to make an ethical judgement.

5.1.1 Please outline the chosen type of research design

The main study is a split-plot design, using between-subject conditions for the psychopathy features (Bold, Mean, Disinhibition) and a correlational research design between the explicit and implicit measures of each of these dimensions. Participants will be randomly allocated to one of three conditions: Boldness, Meanness or Disinhibition.

Each participant will complete one IAT, and the two attentional blink tasks (AB and EAB). All participants will complete the following questionnaires:

A: Triarchic Psychopathy Measure (TriPM; Patrick, 2010) – psychopathy traits
B: UPPS-P Impulsive Behavior Scale (Lynam, Smith, Whiteside, & Cyders, 2006) – impulsivity
C: SRP-4 Self-Report Psychopathy Scale (Paulhus, Neumann, Hare, 2016) - psychopathy traits

No variables will be manipulated. The dependent variables are listed below:

1.Scores on each of the three Implicit Association Test (IATs):
- Boldness IAT will measure the association between the concepts of BOLD and WARY with the attributes of ME and NOT ME.
- Meanness IAT will measure the association between the concepts of CRUEL and KIND with the attributes or ME and NOT ME.
- Disinhibition IAT will measure the association between the concepts of RECKLESS and SENSIBLE with the attributes of ME and NOT ME.
D-scoring protocol from Greenwald et al. (1998) will be used to calculate these associations.

2. Scores on each of the AB tasks:

Scoring protocol from Chun and Potter (1995)/Most et al. (2005) will be used to calculate percentage of trials where T1 and T2 are both reported correctly across a range of lags/SOAs.

3. Scores on the self-report measures listed above.

5.1.2. Have you involved the public in developing your research idea?

- ○ Yes
- ◉ No

5.2.1 Study Methodology

Please describe the methods of data collection and analysis. Please note further specific questions on data collection will be asked later.

All data will be collected online using the Gorilla.sc platform.

A Pilot Attentional Blink Study will be run with student and community participants. The aim of the Pilot AB Study is to test the AB procedure, and ensure that AB effects are obtained in both the AB and EAB tasks prior to the main study. In this study, participants will complete the Attentional Blink and Emotional Attentional Blink tasks along with the TriPM. The order of AB tasks will be counterbalanced.

All participants will be presented on screen with a Participant Information Sheet to read which sets out the aims of the study. If they are happy with its content they will click a Next button. An example of the PIS is included as Appendix 1. This will be altered to reflect the content of the study (AB Pilot/AB Main study). However, no ethical implications are envisaged from these alterations.

For both the pilot and main studies, there will be a two-stage consent process to ensure participants are not exposed to images which they may find upsetting without prior warning and without giving fully informed consent to this exposure beforehand. Firstly, they will be informed that the study will require them to view threat or distress images for short durations. They will be told that on subsequent screens there will be example threatening, distressing, and neutral images (in that order) presented very briefly (1 second) which are similar to those used in some of the tasks. It is highlighted to them on the PIS that the threat and distress images include attacking animals or people attacking others with weapons, images of dead animals and people, and mutilations. If they wish to exit the experiment at this point they are able to do so without seeing any images. If they wish to continue, they will give consent to proceed to the next set of screens which will show 4 small images of each category presented for 1 second. Throughout this presentation they are reminded that they can exit at any point by closing the webpage, and they are given advance notice prior to each category of

image appearing on-screen. All images are presented in small, thumbnail, form and only briefly as a method to reduce any distress or upset caused by viewing the images, while also providing participants with knowledge of the type of images that will be used in the study. Screenshots of this presentation are included as Appendix 2. Once they have viewed these images they can either exit the experiment (and thereby refuse to provide consent to continue), or continue to complete the second (and full, standard) consent form (Appendix 3). It will be made clear to participants that they have the right to withdraw their participation in the study at any time, without penalty or the need to justify their decision.

Before participants begin the study, they will be asked for demographic information (Appendix 4). For the main study, they will also be asked to provide personal information (IAT stimuli, Appendix 5) which will be programmed into the computer as part of the "ME/NOT ME" component of the IATs. Participants will be informed that this information will be disposed of after completion of testing so that their anonymity is assured. Participants will also be asked to select appropriate NOT ME words from a selection which they do not relate to (i.e., have no personal significance for them), for later use in the IATs (Appendix 5). This procedure for the IAT has been used many times before without issue.

In the main study, participants will first complete the relevant IAT (Bold, Mean or Disinhibition). This will require them to first sort the attribute words used within the IAT into the 2 categories (e.g. BOLD and WARY). This is to ensure that there is no confusion regarding the words and what they represent. A full list of the attribute words is included as Appendix 5. Participants in the AB Pilot will not complete the IATs.

Participants will next complete the AB tasks:

1. Each AB trial will comprise a rapid serial visual presentation (RSVP) of 16 stimuli. 14 are digits, and 2 are target letters. Participants need to report the two letters they have seen. Each trial starts with a fixation cross for 400 ms, then blank screen for 100ms, then RSVP stream where each digit/letter is shown for 100 ms.

2. Each EAB trial will comprise an RSVP stream of 17 stimuli. 15 are landscape/building images. 1 is an emotional distractor image (either of neutral, distressing or threatening content). 1 is a target image of a landscape/building rotated by 90 degrees. Participants need to report which way the target image was oriented (left or right). Each trial starts with a fixation cross for 400 ms, then blank screen for 100ms, then RSVP stream where each image is shown for 100 ms. Emotional distractor images are included as Appendices 6 & 7; these have been sourced from the IAPS and NAPS affective picture systems, along with supplementary similar images from the internet (per Most et al., 2005's approach).

Participants will also be asked to complete forward, backward and sequencing digit span tasks.

Once participants have completed the tasks, they will be asked to fill in the questionnaires. Participants in the AB Pilot and Main AB Study will complete the TriPM (Appendix 8). Those in the Main Study will also complete the UPPS-P (Appendix 9) and the SRP-4 (Appendix 10).

After completion of these outcome measures participants will be thanked for taking part in the research before reading a Debrief Form (Appendix 11) that details the study aims. This document will be amended to reflect the content of the study (either Pilot or Main Study), however no ethical implications of this are envisaged. They will then be reminded that their information is anonymous and will remain anonymous. Participants will be given contact details of the support services available to them should the need arise. If they are community-based participants they will be given the opportunity to enter their email on this screen to take part in a prize draw to win one of 4 x £25 vouchers. Student participants via participant pool will receive 3 credits (the anticipated length of the study is a maximum of 45 minutes).

The studies will be advertised via email (Appendix 12) and social media (Appendix 13). Again, these will be amended to reflect the content of the study (either Pilot or Main Study), however no ethical implications of this are envisaged.

5.2.1.1 Are you using questionnaires, workshops, focus groups or interviews?

- (•) Yes
- ( ) No

Please upload your data collection documents

Documents

Type	Document Name	File Name	Version Date	Version	Size
Data collection documents	Appendix 5 - IAT Stimuli for Ethical Application	Appendix 5 - IAT Stimuli for Ethical Application.docx	06/02/2023	1	27.4 KB
Data collection documents	Appendix 4 Demographics Form	Appendix 4 Demographics Form.docx	06/02/2023	1	262.2 KB
Data collection documents	Appendix 8 - Triarchic Psychopathy Measure	Appendix 8 - Triarchic Psychopathy Measure.pdf	16/02/2023	1	43.3 KB
Data collection documents	Appendix 9 - UPPS-P_59_item	Appendix 9 - UPPS-P_59_item.pdf	16/02/2023	1	127.9 KB
Data collection documents	Appendix 10 - SRP 4	Appendix 10 - SRP 4.docx	16/02/2023	1	27.8 KB
Data collection documents	Appendix 6 Threat and Neutral Images	Appendix 6 Threat and Neutral Images.pdf	15/02/2023	1	2.2 MB
Data collection documents	Appendix 7 Distress and Neutral Images	Appendix 7 Distress and Neutral Images.pdf	15/02/2023	1	3.5 MB

5.2.1.2 Are you using Transcranial Direct Current Stimulation? (tDCS)?

- ○ Yes
- ◉ No

5.3 Participants

5.3.1. State the number of the study participants (indicative sample size) and justify why you have chosen this sample size.

Main Study N = 200 per condition (3 conditions).

To calculate the required sample size we assumed an effect size of r = 0.2 with standard conditions (alpha = .05, power = 80%), which revealed a sample of N=160 per group.

In order to account for drop-outs, which in previous online experiments have been approximately 20%, we will gather a sample of 200 people per condition (3 conditions).

5.3.2. State the characteristics of study participants

Participants will be aged between 18+ and will need to be fluent English language speakers due to the language-based nature of the IAT and the English-language questionnaires used. There are no gender exclusions. Participants will be those in the general population as well as students, including those from Swansea University.

5.3.3. State the inclusion criteria for participants.

Adult humans who are fluent in English, aged 18 and over.

5.3.4. State the exclusion criteria for participants.

Adult humans who are not fluent in English, or those under 18 years old.

5.3.7. **Access to participants**

Will the study require the cooperation of a gatekeeper for initial access to the groups or individuals to be recruited? E.g., students at school, members of self- help group, residents of a nursing home, Ministry of Health for overseas work, elite sporting organisation.

○ Yes
◉ No

5.3.8. **Risk, Harm or Distress to anyone**

Please state the risks that may cause harm, damage, or distress to anyone.

Within the EAB, participants will be briefly presented (in the order of 100ms duration) with a range of images. There is a potential risk to participants that they may find some of these images distressing. To deal with this risk, we have proposed a two-stage consent process. Before consenting to take part in the study, participants will be clearly informed that the study may require them to view threatening or distressing images. They will be told that on the next screen, there will be some example threat/distress images similar to those used in some of the tasks. If they wish to exit the experiment at this point they are able to do so without seeing any distressing images. If they wish to continue, they will give consent to proceed to the next screen to view a series of small thumbnail threat/distress images briefly displayed on screen (1 sec). The images are presented in thumbnail form and briefly as a method to reduce any distress or upset caused by viewing the images, while also providing participants with knowledge of the type of images that will be used in the study. Once they have viewed these they can either exit the experiment, or continue to complete the second (and full, standard) consent form. In addition, participants will be made aware (in the information sheet and full consent form) of their right to withdraw from the study at any point with no explanation. Please see Appendix 2 & 3 for full detail on the proposed consent process for this.

The EAB (Most et al., 2005) is a very well-known psychological procedure that has been used many times in the research literature without causing undue distress to participants. However, as this is the first time we have used this procedure in our lab, we will pilot it first to ensure we get the appropriate effect before using it within the main study. The PIS, Consent Form and Debrief Form will be amended accordingly to reflect the pilot study (EAB and AB, no IAT, and self-report measures). However, no ethical implications are envisaged from this.

Should the topic of the experiment elicit any negative feelings, all participants will be informed that they do not need to answer any questions which make them feel uncomfortable and they can stop the study at any time by closing the website page.

When participants are presented with the onscreen debrief sheet, they will be provided with the contact details for the researchers and the supervisor, should they like to discuss anything involved within the study or if they have any concerns they would like to address. They will also be given links to support services available, including Wellbeing@campuslife, details for the Mind Cymru mental health helpline (0300 123 3393) and directed to their local GP if required.

Participants will be informed that their data will be stored anonymously, and each individual's information will be referred to as a unique number so once data has been collected, participants will be anonymous to the researchers and cannot be deleted as the researchers will be unable to detect which data is associated with each participant.

5.3.9. Will the research cause possible psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?

- ○ Yes
- ◉ No

5.3.10. **Briefing and Debriefing of participants**

How will the participants be briefed regarding the study?

Participants will be briefed and debriefed on-screen (due to the online nature of the study). The online programme will display the Participant Information Sheet before they commence the study, and the Participant Debrief Sheet once they have completed the study.

5.3.10.1. Will all participants completing an anonymous survey/questionnaire be informed on the information sheet that returning the completed survey/questionnaire implies consent to participate?

- ◉ Yes
- ○ No
- ○ N/a

5.3.10.2. Will participants be informed of the right to withdraw (and last possible stage for withdrawal, if applicable), without penalty?

- ◉ Yes
- ○ No
- ○ N/a

5.3.10.3. Are you using a Participant information sheet?

- ◉ Yes
- ○ No

5.3.10.4. Please upload briefing material and participant information sheet if used.

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant Information Sheet	Appendix 1 Participant Information Sheet V1 2_Feb_23	Appendix 1 Participant Information Sheet V1 2_Feb_23.docx	06/02/2023	1	52.3 KB

5.3.10.7. Will the participants be given a full debrief following the completion of the study?

- ◉ Yes
- ○ No
- ○ N/a

Pleae upload the Debrief sheet document

Documents

Type	Document Name	File Name	Version Date	Version	Size
Debrief sheet / document	Appendix 11 Debrief Form	Appendix 11 Debrief Form.docx	06/02/2023	1	331.9 KB

5.4 Recruitment

5.4.1. Briefly outline how and from where participants will be recruited

Participants will be recruited from the community by social media and word of mouth. University participants will be recruited via the participant pool as well as emails distributed by the PGR team on behalf of the researcher.

Recruitment Material

5.4.2. Please upload any recruitment materials e.g. flyers, advertisements

Documents

Type	Document Name	File Name	Version Date	Version	Size
Recruitment Material	Appendix 12 Email Advertisement	Appendix 12 Email Advertisement.docx	06/02/2023	1	16.2 KB
Recruitment Material	Appendix 13 Social Media Advertisement	Appendix 13 Social Media Advertisement.docx	06/02/2023	1	114.5 KB

5.4.3. Is the intention to share research findings with participants?

- ○ Yes
- ◉ No

5.4.4. Will participants be invited as Co-researchers? (e.g., where participants lead /facilitate group discussions rather than the researcher)

- ○ Yes
- ◉ No

5.4.5. **Coercion**

Are there any power relationships where participants are known? E.g., gatekeeper or other in a position of influence or authority over the participants?

- ○ Yes
- ◉ No

5.5 Data Collection

All Data collection should comply with the Data Protection Policy of the University. Please confirm compliance with the policy.

☑ Agreement

5.5.1. Briefly describe the type of data that will be collected

For demographics, participant age, gender, ethnicity and highest educational qualification will be collected. This will all be anonymised as participants will be randomly assigned a 7 digit ID number by the Gorilla software when they start the study online.

The IAT will require them to enter their first name, birthdate (DD/MM not year), star sign, occupation, nationality and town of birth. This information will not be retained or analysed - it is merely collected for use as stimuli within the IAT.

As participants will be completing the TriPM, SRP-4 and UPPS-P, they will be providing self-reported data on their personality traits and behaviours (impulsivity).

If participants wish to enter the prize draw (opportunity to win one of 4 x £25 vouchers), they will be asked to provide their email address at the end of the study. This data will be deleted once the study is complete and the prizes have been drawn.

5.5.2. Briefly describe how and by whom the data will be collected?

All data will be collected via the online platform Gorilla.sc and participants will be self-reporting this information.

Participants are not obliged to provide answers to all of the items on the SRP-4, TriPM or UPPS-P and can skip any questions they do not feel comfortable responding to.

5.5.4. Will the research involve respondents to the internet or other visual/vocal methods where respondents may be identified? (e.g., IP Address)

◉ Yes
○ No

Please explain

We will use Gorilla (www.gorilla.sc) to collect data for our study. Gorilla is a cloud software platform specifically for the behavioural sciences. Here are some key facts about their data security:

Cyber Essentials: Certificate of Assurance - IASME-CE-004228
Hosting: Gorilla is hosted on Microsoft Azure within the EU (Republic of Ireland) which is compliant with ISO/IEC 27001:2005
Traffic Encryption: All traffic to and from Gorilla is encrypted (TLS/SSL)
Database Encryption: The database is encrypted using industry-standard cryptography
Data Ownership: The experiment owner owns the research data that has been collected using Gorilla and has complete control over it. Experiment data can be deleted by the experiment owner and will be removed from our backups within 14 days.
Data Protection: Gorilla is fully compliant with data protection legislation
BPS: Gorilla is fully compliant with BPS guidelines.
GDPR: Gorilla is fully compliant with GDPR.
IP Address: Gorilla does not collect or store IP addresses by default

5.5.6. Will the research involve accessing potentially dangerous and/or illegal internet sites?

○ Yes
◉ No

5.5.7. **Anonymity**

Briefly describe how you propose to ensure participant confidentiality and anonymity.

We will use an anonymous recruitment policy in Gorilla. Consequently, once data is collected it is immediately anonymised. This means however, that participants cannot request their data to be deleted after the event as it cannot be identified. Participants can still withdraw from the experiment at any time by closing their browser.

5.6 Data Storage and Disposal

5.6.1. Briefly describe the procedures to be undertaken for the storage and disposal of data. Where will the data be stored?

Once the study is complete, data will be downloaded from the Gorilla.sc server to the researcher's laptop. All data will be stored in a password-protected folder. Access to the computer will be password protected.

5.6.2 Responsibility

5.6.2.1 Who will be responsible for the disposal of data?

Jennifer Pink will be responsible for the storage of the data and any disposal of data.

5.6.2.2 Who will be responsible for the storage of the data?

Jennifer Pink will be responsible for the storage of the data and any disposal of data.

5.6.3. How long will the data be retained after completion of the study?

In line with Swansea University Research Integrity Framework on Research Ethics and Governance, the data will be retained for 10 years (to September 2033).

5.6.4. If working off site or collaborating with others, please confirm data is being stored safely by third parties in third-party locations away from Swansea University (for example on cloud-based services or offsite storage facilities) that procedures are still in line with GDPR legislation.

- (•) Yes
- ( ) No
- ( ) N/a

6.0 Ethical Concerns Statement

6.1. In addition to your ethical question responses, is there any further information relevant to your research study that you would like the committee to consider?

- ○ Yes
- ◉ No

7.1 Consent

Note:

Consent is not always required e.g. When covert medical psychological studies are undertaken to ascertain information from participants. **In most cases consent will be required.**

7.1.1 Is consent required?

- ◉ Yes
- ○ No

7.2 Assent & Informed Consent

7.2.2. **Collection of consent**

Who will collect the informed consent from participants?

Participants will be asked to give informed consent via the Gorilla.sc platform.

7.2.3. How will the consent be recorded?

Participant consent will be recorded on the Gorilla.sc platform, using the template attached. If participants do not consent, they are unable to continue with the study.

7.2.3.1 Please upload your Participant Consent form

Documents

Type	Document Name	File Name	Version Date	Version	Size
Participant consent evidence	Appendixes 2 & 3 Image Presentation for Consent Process and Consent Form	Appendixes 2 & 3 Image Presentation for Consent Process and Consent Form.pdf	16/02/2023	1	1.1 MB

7.2.4. Are eligibility criteria clearly set out for participants?

- ◉ Yes
- ○ No

7.2.5. Will the research involve the sharing of data of confidential information beyond the initial consent given?

- ○ Yes
- ◉ No

7.2.6 Will the information be collected from participants without their knowledge and consent at the time? (e.g.re-use of social media content; covert observation / photos of people in non-public places, etc.)

- ○ Yes
- ◉ No

8.0 Documents

Please upload any additional supporting documents relevant to the research

9.0 Declaration & Signature

- ☑ I confirm I will comply with Health and Safety guidelines and undertake risk assessment of the research as required.

Declarations

- ☑ I declare all the answers to questions given above are true and accurate to the best of my knowledge and belief. I also confirm that I am aware of the content and relevant sections applicable form the University's Policy Framework on Research Integrity and will abide by its ethical guidelines and the ethical principles underlying good practice appropriate to my discipline.
- ☑ I also confirm that I understand that all projects and activities will be undertaken in accordance with relevant external and internal policies, regulations, codes of practice and other requirements, and that further information on these is available from University and Faculty research and teaching support services

Click the sign button below to complete your application.

Signed: This form was signed by MRS JENNIFER PINK ([redacted]) on 27/02/2023 08:51

Important: Click on the 'Request' button below to ask your supervisor to review and submit your application.

Signed: This form was signed by PROF Nicola Gray ([redacted]) on 27/02/2023 09:59

Amendments

You are logged into the Ethical Review System provided by Infonetica.

This form is to be used for applications that have already been approved and require amendment.

Project Title

Psychopathy and the Attentional Blink

Amendment Application Date

From what date would you want your amends to commence

22/06/2023

Project Completion Date

What is the expected completion date of your study?

30/09/2023

Main Applicant

Title

MRS

First Name

JENNIFER

Surname

PINK

Email

[redacted]

Student ID

[redacted]

Faculty / Service

Medicine, Health and Life Science

Department/Subject Area

Psychology

Are you completing this application as a?

Post Graduate Research Student (e.g. MRes, MSc Research, MPhil, PhD)

Supervisor

Note: If your supervisor is not available in the search box then please contact your supervisor and ask them to log into the ethics system.

Title

PROF

First Name

NICOLA

Surname

GRAY

Email

[redacted]

Please select each section you would like to amend in your application.

- ☐ 1. About you
- ☑ 2. About the Project

Please state the changes you would like to make referencing the question number on your original application form where appropriate. In this section, for example, you can change your project description, objectives, location, security-sensitive data or materials, and environmental risks.

On my original application, no payments were to be made to participants. Instead, I was offering a prize draw to win one of 4 x £25 vouchers.

I would like to change the procedure to recruit participants via the Prolific participant platform and pay them a small amount to complete the studies.

- ☐ 3. Partners & the Team
- ☐ 4. Animals
- ☑ 5. Human Subjects

Please state the changes you would like to make referencing the question number in your original application where appropriate. In this section, for example, you can change your Study Design, Study Methodology, Human Samples information, Administration of substances, Participants, Recruitment, Data Collection, Data Storage, and Disposal.

The proposed change is to link the studies (created on Gorilla.sc) to the Prolific website so that this final study can be completed by the end of my PhD. The proposed payment is £3.50 per participant which is at the lower end of the allowed rates on Prolific. Funding from my ESRC DTP research grant will be used to cover the costs.

- ☐ 6. Ethical Concerns
- ☐ 7. Consent
- ☐ 8. Documents

I declare all the information given above is true and accurate to the best of my knowledge and belief.

Signed: This form was signed by MRS JENNIFER PINK ([redacted]) on 03/08/2023 14:58

Participant Information Sheet

Personality and Attention

February 2023

You are being invited to take part in some research. Before you decide whether or not to participate, it is important for you to understand why the research is being conducted and what it will involve. Please read the following information carefully.

What is the purpose of the research?

We are conducting research to determine if there is a relationship between different personality traits and levels of attention. The study will use explicit methods (questionnaires) and implicit methods (computer-based reaction tasks) to measure personality traits and levels of attention. Only participants who are fluent in English may take part in the research, due to the need to respond quickly to English words. Participants are also required to be 18 or over, due to the nature of some of the stimuli. Please ensure that you are completing this on a laptop or desktop computer (not a smart phone or a table). You should be in a quiet place without any distractions for the entire duration of the study. Distractions may affect your reaction time and results.

Who is carrying out the research?

The data is being collected by Jennifer Pink under the supervision of Professor Nicola Gray, from the School of Psychology within the Faculty of Medicine, Health and Life Sciences at Swansea University. The research has been approved by the Faculty of Medicine, Health and Life Sciences Ethics Committee.

What happens if I agree to take part?

Before you agree to take part in any of the tasks, you will be asked if you are happy to view a series of small images which depict scenes of threat or distress. During one of the attention tasks you will be very briefly exposed to images of this nature. These images include scenes of attacking animals, people attacking others with weapons, dead animals or people, and mutilations. Some participants may find such scenes of threat or distress upsetting. If you feel that you might be affected by these types of images, please exit the study now by clicking off the browser or by selecting the No – I do not want to proceed box at the end of this Information Sheet.

If you feel you are comfortable with viewing these types of images, you will need to select the Yes – I want to proceed and am comfortable viewing example scenes of threat or distress box at the end of this Information Sheet. We will then briefly (for 1 second each) show you a selection of small (thumbnail size) pictures which will be similar to those used in one of the tasks so that you can make an informed choice about whether to take part in the study.

After viewing these small example images, if you wish to continue further and start the study, you will be asked to give full consent for the study and then the experiment will commence.

You will then be asked to complete a reaction time task and two attention tasks. You will also be asked to fill in several questionnaires which will ask you about a range of your emotions and behaviours. The whole experiment will be completed within 45 minutes. Only the research supervisor and the researchers will have access to the information, and everything will be kept confidential and anonymous.

Are there any risks associated with taking part?

There is a potential risk that you may find some of the images used in the tasks distressing. There are also some topics included within the questionnaires (e.g., impulsive behaviours) that may be sensitive for some people. Therefore, participation should be considered carefully. The research has been approved by the Faculty of Medicine, Health and Life Sciences Ethics Committee.

Data Protection and Confidentiality

Your data will be processed in accordance with the Data Protection Act 2018 and the General Data Protection Regulation 2016 (GDPR). All information collected about you will be kept strictly confidential. Your data will only be viewed by the researcher/research team. All electronic data will be stored on a password-protected computer file. The data we will collect for our study will be made anonymous at the start of the research. The data controller for this project will be Swansea University.

What will happen to the information I provide?

An analysis of the information will form part of our report at the end of the study and may be presented to interested parties and published in scientific journals and related media. Note that all information presented in any reports or publications will be anonymous and unidentifiable.

Is participation voluntary and what if I wish to later withdraw?

Your participation is entirely voluntary – you do not have to participate if you do not want to. Please note that the data we will collect for our study will be made anonymous at the start of the research; thus, it will not be possible to identify and remove your data at a later date, should you decide to withdraw from the study. Therefore, if at the end of this research, you decide to have your data withdrawn, please let us know before you leave the webpage.

Data Protection Privacy Notice

The data controller for this project will be Swansea University. The University Data Protection Officer provides oversight of university activities involving the processing of personal data and can be contacted at the Vice Chancellors Office. Your personal data will be processed for the purposes outlined in this information sheet. Standard ethical procedures will involve you providing your consent to participate in this study by completing the consent form that has been provided to you online. The legal basis that we will rely on to process your personal data will be processing is necessary for the performance of a task carried out in the public interest. This public interest justification is approved by the School of Psychology and the Faculty of Medicine, Health and Life Sciences Ethics Committee, Swansea University. The legal basis that we will rely on to process special

categories of data will be processing is necessary for archiving purposes in the public interest, scientific or historical research purposes or statistical purposes.

How long will your information be held?

Data will be preserved and accessible for a minimum of 10 years after completion of the research. Records from studies with major health, clinical, social, environmental or heritage importance, novel intervention, or studies which are on-going or controversial should be retained for at least 20 years after completion of the study. It may be appropriate to keep such study data permanently within the university, a national collection, or as required by the funder's data policy. The supervisor will take responsibility for data destruction, and all collected identifiable data will be destroyed on or after September 2033 as it is a requirement of Swansea University Research Integrity Framework on Research Ethics and Governance that data should be kept for a minimum of ten years.

What are your rights?

You have a right to access your personal information, to object to the processing of your personal information, to rectify, to erase, to restrict and to port your personal information. Please visit the University Data Protection webpages for further information in relation to your rights. Any requests or objections should be made in writing to the University Data Protection Officer: University Compliance Officer (FOI/DP), Vice-Chancellor's Office, Swansea University, Singleton Park, Swansea, SA2 8PP. Email: dataprotection@swansea.ac.uk.

How to make a complaint

If you are unhappy with the way in which your personal data has been processed, you may in the first instance contact the University Data Protection Officer using the contact details above. If you remain dissatisfied, then you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF; www.ico.org.uk.

What if I have other questions?

If you have further questions about this study, please do not hesitate to contact us:

Jen Pink	**Professor Nicola Gray**
[redacted]	[redacted]
School of Psychology,	School of Psychology, Swansea University
Swansea University	

To indicate your consent to view example images of threat and distress which you may be exposed to during one of the tasks in the experiment, please select this box to proceed:

Yes – I want to proceed and am comfortable viewing example thumbnail scenes of threat or distress ☐

If you do not wish to proceed further with this study, please select this box:

No – I do not want to proceed ☐

Demographics Questionnaire

1. What is your age?

2. Are you fluent in English?

Yes

No

3. Please select your gender:

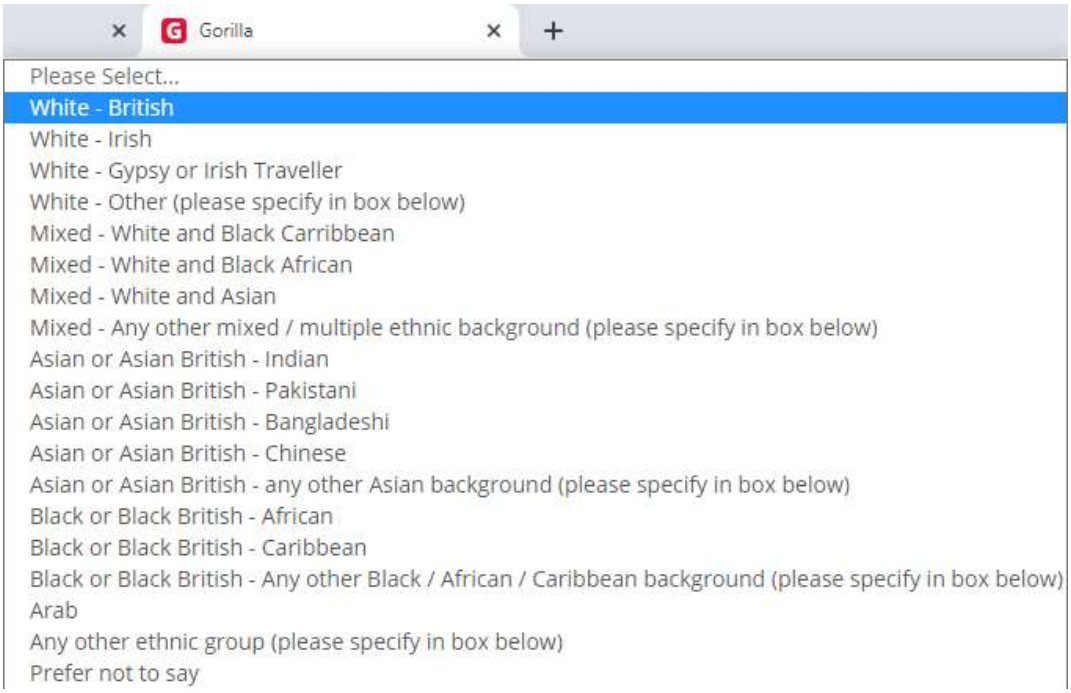
Male

Female

Other gender - please specify if you wish

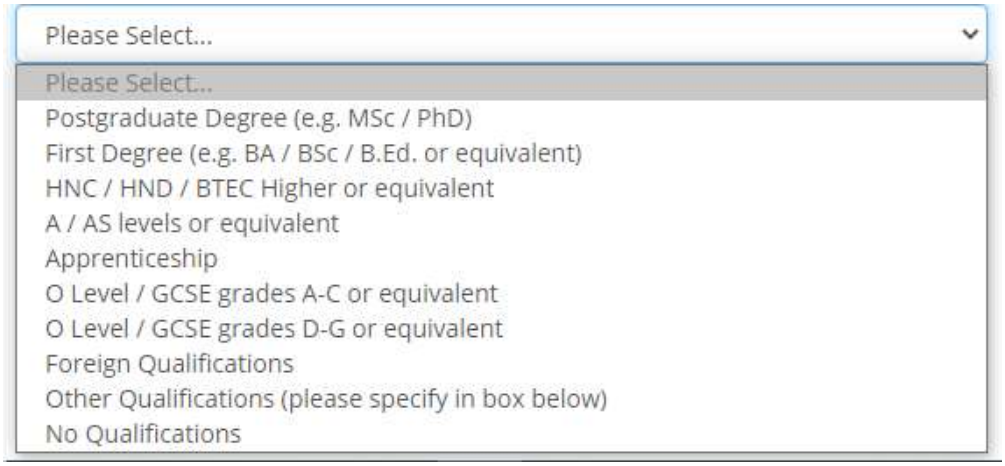
Prefer not to say

4. What is your ethnicity?



Other ethnic group - please specify if you wish

5. What is your highest formal qualification?



Other qualifications - please specify if you are happy to

Participant Debrief Form

Personality and Attention

February 2023

Thank you for taking part in our research. Now that you have completed the study, we will explain the rationale behind this work.

You have completed an Implicit Association Test (IAT) and two attention tasks. These tasks were designed to measure how much you associate your self-concept with specific personality traits, and to index your attention. Depending on which IAT and task you were allocated by the software, these would have indexed levels of impulsivity, boldness and kindness. You have also completed questionnaires which have captured a range of related personality traits and behaviours (e.g., impulsivity).

The tasks are implicit measures that aim to address some limitations that have been associated with self-report measures (such as questionnaires) of personality. Though useful for research, self-report measures may fail to detect thoughts, feelings and behaviours that an individual may not be aware of or are trying to conceal.

This research has measured both your implicit and explicit associations between your self-concept and particular personality traits in order to determine whether one method acts as a better prediction of behaviour.

Data collected for the study will be used to develop implicit tests of personality traits and to evaluate if this can be done reliably. All data is anonymous and will be retained for 10 years. Data will only be analysed by groups, not by individual.

If you feel affected by issues raised by this research and would like to discuss any concerns, please contact the research team or study supervisor on the details provided below. If you feel this piece of research may have health implications for you, we advise you to contact your GP (family doctor) or Swansea University's Wellbeing services (Wellbeing Services, Horton Building, Swansea University, Singleton Park, Swansea, SA2 8PP, Tel : 01792 295592, www.swansea.ac.uk/wellbeing/). Alternatively, you can contact a Wales-wide Mental Health Helpline for support such as Mind Cymru (0300 123 3393).

Jen Pink

[redacted]

School of Psychology, Swansea University

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Participant Consent Form

PARTICIPANT CONSENT FORM

Personality and Attention

February 2023

Please read and check the box for each of the consent statements below

1. I (the participant) confirm that I have read and understand the information sheet for the above study (dated February 2023) that was previously shown to me.☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time and leave this research website, without giving any reasons. I understand that the data will be made anonymous at the start of the research; thus, it will not be possible to identify and remove my data at a later date, should I decide to withdraw from the study. Therefore, if at the end of this research, I decide to withdraw, I will let the researchers know before I leave the webpage. ☐

3. I understand what my role will be in this research, and I understand who to contact if I have any questions. ☐

4. I have been informed that the information I provide will be safeguarded. ☐

5. I am happy for the information I provide to be used (anonymously) in academic papers and other formal research outputs. ☐

6. I have read and understand the Participant Information Sheet. ☐

7. I agree to the researchers processing my personal data in accordance with the aims of the study described in the Participant Information Sheet. ☐

8. I confirm that I am aged 18 or over. ☐

9. I confirm that I have viewed the thumbnail images depicting scenes of threat and distress and I am happy to proceed with the experiment given that I will be briefly exposed to these types of image in one of the tasks. ☐

If you agree to all these statements, and want to continue with the research, please select YES below.

If you do not want to continue, please select NO

Jen Pink

6th February 2023

- ○ Yes
- ○ No

This study is being conducted by Swansea University, Faculty of Medicine, Health and Life Sciences

Principle Researcher:

Jen Pink - [redacted]

School of Psychology, Swansea University

Project Supervisor:

Professor Nicola S Gray - [redacted]

School of Psychology, Swansea University

Participant Recruitment Email

How does personality affect attention?

If you have 45 minutes to spare, are 18+ and fluent in English, please consider taking part in this confidential online research study.

You will be asked to complete several short questionnaires and reaction time type tasks.

To participate, please click the link from a laptop/desktop PC (phones/tablets will not work) <link>.

You could win one of 4 x £25 shopping vouchers. Swansea Uni students will receive 3 credits instead. The study takes approximately 45 minutes, for any queries email Jen Pink (Psychology PhD student) on [redacted]

Social Media Participant Recruitment Advert

The image below will be used on all social media posts with the following wording:

Facebook, Instagram, LinkedIn: How do personality and attention interact? If you are 18+ and fluent in English, you can complete the following study on a laptop by using the link <link>. You could win one of 4 x £25 shopping vouchers. Swansea Uni students will receive 3 credits instead. The study takes approximately 45 minutes, for any queries email Jen Pink on 938525@swansea.ac.uk

#takepart #psychology #research

Twitter (shortened to fit tweet limit): How do personality and attention interact? 18+ and English speaking? Take part in our study! Swansea Uni students will gain 3 credits. Click the link on a laptop to participate <link> or email [redacted] #psychology #research