Boredom as a Motivator of Pain Infliction in Psychopathy

by

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Author's Declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Statement of Contributions

Jessica Lee was the primary author and was responsible for conceptualization, study design, data collection, data analysis and interpretation (all chapters), and coding of the aggression paradigm task (Chapter 3).

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Abstract

Maladaptive behaviours have been associated with both psychopathy and boredom proneness—however, there remains limited evidence of how they interact to influence these behaviours. Given that psychopathy has been linked to boredom susceptibility, it is possible that boredom contributes to harmful behaviours in psychopathy. This thesis addressed this gap by investigating the interplay between boredom proneness, psychopathy, and the inclination to inflict pain on others. Chapter 1 described the current literature on how boredom and psychopathy influence maladaptive behaviours and highlighted limitations in the extant literature. The following chapters were comprised of four studies: the first study (Chapter 2) explored how individuals with different levels of psychopathy and boredom represented emotions in their bodies, to determine whether the traits of boredom proneness and psychopathy were associated with distinct embodied representations of affect. This was deemed important given the role both state and trait boredom would play in subsequent experimental chapters. Results showed that the embodied experience of boredom did not substantially differ as a function of psychopathy or boredom proneness. The second study (Chapter 3) examined whether boredom (both trait and state) and psychopathy traits exacerbated the tendency to inflict physical pain through an online game scenario. Results showed that state boredom diminished aggression strength in those with higher levels of psychopathy, particularly primary psychopathy. The final two studies (Chapter 4) investigated the likelihood of inflicting social pain using novel scenarios in which participants could choose to inflict social pain on a fictional person. In both Study 4A and

4B, trait boredom proneness did not emerge as a significant moderator between psychopathy and choosing socially painful options. However, when forced to consider the likelihood of choosing each option, boredom proneness did act as a significant positive moderator between psychopathy (and primary psychopathy) and social pain infliction. Chapter 5 concluded with a summary of the research findings and explored possible explanations for the discrepancies observed in the results, addressed the limitations of the current studies, and suggested avenues for future research.

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List of Abbreviations

AIC	Akaike information criterion
ANOVA	Analysis of variance
BIC	Bayesian information criterion
BSCS	Brief Self-Control Scale
CAST-12	Comprehensive Assessment of Sadistic Tendencies
LDA	Linear discriminant analysis
LPA	Latent profile analysis
LSRP	Levenson Self-Report Psychopathy Scale
PCA	Principal component analysis
QCAE	Questionnaire of Cognitive and Affective Empathy
SBPS	Short Boredom Proneness Scale
TAS-20	Toronto Alexithymia Scale

Chapter 1: General Introduction

Psychopathy is a personality dimension characterized by a constellation of traits such as lack of empathy and guilt, callousness, impulsivity, and antisocial behaviors (Hare, 2003; Hare & Neumann, 2008). Individuals high in psychopathy tend to engage in selfish and harmful behaviours, such as pursuing a personal advantage at the expense of others, despite an intact ability to discriminate between morally acceptable and less morally acceptable situations (Pletti et al., 2017). This paradox—intact moral reasoning coupled with antisocial actions—stems from affective and motivational deficits, including reduced emotional reactivity to distress cues (Decety et al., 2013; Glenn et al., 2009; Marsh & Cardinale, 2014) and impaired integration of emotional signals in decision-making (Glenn et al., 2009; Rilling, 2007). Indeed, psychopathic individuals appear to lack the affective motivations (e.g., anticipation of guilt, guilt aversion) that drive prosocial behaviours and inhibit morally inappropriate behaviours in non-psychopathic individuals (Blair, 1995; Brazil et al., 2022; Decety et al., 2008, 2012; Decety & Michalska, 2010; Decety & Svetlova, 2012; Gong et al., 2019; Puntillo et al., 2018; Seara-Cardoso et al., 2016). These impairments in emotional regulation, recognition, and reactivity can disconnect moral judgment from action, leading to exploitative behaviors without regard for others (Brazil, 2023; Di Tella et al., 2024; Garofalo et al., 2021; Marsh & Cardinale, 2014; Pletti et al., 2017; Porter et al., 2006; van Dongen, 2020; Velotti et al., 2024).

Psychopathy has been robustly linked to aggressive and harmful behaviours (Anderson & Kiehl, 2014; Blais et al., 2023; Dhingra & Boduszek, 2013; González Moraga et al., 2019; Hoareau et al., 2019; Levenson et al., 1995; Pechorro et al., 2022), as well as boredom, which is

an aversive state of wanting but failing to engage in meaningful activities (Boylan et al., 2021; Danckert & Merrifield, 2018; Eastwood et al., 2012). Similar to psychopathy, state boredom has been associated with harmful behaviours, such as non-suicidal self-harm (Havermans et al., 2015; Nederkoorn et al., 2016; Wilson et al., 2014; Yusoufzai et al., 2024) and sadistic aggression (Pfattheicher et al., 2021, 2023). Nonetheless, functional accounts of boredom have suggested that state boredom serves an adaptive role (Bench & Lench, 2019; Danckert et al., 2018; Danckert & Elpidorou, 2023). Given that state boredom is an inherently unpleasant experience, when bored, individuals may be motivated to pursue more stimulating or rewarding activities (Bench & Lench, 2019; Eastwood et al., 2012). Indeed, prior work has shown that state boredom motivates the pursuit of novel experiences, both positive (e.g., engaging in physical activity, increased prosocial intentions, creative outlets) and negative (e.g., bullying, destructive behaviours), suggesting that state boredom can drive both adaptive and maladaptive behaviour (Bench & Lench, 2019; Bieleke et al., 2022; Buckels et al., 2013; Pfattheicher et al., 2021, 2023).

However, boredom proneness, which is the tendency to experience state boredom more frequently and intensely (Tam et al., 2021), has been consistently linked to a wide range of maladaptive behaviours, ranging from rule-breaking (Boylan et al., 2021; Drody et al., 2022) and substance use (Biolcati et al., 2016; Martínez-Vispo et al., 2019; Sharp et al., 2011; Weybright et al., 2015) to aggression (Dahlen et al., 2004, 2005; Isacescu et al., 2017; Pfattheicher et al., 2023; Rupp & Vodanovich, 1997) and self-harm (Havermans et al., 2015; Nederkoorn et al., 2016). These behaviours may arise from a need for stimulation and novelty due to lack of external stimulation, and align with studies that link boredom proneness to increased impulsivity and

diminished self-control (Dahlen et al., 2004; Isacescu et al., 2017; Moynihan et al., 2017; Struk et al., 2016). While boredom can be attributed to an under-stimulating environment, internal factors, such as diminished emotional awareness and impaired emotional regulation, may also contribute to this aversive state (Eastwood et al., 2007; Weybright et al., 2022). Boredom prone individuals struggle to respond appropriately to emotional cues, which may drive negative emotions (e.g., frustration) and maladaptive behaviours (Tam et al., 2021; Trudel et al., 2024).

Indeed, deficits in the processing of emotional cues are observed in both boredom prone and psychopathic populations (Newman et al., 2010; Newman & Lorenz, 2003), suggesting a common etiological pathway involving attentional dysfunction in the manifestation of maladaptive behaviors. Although boredom susceptibility is a characteristic of psychopathy (Hare & Neumann, 2008), and both boredom proneness and psychopathy have been linked to maladaptive behaviours, the literature examining the effects of boredom on psychopathy and pain infliction behaviour remains scarce. While there is some evidence to suggest that boredom proneness intensifies pain infliction behaviours such as bullying (Pfattheicher et al., 2023) and online trolling behaviour (Lee, 2025; Pfattheicher et al., 2021) in "dark" traits, such as psychopathy and sadism, it is evident that further research is required to elucidate the complex interplay between boredom and psychopathy.

Crucially, although psychopathy is frequently viewed as a single, unified concept, it is more accurately understood as a collection of distinct, yet interconnected, personality dimensions (Hicks & Drislane, 2018; Sellbom & Drislane, 2021). Despite some debate surrounding psychopathy variants, the vast majority of studies have found strong evidence supporting distinct primary and secondary psychopathy variants (Hicks & Drislane, 2018; Sellbom & Drislane,

2021). Primary psychopathy encompasses traits such as a lack of remorse, manipulativeness, callousness, low anxiety, deficient affective experience, and fearlessness. In contrast, secondary psychopathy is composed of traits such as impulsivity, negative affect, disinhibition, and externalizing tendencies (Hare, 2003; Hicks & Drislane, 2018; Hofmann et al., 2021; Karpman, 1941; Levenson et al., 1995; Lykken, 1995; Sellbom & Drislane, 2021). As the extant literature largely supports the primary and secondary distinction, this thesis utilized this distinction throughout.

Some researchers have suggested that frequently used measurement tools for psychopathy, such as the Psychopathy Checklist—Revised (PCL-R; Hare, 2003), rely too heavily on criminality and behavioural maladjustment (Boduszek et al., 2022). This over-emphasis potentially limits the ability of these scales to assess psychopathy in non-criminal populations, as psychopathy does not imply criminal activity, nor should criminality be considered a core feature (Cooke & Michie, 2001). As such, the studies in this thesis utilized the Levenson Self-Report Psychopathy Scale (LSRP; Levenson., 1995), which was designed to assess psychopathy in non-institutionalized populations. The behavioural indicators included in the scale are more reflective of community life rather than overtly criminal actions (Brinkley et al., 2001, 2008). For instance, the questions pertaining to antisocial behaviour assess impulsivity, aggression, and other forms of externalizing psychopathology rather than explicit antisocial and criminal behaviour (Garofalo et al., 2019; Levenson et al., 1995; Psederska et al., 2020). Thus, the results from these studies provide additional insight into how psychopathy traits can manifest in non-criminal populations.

While the Levenson Self-Report Psychopathy Scale was originally conceptualized using the two-factor distinction (i.e., primary and secondary psychopathy), there is also evidence that a three-factor model, proposed by Brinkley and colleagues (2008), may capture the nature of psychopathy more accurately than the two-factor model. In this formulation, the original psychopathy subscale is parsed into three separable components of Egocentricity (representing interpersonal traits such as manipulative tendencies), Callousness (representing core affective deficits such as lack of empathy), and Antisocial (to capture impulsive and rule-breaking behaviours). The first two of these components correspond somewhat to primary psychopathy, while the third more closely corresponds to secondary psychopathy. This partitioning has demonstrated a superior model fit compared to the original two-factor model (Brinkley et al., 2008; Garofalo et al., 2019; Sellbom, 2011; Shou et al., 2017). Supporters of this three-factor model argue that partitioning the affective and interpersonal traits allows for more nuanced interpretation of psychopathy traits (Christian & Sellbom, 2016; Garofalo et al., 2019). Indeed, several studies have confirmed a three-factor structure that theoretically aligns with Cooke and Michie's (2001) conceptual framework and may have greater conceptual clarity compared to the two-factor model (Christian & Sellbom, 2016; Lagera & Sellbom, 2023).

However, other work has shown that the three-factor model only represents an incrementally better fit to the data and demonstrates poorer convergent and discriminant validity compared to the two-factor model (Salekin et al., 2014). Importantly, some items on the Levenson Self-Report Psychopathy Scale appear to assess both interpersonal and affective traits (e.g., "Success is based on survival of the fittest; I am not concerned about the losers"), suggesting that the original two-factor model may still be the optimal partitioning of the scale

(Redondo et al., 2023; Salekin et al., 2014). Indeed, the two-factor model is currently the most empirically and conceptually validated framework (Redondo et al., 2023). The two-factor model has demonstrated good convergent and discriminant validity, as well as acceptable internal consistency for primary, $\alpha = .83$, and secondary psychopathy, $\alpha = .69$ (Brinkley et al., 2001; Salekin et al., 2014). In the three-factor model, two of the three proposed factors (Callousness and Antisocial) have shown lower internal consistency, with Cronbach's alphas of .56 and .52, respectively (Garofalo et al., 2019). Furthermore, Callousness has shown inconsistent associations with measures of empathy, limiting its construct validity (Christian & Sellbom, 2016; Garofalo et al., 2019; Salekin et al., 2014; Sellbom, 2011).

Despite the psychometric concerns discussed above, additional analyses for each of the studies in this thesis were run using the three-factor model to examine whether this parsing of traits would yield similar patterns of results (Appendix A). The results showed largely comparable patterns to the findings using the primary versus secondary distinction, with Egocentricity emerging as the most consistent factor related to pain inflicting behaviours. It appears that the manipulative, antagonistic, and selfish interpersonal traits of primary psychopathy in particular influence pain infliction on others when there is no provocation or personal gain. This is consistent with literature showing that those high in primary psychopathy traits, particularly Egocentricity, are more likely to respond aggressively regardless of level of provocation (Bresin et al., 2022). A more detailed breakdown of these results can be found in Appendix A.

However, for all datasets presented in this thesis, the tripartite model showed poor internal consistency (Appendix A). Only Egocentricity consistently showed good reliability, with

the Cronbach's alphas ranging from .79-.84, whereas both Callousness and Antisocial demonstrated questionable to poor internal consistency, with Cronbach's alphas for Callousness ranging from .52-.69, and Cronbach's alphas ranging from .58-.65 for Antisocial. Callousness was particularly problematic, with three out of the four studies showing poor internal consistency ($\alpha < .60$; Appendix A). In contrast, the primary psychopathy scale showed good internal consistency ($\alpha = .82$-$.85$), and the secondary scale showed acceptable, albeit somewhat lower, internal consistency ($\alpha = .68$-$.72$). As such, the analyses presented here using the bipartite distinction of primary and secondary psychopathy appear warranted.

Given the fact that the current state of the literature does not definitively allow for a choice of one factor structure over another, the psychometric issues surrounding the three-factor model, and because a substantial body of research on psychopathy variants has found strong evidence supporting the differentiation between primary and secondary psychopathy (Hicks & Drislane, 2018; Sellbom & Drislane, 2021), the two-factor structure was utilized in this thesis for its simplicity of interpretation.[1] Additionally, a variety of recent studies have used the primary versus secondary distinction used in this thesis (Friedman et al., 2021; Kyranides et al., 2024; López-Villatoro et al., 2020; Wu et al., 2022). Nevertheless, recent efforts to expand the Levenson Self-Report Psychopathy Scale have largely ameliorated the psychometric issues present in the original scale (Christian & Sellbom, 2016; Lagera & Sellbom, 2023). Future studies should examine these relations using the three-factor model with the Expanded Levenson

[1] As a version of Chapter 3 using the two-factor model had already been published, the two-factor model was utilized throughout the studies in this thesis for the sake of consistency.

Self-Report Psychopathy Scale (E-LSRP; Christian & Sellbom, 2016) to explore these relationships with greater precision and depth.

1.1 The Present Investigations

This dissertation includes a series of studies that aimed to address the relationship between boredom, psychopathy, and the infliction of pain on others. While a variety of studies have examined how individuals with psychopathic traits make decisions that harm another person when there is potential gain, there is a relative dearth of literature on whether they will choose to inflict pain when they are unprovoked and there is nothing to gain. Removing these external motivators allowed for a more nuanced examination of the internal motivators (e.g., boredom) that contribute to aggressive and harmful behaviours in these individuals. Since state boredom acts as a motivator to change the current situation (Bench & Lench, 2019; Van Tilburg & Igou, 2012; Westgate & Wilson, 2018), causing pain to others may function well to alleviate this aversive state, especially in those with psychopathic traits. Additionally, boredom proneness may exacerbate sadistic behaviour in psychopathy, given the shared links between these traits and maladaptive behaviours. The current chapter (Chapter 1) addresses the current state of the literature examining how boredom and psychopathy independently relate to maladaptive behaviours, as well as gaps in the current understanding of how boredom and psychopathy interact to influence behaviour.

Chapter 2 explored whether boredom has a unique emotional body map compared to other emotions, as well as how bodily maps of emotion differ between those with higher and lower levels of our trait measures (i.e., boredom proneness, psychopathy, alexithymia, cognitive and affective empathy). This study utilized a novel method (the emBODY tool) to explore for

possible differences in how embodied representations are felt in those with psychopathy traits (N = 219). This was deemed important given that psychopathy is linked to emotional dysregulation, boredom proneness, and maladaptive behaviours, and boredom was a key focus in later chapters. Participants were presented with two silhouettes with a corresponding emotion and asked to indicate where they felt activity increase on one and decrease on the other. A latent profile analysis found four distinct patterns of activation for boredom. Psychopathy predicted decreased likelihood of belonging to the Deactivation profile. Participants' activation and deactivation maps were also analyzed across emotions. Individuals high in primary psychopathy had more sparsely represented maps for both positive and negative emotions, suggestive of a kind of emotional blunting. It appears that there is no specific pattern of embodied boredom for those high in psychopathy or boredom proneness, despite the fact that boredom is a common experience for these individuals. As such, it was reasonable to assume that the results in the following chapters would not be influenced by differences in the representation of state boredom as a function of differing levels of psychopathy or boredom proneness.

Chapter 3 investigated whether state boredom, psychopathy, sadism, and trait boredom proneness would exacerbate the tendency to inflict physical pain on others (overall N = 173, Boredom Condition n = 87, Interest Condition n = 86). Participants viewed a boring or interesting video mood induction before playing an online game under the ruse that there was another participant in the other room. The "winner" of the game was then given the chance to blast their opponent with white noise – presumably, an unpleasant experience. Psychopathy, primary psychopathy, and sadism were correlated with increased aggression strength. While boredom proneness and psychopathy were highly correlated in our sample (with a stronger

relation between boredom proneness and secondary psychopathy), neither boredom proneness nor state boredom were associated with increased aggression strength. In fact, in moderation models, state boredom *dampened* the effect of both psychopathy and primary psychopathy on aggressive actions such that those low in boredom and high in psychopathy (particularly primary psychopathy) were more likely to administer louder and longer noise blasts to their opponent. These findings suggest that motivations, other than boredom proneness, may underlie aggressive behaviours in those with high levels of psychopathic traits.

Across two studies, Chapter 4 examined whether psychopathy, trait boredom proneness, and sadism would increase the likelihood of inflicting social pain (Study 4A: $N = 496$, Study 4B: $N = 310$). Six novel scenarios were created depicting interpersonal situations in which participants had the option to either inflict negative or positive social outcomes on a fictional character. In Study 1, psychopathy and primary psychopathy predicted choosing a socially painful option, whereas boredom proneness did not. Boredom proneness was not a significant moderator between psychopathy and choosing socially painful options. However, few people chose the moderately socially painful option, potentially affecting the results due to range restriction. To address this, questions asking participants to rate their likelihood of choosing each individual response option, with a Likert scale ranging from 1 to 10, were added in the second study. Psychopathy and sadism predicted choosing a socially painful option. While boredom proneness did not, on its own, predict choosing a socially painful option, it was a positive moderator of the relationship between psychopathy and likelihood of choosing socially painful options. The same result was found for primary psychopathy, but not secondary psychopathy. These findings showed that psychopathy, particularly primary psychopathy, may play a role in

social pain infliction, especially when coupled with high boredom proneness. Taken together, these results suggest that while boredom proneness influences the relationship between psychopathy and social pain infliction, these effects are somewhat mixed.

The final chapter concludes with a general summary of the findings and a discussion of several possibilities behind the inconsistencies in the influence of boredom on pain infliction behaviour in psychopathy. This chapter also contains a critical examination of the methodological constraints surrounding psychopathy and boredom proneness research and proposes potential avenues for subsequent investigations.

Chapter 2: Bodily Maps of Emotion in Boredom and Psychopathy

2.1 Introduction

Emotions are often felt in the body, as evidenced by prior work showing that people are able to feel distinct bodily changes corresponding to different emotions, suggesting that perceptions of these physical sensations play a key role in the conscious experience of emotions (Herman et al., 2022; Nummenmaa et al., 2013). While theoretical accounts of emotion differ in terms of the exact mechanisms underlying the connection between emotional experiences and embodied states or physiological signatures (Bard, 1928; Cannon, 1927; Hoemann et al., 2020; James, 1948; Lange, 1885; Schachter & Singer, 1962), one thing is clear—emotions are embodied.

Boredom is described as the state in which one wishes to engage with their environment, but finds the currently available options for engagement to be unsatisfactory (Danckert & Elpidorou, 2023; Eastwood et al., 2012). As such, boredom may not be best characterized a "pure" emotion but rather, as a cognitive-affective experience that Eastwood and Gorelik (2019) call the "feeling of thinking", a feeling that drives engagement with the environment in both positive and negative ways (Danckert & Eastwood, 2020; Eastwood & Gorelik, 2019). Nevertheless, boredom too is embodied. The most common bedfellows of boredom are the opposites of ennui (or fatigue, lethargy, etc.) and restlessness or agitation (e.g., Danckert, Hammerschmidt, et al., 2018; but see Martin et al., 2006 and Harris, 2000 for comprehensive descriptions of the felt experience of boredom). Such experiences may be exaggerated in those high in the trait disposition to experience boredom more frequently and intensely—the so-called

boredom prone (Tam et al., 2021). Clearly, the experience of boredom is a complex one, potentially accompanied by multifaceted felt sensations.

Interoception, the sense that allows individuals to perceive and interpret internal bodily signals, provides awareness of physiological states and contributes to emotional regulation and self-awareness (Chen et al., 2021). A recent study examining the relation between boredom proneness and interoception found that boredom prone individuals struggle to interpret internal states despite a strong focus on those same states (Trudel et al., 2024). This fits well with findings that show those high in boredom proneness also report higher levels of alexithymia, a condition characterized by difficulties recognizing, identifying, and expressing emotions (Eastwood et al., 2007; Taylor, 2000; Taylor et al., 1999). Taken together, these findings suggest that boredom prone individuals may not have a clear embodied representation of in-the-moment experiences of the state of boredom.

As previously mentioned in Chapter 1, boredom proneness has been extensively linked to maladaptive behaviours. Similarly, alexithymia has previously been linked to elevated levels of aggression, with impulsivity and emotional dysregulation mediating this relationship (Velotti et al., 2016). In line with this, deficits in emotional regulation and empathetic impairments linked to alexithymia may contribute to the impulsive and aggressive tendencies in psychopathy (Garofalo et al., 2021; Velotti et al., 2016). Some conceptual frameworks have suggested that the diminished ability to interpret one's own affective states may impair empathetic experiences (Bird & Viding, 2014; Valdespino et al., 2017). Consistent with this, alexithymia was found to mediate the relationship between psychopathy and empathy, indicating that these socioemotional impairments may be at the root of antisocial behaviour (Di Tella et al., 2024). This is further

substantiated by a meta-analysis that found shared neural correlates underlying interoception, emotion, and social information processing (Adolfi et al., 2017).

Theoretical accounts suggest that emotional processing is closely tied to moral development, a process that is disrupted in psychopathy (Blair et al., 2013; Haidt & Björklund, 2008; Nichols, 2002; Prinz, 2006). The notion that moral judgement and behaviour are critically influenced by emotional processing has been supported in a variety of studies (Avramova & Inbar, 2013; Blair et al., 2013; Nichols, 2002; Teper et al., 2015). In line with this, a number of studies have found evidence to support the notion that individuals scoring high in psychopathy demonstrate aberrant emotional processing, impaired affective responsiveness, as well as reduced guilt and empathy, factors that may facilitate moral transgressions (Burghart & Mier, 2022; Campos et al., 2022; Gong et al., 2019; Hoppenbrouwers et al., 2016; Long et al., 2014; Marsh & Cardinale, 2014; Northam & Dadds, 2020; Seara-Cardoso et al., 2016; Velotti et al., 2024).

Additionally, recent meta-analyses found that both cognitive empathy, the ability to understand another's emotions from their perspective, and affective empathy, the capacity to emotionally resonate with others, are both diminished in psychopathy, with a stronger effect observed for affective empathy (Burghart & Mier, 2022; Campos et al., 2022). Despite these affective empathy deficits, individuals with higher levels of psychopathy traits have shown an intact ability to successfully identify others' emotions (Decety et al., 2015), suggesting that these individuals process emotional signals using higher-level cognitive processes rather than automatic affective responses (Brennan & Baskin-Sommers, 2021; Hartmann & Schwenck, 2020; Vitale et al., 2018). This dichotomy allows psychopaths to manipulate others' emotions

without experiencing guilt or remorse (Blair, 2008; Mullins-Nelson et al., 2006; Wai & Tiliopoulos, 2012), a pattern that is particularly evident for primary psychopathy (Campos et al., 2022; Wai & Tiliopoulos, 2012). Conversely, in secondary psychopathy, impairments appear to manifest more within the domain of executive functioning (e.g., emotional volatility, impulsivity), resulting in greater impairments in cognitive empathy, such as difficulties perspective shifting from oneself to others (Campos et al., 2022; Hofmann et al., 2021; Ogilvie et al., 2011; Ross et al., 2007). Much less is known about how trait boredom relates to empathy. However, as discussed above, those high in trait boredom proneness do tend to exhibit poor self-regulatory control particularly in affective domains (Eastwood et al., 2007; Trudel et al., 2024; Weybright et al., 2022).

Given that later chapters in this thesis will explore how boredom proneness interacts with psychopathy to influence antisocial behaviours (whether that is inflicting physical pain on others; Chapter 3, or willingness to inflict social pain; Chapter 4), the current chapter first aimed to investigate whether these individual traits would lead to meaningful differences in the representation of emotions. This was particularly important for the representation of state boredom, first because little to nothing is known about how psychopathic traits interact with boredom to influence pain infliction behaviour, and second, because boredom will play a prominent role in subsequent chapters. As both boredom proneness and psychopathy are implicated in maladaptive behaviours and both are linked to emotional dysregulation, the current chapter sought to examine differences in how those high and low in these traits experience a variety of embodied emotions.

The current chapter explored how individuals represent boredom and other affective experiences in their bodies by asking them to indicate where in their body they felt particular emotions. The range of emotions examined included those typically tested in affective science (what might best be labelled the Ekman 6; Ekman, 1992) and a broader range of relevant emotions (e.g., hostility, embarrassment, humiliation). Participants were asked to rate where in the body they experienced emotions including boredom, with trait measures of boredom proneness and psychopathy explored to determine whether they would influence these embodied representations. In addition, measures of alexithymia and self-control, both of which show moderate to strong relations with both boredom proneness and psychopathy, were included as possible determinants of embodied affective representations (Eastwood et al., 2007; Isacescu et al., 2017; Levenson et al., 1995). Finally, measures of cognitive and affective empathy were included as emotional deficits in these domains are evident in psychopathy (Campos et al., 2022). This work was necessarily exploratory precluding any specific directional hypotheses regarding the influence of these factors on body maps of boredom or other affective states.

2.2 Method

2.2.1 Participants

A total of 219 participants took part in the study. Those who failed to respond to one or more of the emotion words were removed prior to data analysis, reducing our sample to 176 participants (141 female, 26 male, 1 preferred to self-identify, 6 trans/non-binary, 2 no gender response; < 18 years old = 1, 18-24 years old = 155, 24-39 years old = 13, 39-54 years old = 6, no age response = 1). Individuals participated in exchange for one course credit and accessed the study through SONA, administered online through Qualtrics. All participants provided informed

consent prior to taking part in the study. The study was cleared by the University of Waterloo's Office of Research Ethics (protocol code 45819, approved August 23, 2024).

2.2.2 Measures

Psychopathy. Psychopathy was measured using the 26-item Levenson Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995). The LSRP was designed to assess psychopathy in non-incarcerated populations, and contains 16 items that assess primary psychopathy, and 10 items that assess secondary psychopathy. Responses are assessed on a 4-point Likert scale ranging from 1 ("*disagree strongly*") to 4 ("*agree strongly*"). An example item is "In today's world, I feel justified in doing anything I can get away with to succeed". The scale has demonstrated acceptable reliability and validity, as well as internal consistency, with Cronbach's alphas of .83 and .69 for the two subscales (Brinkley et al., 2001). The LSRP's primary and secondary psychopathy trait profiles closely align with profiles from other well-validated scales and demonstrates strong convergent and criterion validity, suggesting it effectively captures key psychopathy traits across various measures and correlates (Weiss et al., 2020). While there may be concerns about social desirability biases, particularly given that psychopathy is associated with tendencies toward manipulation and deception, a previous meta-analysis demonstrated a negative relation between social desirability and self-reported psychopathic traits, suggesting that response distortion is limited (Ray et al., 2013).

Boredom. Boredom was measured using the 8-item Short Boredom Proneness Scale (SBPS; Struk et al., 2017). Items are scored on a Likert Scale ranging from 1 ("*strongly disagree*") to 7 ("*strongly agree*"). An example item is "I find it hard to entertain myself". Higher scores on the SBPS correspond with greater levels of trait boredom proneness. Good

internal consistency (α = .88) and construct validity has previously been found for the SBPS (Struk et al., 2017).

Alexithymia. Alexithymia was measured using the 20-item Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994). It is rated on a 5-point Likert scale ranging from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). An example item is "It is difficult for me to find the right words for my feelings". It has good internal consistency, with a Cronbach's alpha of .81 (Bagby et al., 1994). It has also demonstrated good construct validity and factorial validity (Bagby et al., 2020).

Self-Control. Self-control was measured using the 13-item Brief Self-Control Scale (BSCS; Tangney et al., 2004). It is scored on a 5-point Likert scale ranging from 1 ("*not at all like me*") to 5 ("*very much like me*"). An example item is "I wish I had more self-discipline". It has demonstrated good internal consistency, with Cronbach's alphas ranging from .83 to .91, as well as good construct validity (Manapat et al., 2021; Tangney et al., 2004).

Empathy. Empathy was measured using the 31-item Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2011). The QCAE has 19 items assessing cognitive empathy and 12 items assessing affective empathy. Responses are assessed on a 4-point Likert scale ranging from 1 ("*strongly disagree"*) to 4 ("*strongly agree*"). An example item for affective empathy is "I am happy when I am with a cheerful group and sad when the others are glum". An example item for cognitive empathy is "I am quick to spot when someone in a group is feeling awkward or uncomfortable". It has demonstrated acceptable internal consistency, with the Cronbach's alphas for the five subscales (perspective-taking, online simulation, emotion contagion, proximal responsivity, and peripheral responsivity) ranging from .65 to .85. Cognitive

empathy is reflected by the first two subscales, whereas affective empathy is reflected by the last three subscales. The scale has also demonstrated convergent validity and construct validity (Reniers et al., 2011).

2.2.3 Procedure

A modified version of the emBODY tool was utilized for this study, where the emotion-related words "neutral" and "depression" were removed, and "hostility," "boredom," "humiliation," and "embarrassment" were included instead (Nummenmaa et al., 2013). The outlines of two human figures were shown to participants, accompanied by a word that represented one of 16 emotions (six basic emotions and ten non-basic emotions; Figure 2.1). The emotions included were: anger, fear, disgust, happiness, sadness, surprise, anxious, love, contempt, pride, shame, envy, hostility, boredom, humiliation, and embarrassment. The presentation order of the emotion words was randomized. Participants were asked to use the computer's mouse to shade the regions on one figure where they felt emotional activity increased and to mark the areas on the other figure where they sensed a reduction in activity in response to each emotion (Figure 2.1). The program recorded the number of times the mouse passed over each of the pixels within the silhouettes. Participants then completed a series of surveys on Qualtrics that included measures of boredom proneness, psychopathy, alexithymia, empathy, and self-control. The order of the surveys was the same across participants; however, questions within each survey were randomized. Demographic information (i.e., age, gender, faculty) were also collected.

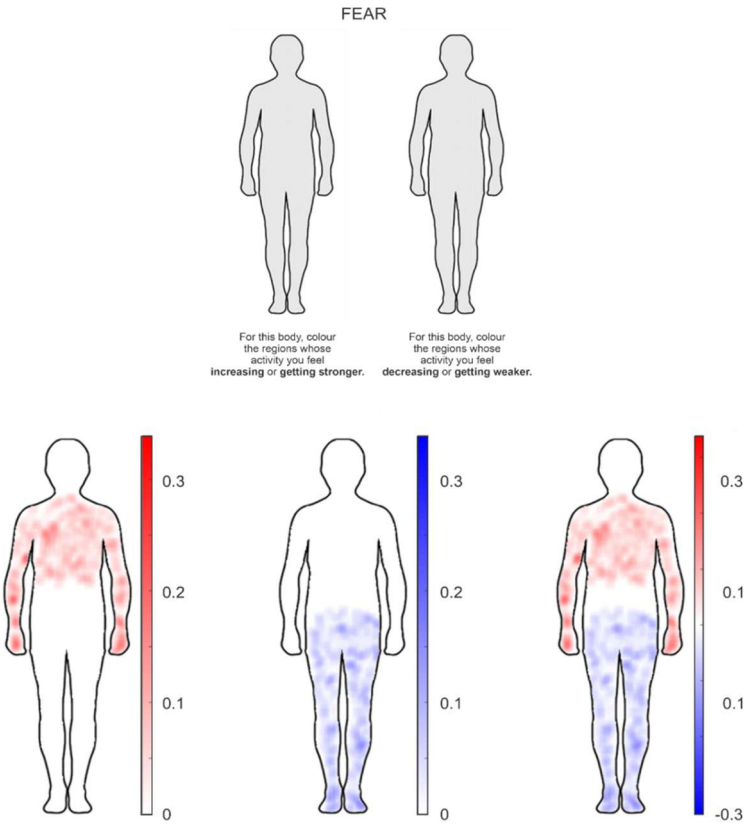


Figure 2.1 Representation of the trial and an individual's response to emotion prompt "fear". Participants first draw (using the mouse) where they feel activity increasing or getting stronger (shown in red on the right) and then indicate on a separate manikin where they feel activity decreasing or getting weaker (shown in blue in the middle bottom image). These maps are then combined in the analysis to give a complete picture of where in the body an emotion was experienced.

2.2.4 Data Analysis

First, correlations between the trait variables were examined, followed by the aggregate body maps for each emotion. Subsequently, profiles of activity were examined for boredom, with logistic regressions conducted to examine how the trait measures would predict membership in each profile. Body maps for each emotion were produced following the methods outlined by Nummenmaa and colleagues (2013). The experiment code used can be found here: https://version.aalto.fi/gitlab/eglerean/embody. The activation and deactivation maps for each emotion were created using pixel values, with magnitude representing the degree of colouring (i.e., the total number times the mouse passed over a given pixel). The extent to which a participant repeatedly marked a specific region of the body was indicated by saturation of the colour shown. That is, the more a region was marked, the more saturated the depicted colour (Figure 2.1). To create a single body map for each emotion, pixel values for the deactivation silhouette were subtracted from the values of the corresponding pixels in the activation silhouette.

To create aggregate body maps across participants, mass univariate t-tests comparing pixel values against zero were conducted with a false discovery rate correction applied (i.e., Benjamini-Hochberg procedure, $\alpha = .05$ across all tests). The resulting t-values were plotted on the silhouettes, with positive (activation) values shown in warm tones and negative (deactivation) values shown in cool tones.

Consistent with the methods of Nummenmaa and colleagues (2013), the discriminability of each emotion was assessed by first performing a Principal Component Analysis (PCA) to reduce the dataset to 30 principal components. These components were then analyzed using

Linear Discriminant Analysis (LDA), a statistical pattern recognition method that evaluates the classifier's ability to differentiate one emotion from all others (one-out classification) or all emotions from one another (complete classification). A 50-fold cross-validation procedure was employed, and the process was repeated 100 times. For ANOVAs presented throughout the article, where the assumption of sphericity was violated, a Greenhouse-Geisser correction was applied.

2.3 Results

Correlations across all variables are shown in Table 2.1. Psychopathy and primary psychopathy were both negatively correlated with affective empathy, whereas neither psychopathy, nor either of its variants, were correlated with cognitive empathy. Boredom proneness and alexithymia were positively associated with psychopathy and its variants, whereas self-control was negatively associated with these traits. Replicating prior work, boredom proneness was negatively correlated with self-control and positively correlated with alexithymia (Eastwood et al., 2007; Isacescu & Danckert, 2018; Struk et al., 2017). Furthermore, boredom proneness was positively correlated with psychopathy and its variants. This relation was stronger for secondary psychopathy (z = -5.78, p < .001), when directly compared to those same relations with primary psychopathy. Secondary psychopathy also showed a stronger negative relation with self-control (z = 5.23, p < .001) and a stronger positive relation with alexithymia (z = -2.92, p = .003) when contrasted with those same relations in primary psychopathy. Alexithymia was not significantly linked to either cognitive or affective empathy but was positively correlated with psychopathy and its variants. Despite the predominantly female sample, two-sample t-tests revealed no significant gender differences between trait measure scores (ps > .05).

Table 2.1. Correlations between main variables

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6	7	8
1. Psychopathy	50.66 (10.02)	0.45	-0.23	-	.92***	.78***	-.03	-.18*	.42***	-.52***	.31***
2. Primary Psychopathy	30.01 (7.15)	0.78	0.50		-	.48***	.06	-.22**	.21*	-.32***	.18*
3. Secondary Psychopathy	20.64 (4.37)	0.08	-0.31			-	-.16	-.04	.62***	-.67***	.41***
4. Cognitive Empathy	62.54 (8.32)	0.03	0.34				-	.40***	-.10	.17*	-.12
5. Affective Empathy	35.57 (5.07)	-0.28	0.02					-	.07	-.03	.00
6. Boredom Proneness	28.29 (10.18)	0.16	-0.63						-	-.59***	.50***
7. Self-Control	40.44 (8.98)	0.16	-0.48							-	-.32***
8. Alexithymia	53.61 (12.15)	-0.01	-0.55								-

Note. * $p < .05$; ** $p < .01$; *** $p < .001$. $N = 149$.

2.3.1 Body Maps

Body maps for each of the 16 emotions are presented in Figure 2.2. Warm tones in the maps indicate self-reports of increased activation and cool tones indicate self-reports of decreased activation. Patterns of activation largely replicated those observed by Nummenmaa and colleagues (2013). For instance, anger was associated with increased activation in the head, torso, and arms; sadness was linked to increased activation in the head and torso, along with decreased activation in the legs; and happiness was associated with increased activation throughout the body. The average boredom map showed only sparse representations relative to the other emotions and was associated with a slight decrease in activation in the chest, stomach, and arms, as well as increased activation in the hands and feet (Figure 2.2). Results of the one-out LDA revealed a mean accuracy of 93.49% (SD = 0.00), while the complete classification demonstrated an above chance level (6.25%) accuracy of 15.21% (SD = 0.01), indicating that the emotions showed distinct patterns of activation. These results did not change when boredom was removed from the group of states to be evaluated (i.e., one-out LDA mean accuracy = 93.10 (SD = 0.00), complete classification accuracy = 14.68 (SD = 0.08)).

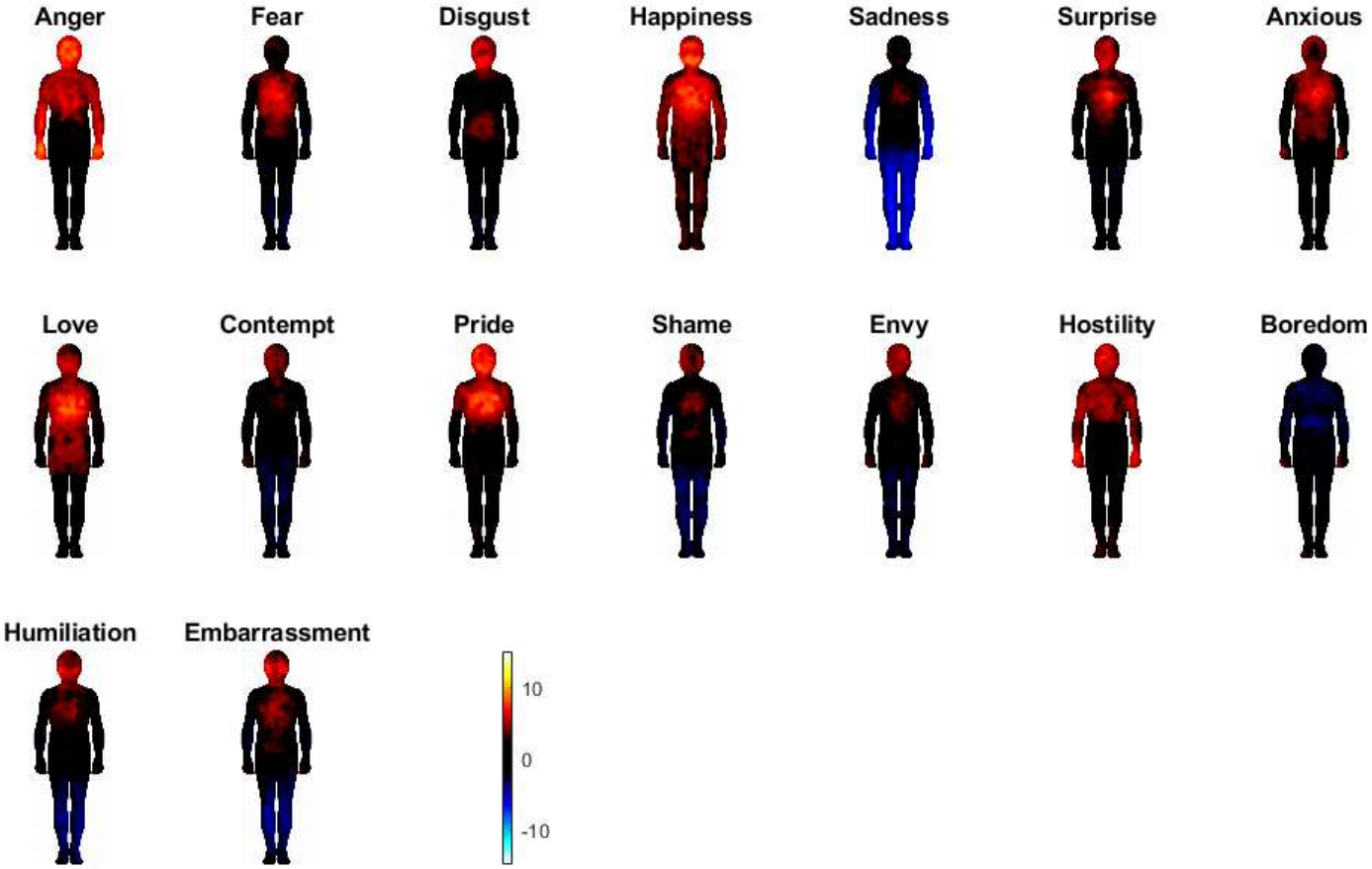


Figure 2.2. Bodily sensation maps for each emotion. Warm tones indicate areas of increased activation while cool tones indicate regions associated with deactivation. Colour intensities are based on the magnitude of the t-values.

2.3.2 Latent Profile Analysis

Since no strong pattern of activity emerged for the boredom map, additional exploratory anlayses were conducted to determine whether there were distinct profiles of representation for boredom and to explore whether these profiles might relate to variations in trait variables of either psychopathy, boredom proneness, self-control, alexithymia, cognitive empathy, or affective empathy. To this end, participants' data was recoded such that each pixel was assigned a value of 1 if it was predominantly associated with activation, -1 if it was associated with deactivation or 0 if it was not coloured. Since participants were given no specific instructions

about the amount to colour in the pixels, it was determined that this variable (i.e., the number of times the mouse passed over a given pixel) would be challenging to interpret succinctly. As such, this information was not retained in the current analysis. Areas of interest corresponding to the head, torso, arms, hands, legs, and feet were created with the pixel values within each region summed for each participant. These values indicated whether each region was predominantly associated with activation (positive values), deactivation (negative values), or little to no activation (values near zero).

Next, a latent profile analysis (LPA) was conducted using the tidyLPA package in R to identify distinct classes or subgroups (i.e., profiles) of responders based on participants' colouring patterns across the regions of interest. Given the exploratory nature of this analysis, there were no expectations regarding the number of profiles that would best fit the data. As such, different models were specified with different ranges of profiles and the tidyLPA package was used to select the optimal model applying various model fit criteria (i.e., the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), the Approximate Weight of Evidence (AWE), the Classification Likelihood Criterion (CLC) and the Kullback Information Criterion (KIC)). These criteria were used to determine the optimal number of profiles within the specified range. Each time the highest number of profiles was selected as optimal, the range of profiles was increased by one and this process was repeated until the highest value no longer emerged as the optimal model. When comparing models consisting of one to five profiles, a model consisting of four profiles was found to be optimal. Thus, four profiles were included in the LPA. The model demonstrated good fit indices (e.g., AIC = 22181.85, BIC = 22403.78, AWE = 22851, CLC = 22348, KIC = 22463), excellent accuracy in classifying the profiles (entropy = 0.96) and high confidence in assigning individuals to the profiles, with average posterior

probabilities ranging from 0.91 to 1.00. The resulting profiles were classified into four categories: Deactivation, marked by predominant deactivation (Profile 1); Activation, characterized by notable levels of activation across regions (Profile 2); Low Activation, reflecting little to no activation or deactivation across all regions (Profile 3); and Mixed Activation, showing a combination of activation and deactivation across regions (Profile 4). The mean response patterns for each of the profiles across all regions of interest and their associated embodied maps are presented in Figure 2.3.

To determine whether each of the profiles exhibited similar response patterns across the other emotions, the total number of pixels coloured by participants for each of the emotions was calculated (Figure 2.4). Recall that the data used for the LPA consisted of summed pixel values for each region of interest, where individual pixels with values of -1 represented deactivation, those with values of 0 represented no activation, and those with values of 1 represented increased activation. To remain consistent with this analysis, when calculating how many pixels each of the profiles indicated for boredom, the absolute values of the original summed pixels values were summed for each of the body regions. These values were submitted to a mixed factorial ANOVA with emotion as a within-participants factor and profile membership as a between-participants factor. There was a main effect of profile membership, $F(3, 159) = 12.75$, $p < .001$, $\eta_p^2 = .19$, as well as a main effect of emotion, $F(12.39, 1970.75) = 15.01$, $p < .001$, $\eta_p^2 = .09$. There was also an interaction between profile membership and emotion, $F(37.18, 1970.75) = 3.50$, $p < .001$, $\eta_p^2 = .06$. Pairwise comparisons, Bonferroni adjusted, revealed that the Low Activation group indicated significantly fewer pixels than the Activation and Deactivation groups for anger, happiness and fear, and that this group indicated significantly fewer pixels than the Activation group for disgust, anxious, contempt, embarrassment, envy, and hostility (ps $< .05$). This group

also indicated significantly fewer pixels than the Activation, Deactivation, and Mixed groups for boredom alone (*p*s < .001). No other group differences were found across any of the emotions (*p*s > .05).

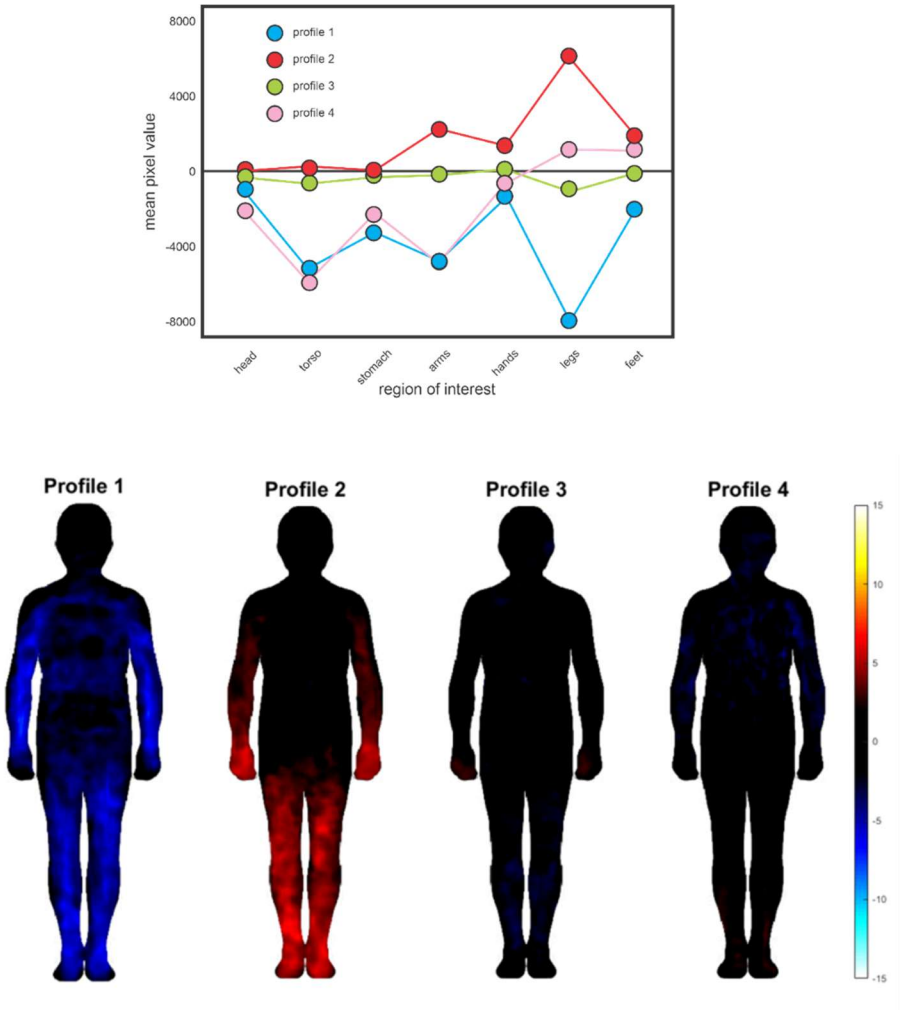


Figure 2.3. Upper Panel: LPA results for participants' colouring patterns across the regions of interest within the body maps for boredom. Points in the graph mark the total number of pixels indicated for each region of interest, averaged across participants. Lower Panel: Corresponding body maps for each profile determined by LPA. *Note:* colouring pattern appears muted for Profile 4 due to the low number of participants.

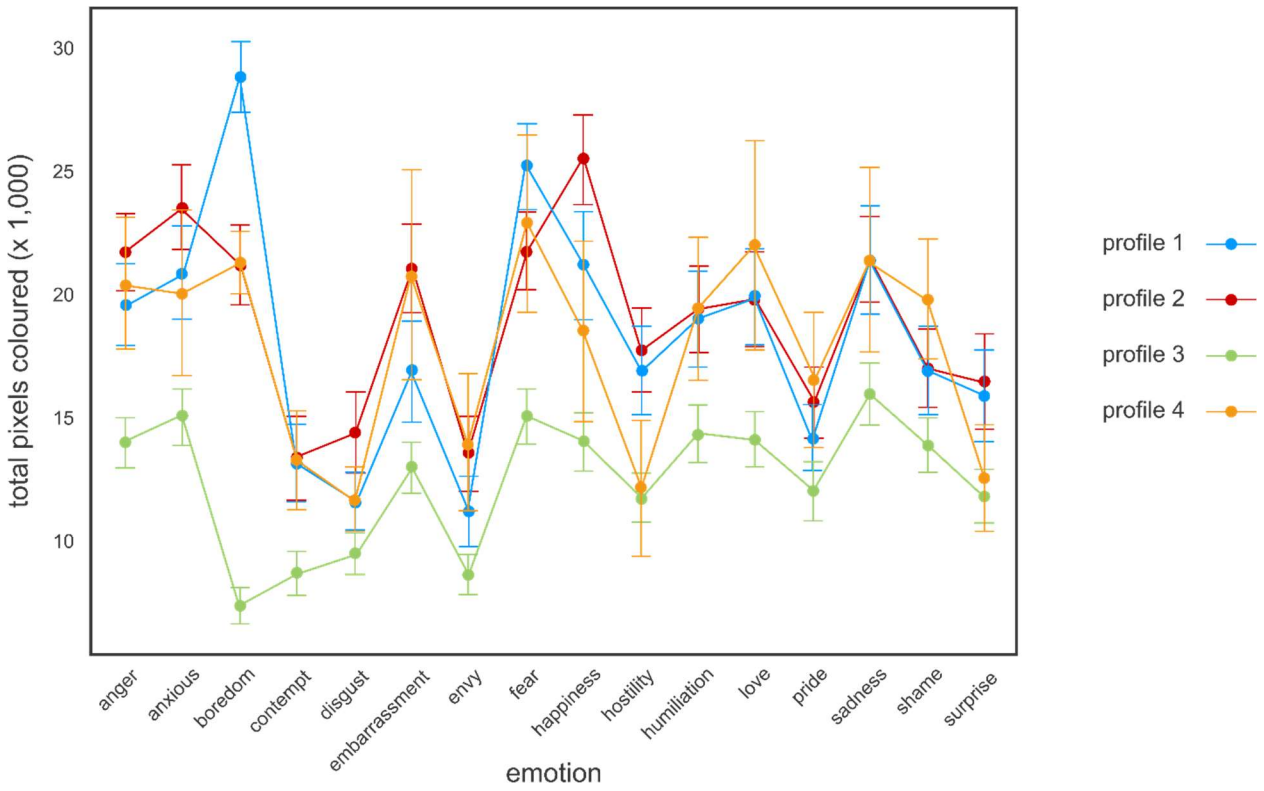


Figure 2.4. Total number of pixels coloured for each emotion for each profile

Four separate logistic regressions were then run with psychopathy, boredom proneness, self-control, alexithymia, cognitive empathy, and affective empathy predicting membership in one of the four profiles. Participants with missing responses on any of the trait measures were removed prior to conducting this analysis ($N_{analyzed}$ = 149). Before conducting this analysis, the trait measures were explored to examine whether they differed based on profile membership. None of the trait measures were found to differ significantly as a function of profile membership (ps < .05; Table 2.3). Descriptive statistics for the trait variables as a function of profile membership are presented in Table 2.2. As shown in Table 2.3, with the exception of a negative relation between psychopathy and membership in the Deactivation profile and a negative relation between alexithymia and membership in the Low Activation profile (Profile 3), no relations were

found between the traits and profile membership. When psychopathy was split into primary and secondary psychopathy, only the negative relation between alexithymia and the Low Activation profile remained (Table 2.4).

Table 2.2. Descriptive statistics for trait variables within each profile

Profile	*N*	Boredom Proneness *M (SD)*	Self-Control *M (SD)*	Alexithymia *M (SD)*	Psychopathy *M (SD)*	Primary Psychopathy *M (SD)*	Secondary Psychopathy *M (SD)*	Cognitive Empathy *M (SD)*	Affective Empathy *M (SD)*
Deactivation	28	28.11 (8.99)	39.89 (9.92)	54.50 (11.8)	47.11 (8.09)	27.25 (5.30)	19.86 (4.10)	61.14 (9.01)	36.21 (5.40)
Activation	37	28.03 (10.00)	38.95 (9.13)	55.27 (13.99)	51.49 (9.51)	30.30 (6.81)	21.19 (4.44)	62.35 (7.88)	35.45 (4.19)
Low	76	27.8 (10.90)	41.50 (8.59)	51.62 (11.05)	51.47 (10.86)	30.87 (7.77)	20.61 (4.60)	63.22 (8.49)	34.92 (5.34)
Mixed	8	34.75 (6.56)	39.12 (8.90)	61.75 (11.66)	51.50 (8.91)	30.25 (6.96)	21.25 (2.43)	61.75 (6.67)	37.75 (4.68)

Note. Values were computed after removing participants with missing responses on the any of the scales. $N = 149$.

Table 2.3. Logistic regressions with trait variables predicting profile membership for boredom

		Odds Ratio	Lower 95% CI	Upper 95% CI	*B (SE)*	*p*	Nagelkerke Pseudo R^2
Deactivation	Psychopathy	0.92	0.86	0.98	-0.08 (0.03)	.013*	.11
	Boredom Proneness	0.99	0.94	1.05	-0.01 (0.03)	.841	
	Self-Control	0.95	0.89	1.02	-0.05 (0.03)	.168	
	Alexithymia	1.02	0.98	1.06	0.02 (0.02)	.409	
	Cognitive Empathy	0.97	0.91	1.03	-0.03 (0.03)	.256	
	Affective Empathy	1.02	0.93	1.13	0.02 (0.05)	.648	
Activation	Psychopathy	1.00	0.96	1.05	0.00 (0.02)	.837	.04
	Boredom Proneness	0.96	0.91	1.01	-0.04 (0.03)	.142	
	Self-Control	0.96	0.91	1.02	-0.04 (0.03)	.191	
	Alexithymia	1.02	0.99	1.06	0.02 (0.02)	.252	
	Cognitive Empathy	0.99	0.94	1.05	-0.01 (0.03)	.843	
	Affective Empathy	1.03	0.94	1.13	0.03 (0.05)	.502	
Low Activation	Psychopathy	1.04	1.00	1.09	0.04 (0.02)	.075	.13
	Boredom Proneness	1.02	0.98	1.07	0.02 (0.02)	.310	
	Self-Control	1.05	1.00	1.10	0.05 (0.03)	.077	
	Alexithymia	0.96	0.93	1.00	-0.04 (0.02)	.029*	
	Cognitive Empathy	1.03	0.98	1.08	0.03 (0.02)	.258	
	Affective Empathy	0.94	0.87	1.02	-0.06 (0.04)	.122	
Mixed Activation	Psychopathy	0.99	0.89	1.09	-0.01 (0.05)	.861	.16
	Boredom Proneness	1.07	0.97	1.18	0.06 (0.05)	.204	
	Self-Control	1.03	0.92	1.15	0.03 (0.06)	.576	
	Alexithymia	1.06	0.98	1.14	0.05 (0.04)	.153	
	Cognitive Empathy	0.97	0.88	1.07	-0.03 (0.05)	.495	
	Affective Empathy	1.15	0.96	1.42	0.14 (0.10)	.161	

Note. $N = 149$, * $p < .05$

Table 2.4. Logistic regressions with trait variables predicting profile membership for boredom (with psychopathy split into variants)

		Odds Ratio	Lower 95% CI	Upper 95% CI	*B (SE)*	*p*	Nagelkerke Pseudo R^2
Deactivation	Primary Psychopathy	0.93	0.85	1.00	-0.08 (0.04)	.072	.11
	Secondary Psychopathy	0.90	0.75	1.06	-0.11 (0.09)	.227	
	Boredom Proneness	1.00	0.94	1.06	-0.00 (0.03)	.902	
	Self-Control	0.95	0.88	1.02	-0.05 (0.04)	.168	
	Alexithymia	1.02	0.98	1.06	0.02 (0.02)	.395	
	Cognitive Empathy	0.96	0.91	1.02	-0.04 (0.03)	.244	
	Affective Empathy	1.02	0.93	1.13	0.02 (0.05)	.625	
Activation	Primary Psychopathy	0.99	0.93	1.06	-0.01 (0.03)	.858	.04
	Secondary Psychopathy	1.04	0.90	1.19	0.04 (0.07)	.594	
	Boredom Proneness	0.96	0.90	1.01	-0.04 (0.03)	.122	
	Self-Control	0.97	0.91	1.02	-0.03 (0.03)	.264	
	Alexithymia	1.02	0.98	1.06	0.02 (0.02)	.261	
	Cognitive Empathy	1.00	0.95	1.05	-0.00 (0.03)	.926	
	Affective Empathy	1.03	0.94	1.13	0.03 (0.05)	.556	
Low Activation	Primary Psychopathy	1.04	0.98	1.10	0.04 (0.03)	.227	.13
	Secondary Psychopathy	1.05	0.93	1.20	0.05 (0.06)	.415	
	Boredom Proneness	1.02	0.98	1.07	0.02 (0.02)	.361	
	Self-Control	1.05	1.00	1.10	0.05 (0.03)	.082	
	Alexithymia	0.96	0.93	1.00	-0.04 (0.02)	.028*	
	Cognitive Empathy	1.03	0.98	1.08	0.03 (0.02)	.250	

	Affective Empathy	0.94	0.87	1.02	-0.06 (0.04)	.119	
Mixed Activation	Primary Psychopathy	1.04	0.91	1.19	0.04 (0.07)	.557	.18
	Secondary Psychopathy	0.87	0.64	1.14	-0.14 (0.15)	.333	
	Boredom Proneness	1.09	0.98	1.21	0.08 (0.05)	.124	
	Self-Control	1.03	0.91	1.16	0.03 (0.06)	.659	
	Alexithymia	1.06	0.99	1.15	0.06 (0.04)	.120	
	Cognitive Empathy	0.96	0.86	1.06	-0.05 (0.05)	.378	
	Affective Empathy	1.17	0.97	1.46	0.16 (0.10)	.127	

Note. $N = 149$, * $p < .05$.

2.3.3 Pixel Plots Across All Emotions

An additional aim was to examine whether high and low levels of the trait measures would influence the amount of activation and deactivation participants indicated across emotions. To do this, the number of activation pixels across each emotion were plotted for high and low tertile scorers for each of the trait measures. This process was repeated for the deactivation pixels. No significant interaction between any of our trait measures and emotion was found.

Activation Plots. A significant main effect of primary psychopathy on overall activation pixels was found, $F(1, 106) = 7.32$, $\eta^{p2} = 0.02$, $p = .008$, such that those high in primary psychopathy generally indicated *less* overall activation compared to those low in primary psychopathy (Figure 2.5). Those high in primary psychopathy indicated significantly fewer activation pixels for anger, $t(106) = -2.33$, $p = .022$, fear, $t(106) = -2.00$, $p = .048$, happiness, $t(106) = -2.82$, $p = .001$, anxiety, $t(106) = -2.59$, $p = .011$, and contempt, $t(106) = -2.04$, $p = .044$. A significant main effect of alexithymia on overall activation pixels was also found, $F(1, 108) = 5.38$, $\eta^{p2} = 0.02$, $p = .022$, such that those high in alexithymia indicated *more* overall activation compared to those low in alexithymia (Figure 2.6). No main effect of boredom proneness, psychopathy, or secondary psychopathy was observed for overall indications of activation (Figures 2.7-2.9).

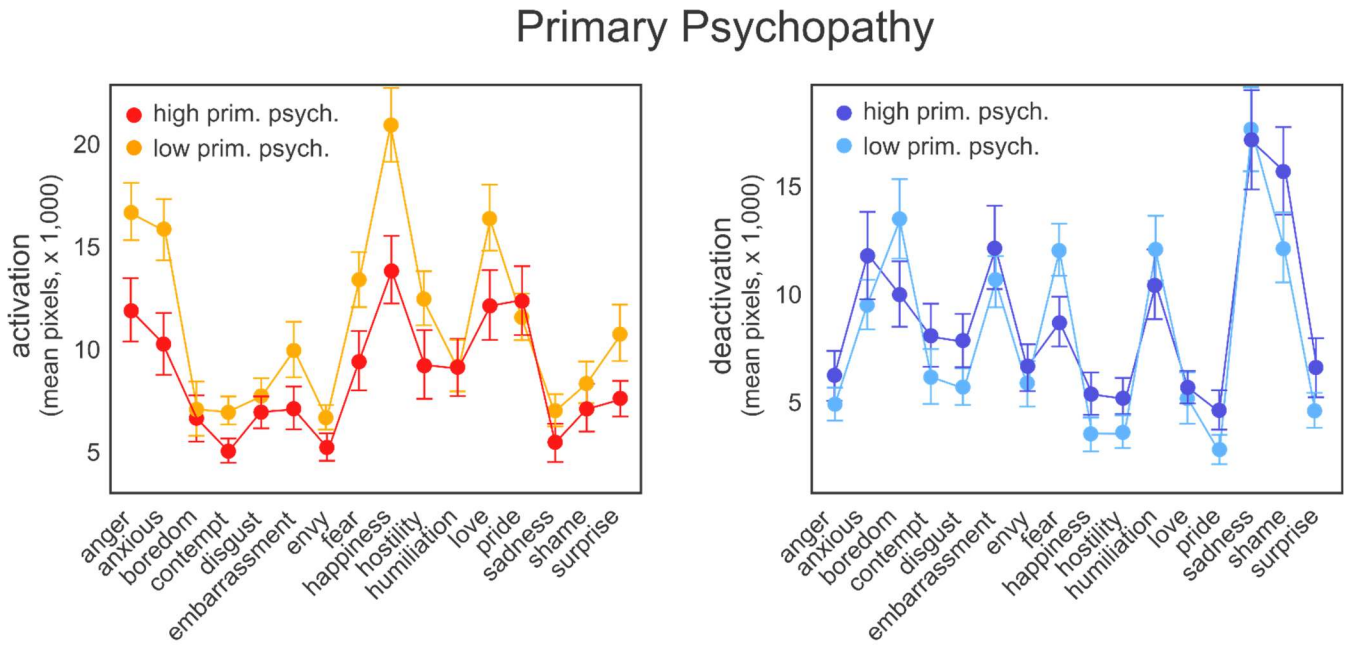


Figure 2.5. Figure showing the number of activation (left) and deactivation (right) pixels indicated for each emotion for those high or low in primary psychopathy.

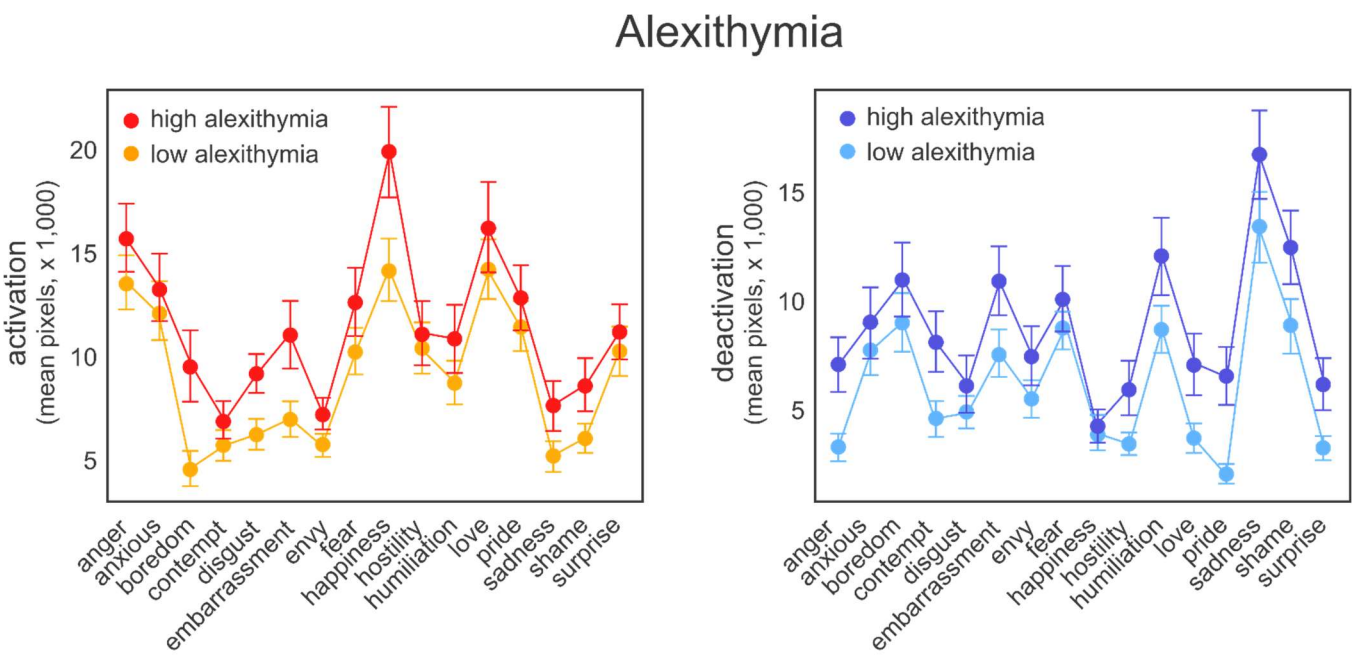


Figure 2.6. Figure showing the number of activation (left) and deactivation (right) pixels indicated for each emotion for those high or low in alexithymia.

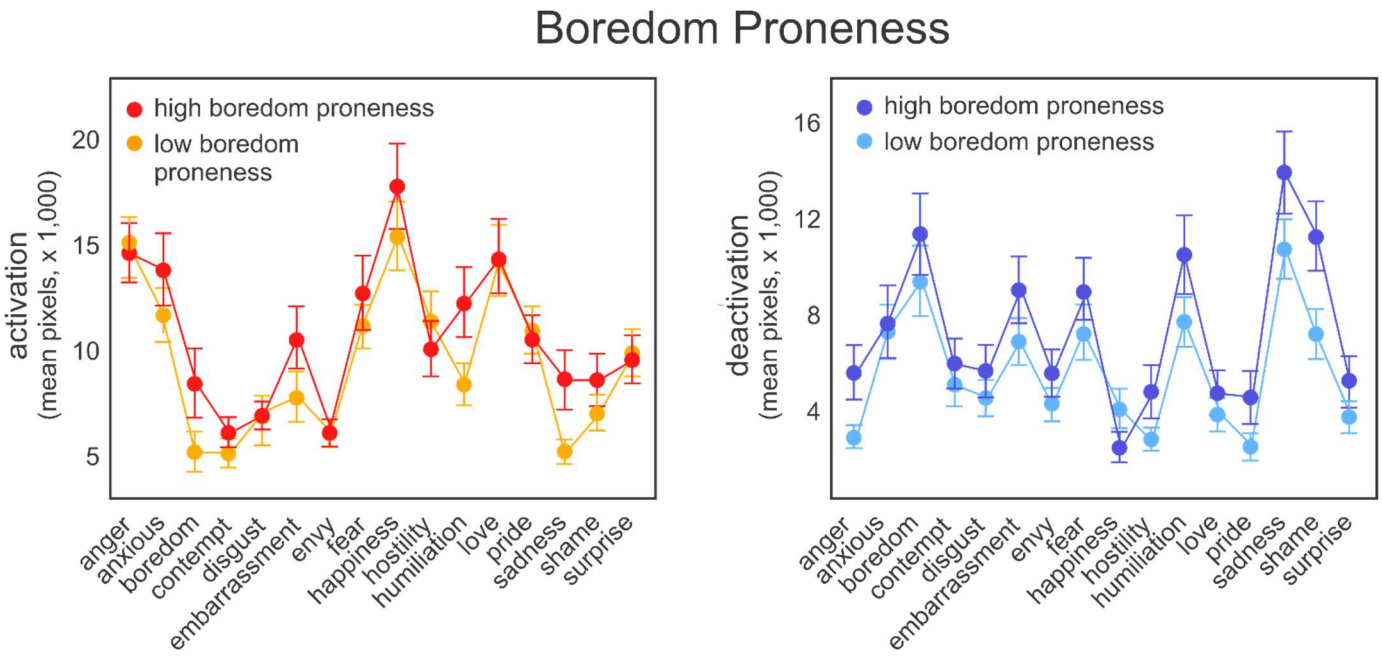


Figure 2.7. Figure showing the number of activation (left) and deactivation (right) pixels indicated for each emotion for those high or low in boredom proneness.

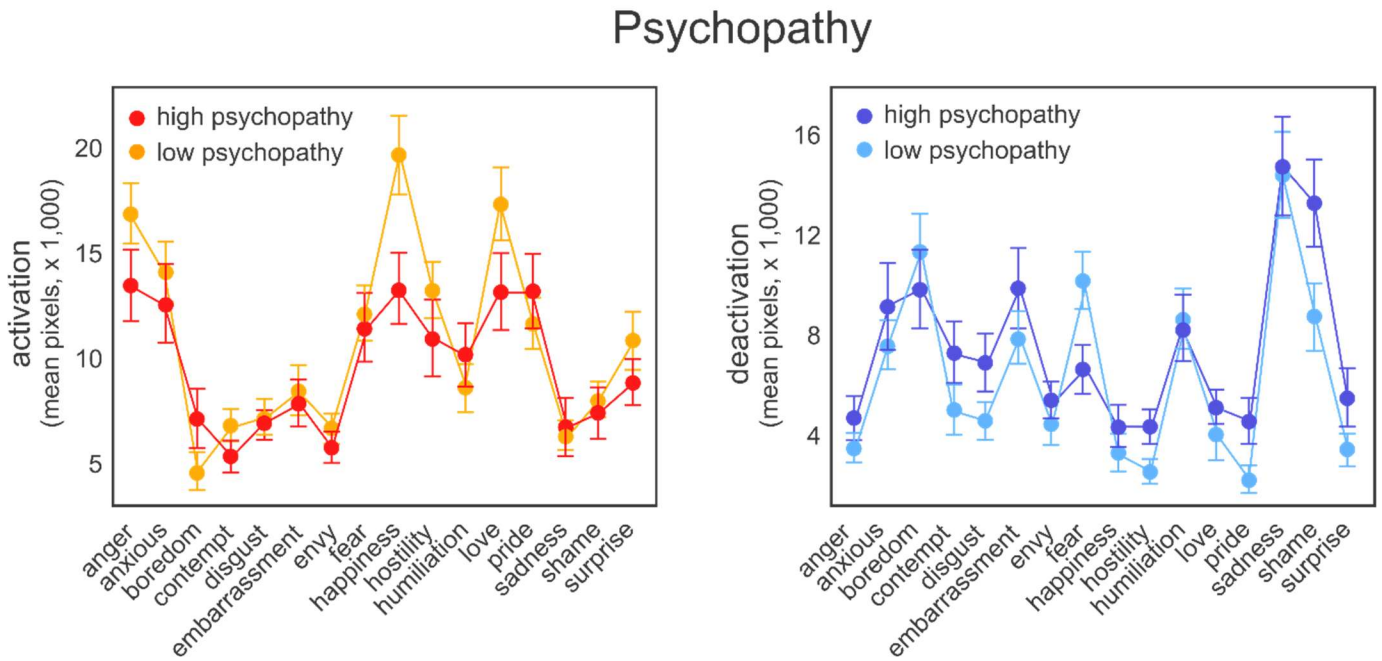


Figure 2.8. Figure showing the number of activation (left) and deactivation (right) pixels indicated for each emotion for those high or low in psychopathy.

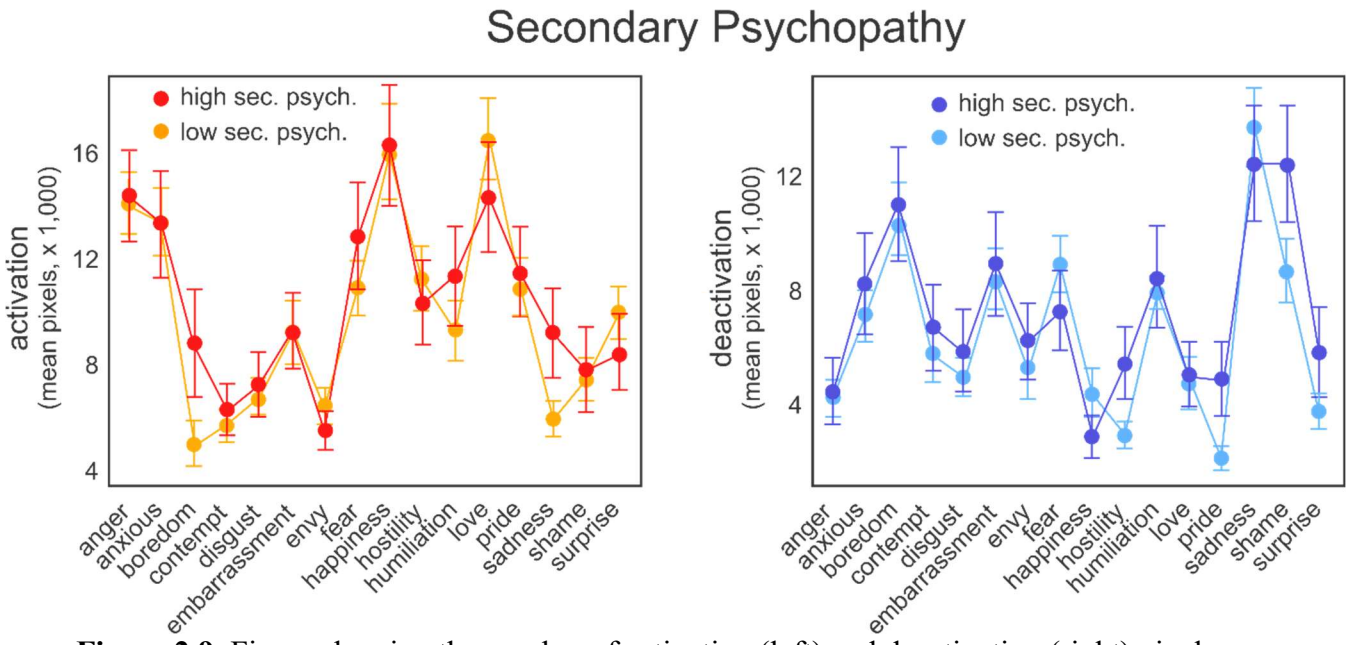


Figure 2.9. Figure showing the number of activation (left) and deactivation (right) pixels indicated for each emotion for those high or low in secondary psychopathy.

Deactivation Plots. A significant main effect of alexithymia on overall deactivations was found, $F(1, 108) = 7.21$, $\eta^{p2} = 0.02$, $p = .008$, such that those high in alexithymia indicated *more* overall deactivation compared to those low in alexithymia (Figure 2.6). No main effect of boredom proneness, psychopathy, primary psychopathy, or secondary psychopathy on overall deactivation pixel colouring was found (Figures 2.7-2.9).

2.4 Discussion

This chapter examined how different emotions were embodied using a unique self-report tool (Nummenmaa et al., 2013), with a specific focus on boredom, an experience that has yet to be examined in this context. Activation and deactivation patterns for emotions traditionally examined in psychological research were consistent with the findings of Nummenmaa and colleagues (2013), which showed distinct bodily maps for each emotion

(Figure 2.2). Although the embodied map for boredom was indeed distinct from the other emotions, it failed to demonstrate a strong profile of either activation or deactivation in the average map (Figure 2.2). This weak pattern of embodied representation may reflect the complex nature of boredom, one that is not easily characterized as either a high or low arousal experience (Danckert et al., 2018; Elpidorou, 2021), and that has complex associations with self-regulation, meaning making, and the sense of agency (Dadzie & Danckert, 2025; Fahlman et al., 2009; Gorelik & Eastwood, 2024; Isacescu et al., 2017; Mugon et al., 2018; Van Tilburg & Igou, 2012). In addition, given the known association between boredom and alexithymia, it is plausible that the highly variable embodiment of boredom seen here reflects the challenge in accurately representing the felt experience that is characteristic of alexithymia. This is substantiated to some extent by recent work showing that the boredom prone pay inordinate attention to internal body states, while struggling to make sense of those same sensations (Trudel et al., 2024).

The hypothesis outlined above may be supported by the fact that the trait measures had little influence in how the embodied experience of boredom was represented (Table 2.2). That is, although the data suggested there were four profiles of embodied representation for the experience of boredom, none of the trait measures were clearly associated with one specific profile. If the state of boredom was associated with a singular, embodied representation, one might expect less confusion in representing that state. That was clearly not the case.

The current results also cast an interesting light on the debate concerning the role arousal plays in defining and theorising about boredom (Danckert & Elpidorou, 2023;

Elpidorou, 2021). One theory suggests that we should not consider arousal as part of the *definition* of the state of boredom but instead constrain ourselves to functional accounts of the experience. That is, regardless of whether boredom is a high, low, or mixed arousal experience, it is the functional role—the call to action, to explore the world for better opportunities for engagement—that is critical in defining boredom (Elpidorou, 2020). The variable profiles of embodied representation demonstrated here would seem to support that notion. In addition, while the current metric is not an explicit measure of physiological arousal, or even a subjective report of arousal levels, the distinct profiles that split in terms of "activation" and "deactivation" imply that the experience resists easy classification as a high or low arousal state (Figure 2.3).

One of the only factors that did predict profile membership was alexithymia which predicted a *decreased* likelihood of membership in the Low Activation profile. This may indicate that while those high in alexithymia struggle to express and label their emotional experiences, this is not for a lack of feeling them. That is, were alexithymia to arise as a consequence of a failure to feel the embodied components of emotional experiences, we would expect that this trait would positively predict membership of the Low (or no) Activation profile. It did the opposite. Indeed, alexithymia has been identified as a major risk factor for psychological distress and affective dysregulation (Goerlich, 2018), suggesting that the inability to label emotions does not necessarily suggest a lack of somatosensory experience. It is possible that these individuals simply may not be able to accurately pinpoint where in the body they feel each emotion, thus indicating more widespread patterns of

activation and deactivation on the body maps tested here (Khalsa et al., 2018; Lloyd et al., 2021).

Importantly, classifying the Low Activation group may be problematic. Given these individuals indicated significantly fewer pixels for boredom (and in general, indicated fewer pixels for all emotions; Figure 2.4) compared to individuals in the other profiles, it is hard to determine the cause for this muted pattern of embodied self-report. However, there was a particularly pronounced discrepancy in the number of indicated pixels for boredom between the Low Activation profile and the other three profiles (Figure 2.4), suggesting that boredom represented a particular lack of embodied experience. As mean boredom proneness scores for this profile did not significantly differ from the other profiles, it is evident that these individuals do not lack the ability to experience boredom. Several possibilities arise for these results. One is that these individuals were less engaged by the task itself. Another possibility is that these individuals do not feel emotions (particularly boredom) in a strongly embodied way. It may be the case that these individuals experience low embodied experiences in general due to difficulties perceiving interoceptive signals (Murphy, 2024). Further research is clearly needed to determine why this group, the largest in this sample, did not report a strong embodied experience of emotion.

Surprisingly, psychopathy predicted a *diminished* likelihood of belonging to the Deactivation profile for boredom (Table 2.3). Given that psychopathy is highly correlated with boredom proneness (Table 2.1), and feelings of boredom may in turn motivate antisocial behaviour, boredom may represent an activating experience for individuals high in psychopathy, consistent with its more general role as a signal to change one's current

circumstances. Indeed, it has been suggested that boredom may prompt individuals to seek out novel experiences, even if those experiences are negative or self-harming or injurious to others (Bench & Lench, 2019; Havermans et al., 2015; Nederkoorn et al., 2016; Pfattheicher et al., 2021, 2023). This propensity to indiscriminately pursue stimulation could explain why individuals with psychopathy traits might engage in risk-taking or impulsive behaviors as a means of alleviating their boredom. Rather than withdrawing (as we might expect of those in the Deactivation profile), these individuals might instead exhibit heightened activity levels and a drive for engagement, albeit in maladaptive ways.

This same relationship was not found when psychopathy was split into variants (Table 2.4). This was perhaps most surprising for secondary psychopathy, where the relation with boredom proneness is strongest. The current results show that the affective empathy deficits seen in primary psychopathy are not seen in secondary psychopathy, which may explain why blunted activation in response to emotions was not found in secondary psychopathy. This is consistent with the current literature suggesting that secondary psychopathy is not associated with emotional arousal deficits (Campos et al., 2023; Estrada et al., 2021). It is possible that self-control deficits underlie antisocial behaviour in secondary psychopathy, as evidenced by the significant negative correlation between secondary psychopathy and self-control. This is supported by the dual-process models of psychopathy (Fowles & Dindo, 2009; Patrick, 2007), which suggest that emotional deficits underlie diminished threat responses in those with primary psychopathy traits. In contrast, secondary psychopathy traits are tied to deficits in executive control which disrupts threat processing and hinders behavioural inhibition (Fowles & Dindo, 2009; Patrick, 2007). Amygdala

dysfunction may be at the root of affective-interpersonal traits (e.g., low emotional arousal, reduced responsiveness to threats), whereas prefrontal cortex impairments may be at the core of impulsive and antisocial behaviour (Fowles & Dindo, 2009; Patrick et al., 2009). Indeed, primary psychopathy was associated diminished activity in the amygdala and insula in response to fear, regions implicated in fear responses and interoception (Sethi et al., 2018). In contrast, individuals with only secondary psychopathy traits demonstrated increased reactivity in the amygdala and negative emotionality during provocation of anger (Hyde et al., 2014). As such, these individuals may be more prone to emotional dysregulation and reactive aggression.

Previous work has shown diminished affective reactivity when perceiving emotions in those with high psychopathy traits (Decety et al., 2014). Within the variants explored here, the data showed that those high in primary psychopathy reported embodied emotion maps with less activation than did those low in primary psychopathy across a broad swathe of emotions (Figure 2.4). Additionally, these individuals reported lower activation for a number of both positive and negative emotions (e.g., happiness and fear), indicative of widespread affective blunting. This is in line with the broad affective and empathetic deficits described in primary psychopathy (Campos et al., 2023; Fan, 2023), as well as our results showing primary psychopathy to be negatively correlated with affective empathy. In addition, primary psychopathy was not significantly linked to diminished cognitive empathy, which is concordant with the extant literature indicating that these traits are associated with intact cognitive, but diminished affective, empathy (Campos et al., 2022; Wai & Tiliopoulos, 2012). Individuals high in traits relating to primary psychopathy appear to be able to

effectively simulate cognitive empathy and mimic genuine emotional expressions, allowing them to understand and manipulate others even without experiencing the full affective range themselves (Atanassova et al., 2025; Book et al., 2015; Cleckley, 1951; Robinson & Rogers, 2015). Nonetheless, it appears that while they are able to cognitively understand the emotions of others, they do so with blunted intensity due to their own emotional impairments. Indeed, in the context of understanding the emotions of others, it has been proposed that our ability to empathize is limited by the scope of our own emotional experiences (Bird & Viding, 2014; Hoppenbrouwers et al., 2016). That is, our affective range acts as an "internal ruler" used to measure emotions in others—we cannot accurately infer the emotional states of others if they experience feelings at intensities that exceed our own range (Hoppenbrouwers et al., 2016; Miller et al., 2014). As such, the empathetic and affective deficits demonstrated in primary psychopathy suggest that impairments in emotional sensations and resonance contribute to why they are able to aggress against others without guilt or remorse.

This echoes the findings from previous studies suggesting that the combination of reduced affective empathy and intact cognitive empathy may facilitate exploitative tendencies in psychopathic individuals (Blair, 2008; Mullins-Nelson et al., 2006). For instance, psychopathy was positively related to others' trust, indicating that individuals high in these traits are adept at feigning emotions such as remorse to build social connections, even if they lack genuine emotional experience (Brazil et al., 2021). Such calculated emotional mimicry, despite underlying exploitative tendencies, highlights a capacity for exploitation (Brazil et al., 2021). Future studies should examine how emotional body maps differ when individuals high in psychopathy are asked to colour in body maps for themselves

as well as body maps for others, as perspective taking has been shown to differ between individuals with higher primary vs secondary psychopathy traits when viewing others in physical pain (Yoder et al., 2022). Although a previous study found evidence to suggest that cognitive empathy impairments (i.e., perspective taking) are correlated with diminished overlap between emotional body maps of own emotions and the body maps of others (Sachs et al., 2019), they did not examine this in the context of psychopathy, nor psychopathy variants.

This chapter provides novel insight into the embodied sensation of boredom. It appears that boredom's embodied map lacks a strong activation or deactivation profile, distinguishing it from more "classic" emotions. This ambiguity in bodily representation aligns with the multifaceted nature of boredom, which resists simple categorization as a high or low arousal state, or indeed as a pure emotional/affective experience (Eastwood & Gorelik, 2019). Additionally, this chapter explored whether trait differences in important factors tested over the remainder of this thesis would influence these embodied representations (particularly of boredom). The results indicated that the experience of boredom, despite its diverse manifestations, was not characterized in distinct ways by individual who differ in either trait boredom proneness or psychopathy traits. This suggests that boredom is not differentially experienced as a function of psychopathy. However, variations in emotional and empathetic experiences between primary and secondary psychopathy may have different implications for antisocial behaviour.

This nuanced understanding of the emotional basis of psychopathy becomes particularly relevant when considering the potential for pain infliction, both social and

physical, given the shared neural underpinnings in both domains (Eisenberger, 2012a, 2012b; Eisenberger et al., 2006; Kross et al., 2011; Novembre et al., 2015). As such, Chapter 3 explored how boredom and psychopathy interact to influence physical pain infliction.

Chapter 3: Boredom, Psychopathy, and Physical Pain Infliction[2]

3.1 Introduction

Psychopathy has been consistently linked to harmful and aggressive behaviours. A meta-analysis found that psychopathy traits such as callousness and lack of empathy (Caravita et al., 2009; Ciucci et al., 2014; Fanti et al., 2009; Jolliffe & Farrington, 2006) and impulsivity (Jolliffe & Farrington, 2006) in youth were significantly correlated with bullying behaviours (van Geel et al., 2017). In young adults, psychopathy traits were positively correlated with aggressive and antisocial behaviours (González Moraga et al., 2019). Similarly, research has consistently shown that the highly boredom prone tend towards alleviating boredom in aggressive and maladaptive ways (Danckert, Mugon, et al., 2018; Isacescu et al., 2017). Previous studies focusing on trait boredom proneness have suggested that individuals with higher levels of sadism, a trait conceptualized as the tendency to experience pleasure from others' pain or humiliation (Baumeister, 1997; Nell, 2006), are indeed more prone to boredom (Pfattheicher et al., 2021), and are more likely to behave aggressively towards others in various contexts, both in-person and online (Buckels et al., 2014; Pfattheicher et al., 2021, 2023). For example, students who experienced a greater frequency of boredom at school were more likely to engage in bullying (Pfattheicher et al., 2023). Given that individuals high in psychopathy are more boredom prone and are dispositionally drawn to sadistic cues (Levenson et al., 1995; Spantidaki Kyriazi et al., 2025),

[2] A version of this chapter has been accepted for publication as "Lee, J.A., Drody, A.C. & Danckert, J. (2025). The effect of boredom, psychopathy, and sadism on unprovoked aggression towards others. *Journal of Criminal Psychology.* doi: 10.1108/JCP-01-2025-0005"

it is likely that boredom proneness would exacerbate sadistic behaviour in those with higher levels of psychopathy.

Nonetheless, the literature remains mixed as to whether state boredom acts as a positive or negative influence, particularly in terms of interpersonal interactions (Pfattheicher et al., 2021; Westgate & Steidle, 2020). Functional accounts of state boredom suggest that both adaptive and maladaptive behaviours arise out of boredom, and that state boredom serves as an impartial signal to change the current situation (Bench & Lench, 2019; Bieleke et al., 2022; Danckert & Eastwood, 2020). Various studies have found state boredom to motivate pain inflicting behaviours (Havermans et al., 2015; Nederkoorn et al., 2016; Pfattheicher et al., 2021; Yusoufzai et al., 2024). Additionally, state boredom appears to play a moderating role in the expression of sadistic behavior. Consequently, even individuals who are not inherently sadistic may engage in harmful behaviors when bored, suggesting that boredom itself can act as a catalyst for aggression (Pfattheicher et al., 2021). However, when a "prosocial" alternative is available, state boredom only motivated sadistic behaviours in individuals with higher levels of the trait (Pfattheicher et al., 2021). This suggests that state boredom may moderate the expression of traits such as sadism, influencing whether individuals choose to alleviate it through adaptive or maladaptive actions, depending on their underlying personality characteristics (Bieleke et al., 2022; Pfattheicher et al., 2023; van Tilburg & Igou, 2017). Although some work has examined the effects of both state boredom and trait boredom proneness on sadism, little work has specifically examined the effect of state boredom on psychopathy, a gap this chapter aimed to address.

While both primary and secondary psychopathy have been associated with higher levels of boredom proneness and aggressive behaviours (Hare & Neumann, 2008), individuals with these traits may choose to aggress towards others for different reasons and may also respond differently to boredom. Previous studies have shown that psychopathic and sadistic traits, particularly traits associated with primary psychopathy, were significant predictors of unprovoked aggression (Reidy et al., 2008, 2011). It is possible that individuals with greater levels of primary psychopathy will behave more aggressively if they think that there is something to gain, whereas those with increased levels of secondary psychopathy may not feel the need to do so.

Clearly, more studies are needed to examine how boredom (both state and trait) and psychopathy interact to influence pain infliction. Consequently, it is essential to investigate whether transient experiences of boredom intensify pain infliction behaviors among individuals exhibiting these traits and whether these effects differ as a function of state boredom and trait boredom proneness. A prior study by Buckels and colleagues (2013) asked participants to play a game against an opponent seated in another room. Participants were told to press a button in response to a stimulus faster than their opponent, with the winner administering a white noise blast – presumably an unpleasant experience – to their opponent. Results showed that sub-clinical psychopathy predicted greater aggressive strength directed towards an innocent opponent when aggression was non-costly and unprovoked. In contrast, sadism predicted increased aggression strength even when additional time and energy was required. However, their study did not directly examine how boredom would affect these relationships. The present study builds upon the work of Buckels and colleagues (2013) by

examining how induced states of boredom might moderate the relationship between trait measures associated with aggressive tendencies (i.e., psychopathy, boredom proneness, and sadism) and unprovoked aggressive behavior (measured by the administration of white noise blasts). Given that a focus of this work was to investigate pain infliction behaviours in the absence of external motivators (e.g., provocation, personal gain), this study examined whether motivators such as state boredom and boredom proneness would strengthen the relationship between psychopathy and aggressive actions towards others in the absence of provocation.

The hypotheses for this study were threefold: first, participants with higher levels of psychopathy, boredom proneness, and sadism would show greater aggression strength (i.e., administering louder and longer noise blasts) compared to participants low in these traits. Second, participants who undergo the boredom induction would show greater aggression strength compared to participants exposed to a control condition (i.e., an interest mood induction, see below for details). Third, both state boredom and trait boredom proneness would moderate the relationship between trait measures of psychopathy and sadism and aggression strength, with higher levels of boredom proneness being associated with higher levels of pain infliction among those high in psychopathy or sadism. Finally, each hypothesis was re-tested with groups split on the variant of psychopathy (i.e., either primary or secondary) to explore whether the predicted outcomes would vary as a function of these trait dimensions.

3.2 Method

3.2.1 Participants

A total of 173 undergraduate students (135 female, 31 male, 6 transgender/non-binary, 1 prefer to self-identify) with an age range of 17-54 were recruited from an online participant pool (SONA) at the University of Waterloo. Participants were granted one credit in a course in exchange for their time and accessed the study through SONA, completing the study online through Qualtrics. All participants provided informed consent prior to taking part in the experiment. The study protocol was cleared by the Office of Research Ethics at the University of Waterloo (protocol code 45551, approved June 27, 2024).

3.2.2 Measures

The same scales used to measure psychopathy and boredom proneness (Chapter 2, section 2.2.2) were used in the current chapter.

Comprehensive Assessment of Sadistic Tendencies. Sadism was assessed using the Comprehensive Assessment of Sadistic Tendencies (CAST-12; Buckels, 2023). The CAST-12 is a brief self-report measure of trait sadism, and contains subscales for direct verbal sadism, vicarious sadism, and direct physical sadism, and has demonstrated sufficient psychometric properties (Buckels, 2023). Here, only the overall scale scores were used as there were no a priori hypotheses regarding the distinct subscales. The scale is scored on a 5-point Likert scale with 1 indicating "*strongly disagree*" and 5 indicating "*strongly agree*". The CAST-12 has demonstrated good internal consistency ($\alpha = .87$) and construct validity(i.e., structural, concurrent, and predictive validity; Buckels, 2023).

3.2.3 Procedure

Participants were asked to complete an in-lab experiment, during which they were told that they would be playing a reaction time game in competition with a participant in another room. To enhance the believability of the deception that they would be playing against another participant, participants were brought in at the same time and then split into two different experimental rooms. Participants were randomly assigned to the Boring (n = 87) or Interesting mood induction conditions (n = 86). This study used a modified version of the Taylor Aggression Paradigm (as described in Buckels et al., 2013), during which participants saw a sequence of traffic lights that changed from red to yellow to green. Prior to the game, participants were given two buttons that they could click on to gauge the volume of the noise blasts that they could administer or receive. One button was set to 70dB and the other was set to 95dB to give an estimate of the range of noise blasts. They were then asked to rate their level of state boredom by responding to the question "How bored do you feel right now on a scale of 1 (not bored at all) to 7 (very bored)?" using a Likert scale from 1 to 7. A coding error resulted in the loss of baseline state boredom ratings. However, the effectiveness of the mood inductions was able to be assessed by comparing post-induction ratings of boredom across groups. This method has been previously used in numerous studies employing a wide variety of boredom mood inductions (Koval & Todman, 2015; Markey et al., 2014; Nederkoorn et al., 2016; Pfattheicher et al., 2021). Following this, participants were asked to watch one of two mood induction videos, which were each four minutes long. Participants in the Boredom Condition viewed a boring video depicting two men folding laundry, while participants in the Interest Condition viewed a clip from a BBC Deep Sea documentary. Both videos have been previously validated as effective inducers of boredom

and interest, respectively (Merrifield & Danckert, 2014). Following the videos, participants were once more asked to rate their level of state boredom.

Participants then did one trial of the game as practice before the experiment began. They were instructed to press the space bar as fast as possible when they saw the green light, third in a sequence of "traffic lights" (i.e., lights came on in a red, orange, green sequence), attempting to do so faster than their opponent. Each light was displayed for 1.25 seconds, and participants were given one second to press the space bar to react. The task was coded so that the trial would restart if the participant did not respond, if they took too long to respond, or responded before the green light was shown. Prior to each trial, participants were asked to choose the intensity and duration of the noise blast to administer to their opponent should they win (Figure 3.1). The numbers of wins and losses were kept consistent (participants won 15/20 trials), with trial order randomized for each participant. For losing trials, the opponent never retaliated, always choosing a noise blast of 0dB to administer to the participant. Participants were not aware this would be the case prior to commencing the experiment. This aspect of the design was included to ensure that aggressive choices were unprovoked. State boredom was probed after every fourth trial in the same manner as was done with respect to the mood induction.

At the end of the trials, participants were asked to complete survey measures that consisted of a variety of self-report measures, including measures of psychopathy, sadism, and boredom proneness. Demographic information (i.e., age, gender, faculty) were also collected. To mitigate the potential for response biases, participants were not told at the beginning of the study that psychopathy and sadism were a focus of the research. Instead,

they were informed that the study would examine how personality traits and boredom proneness affected interpersonal decision-making. Participants were debriefed at the end of the study where this deception was fully outlined and all questions participants had were addressed by the experimenter.

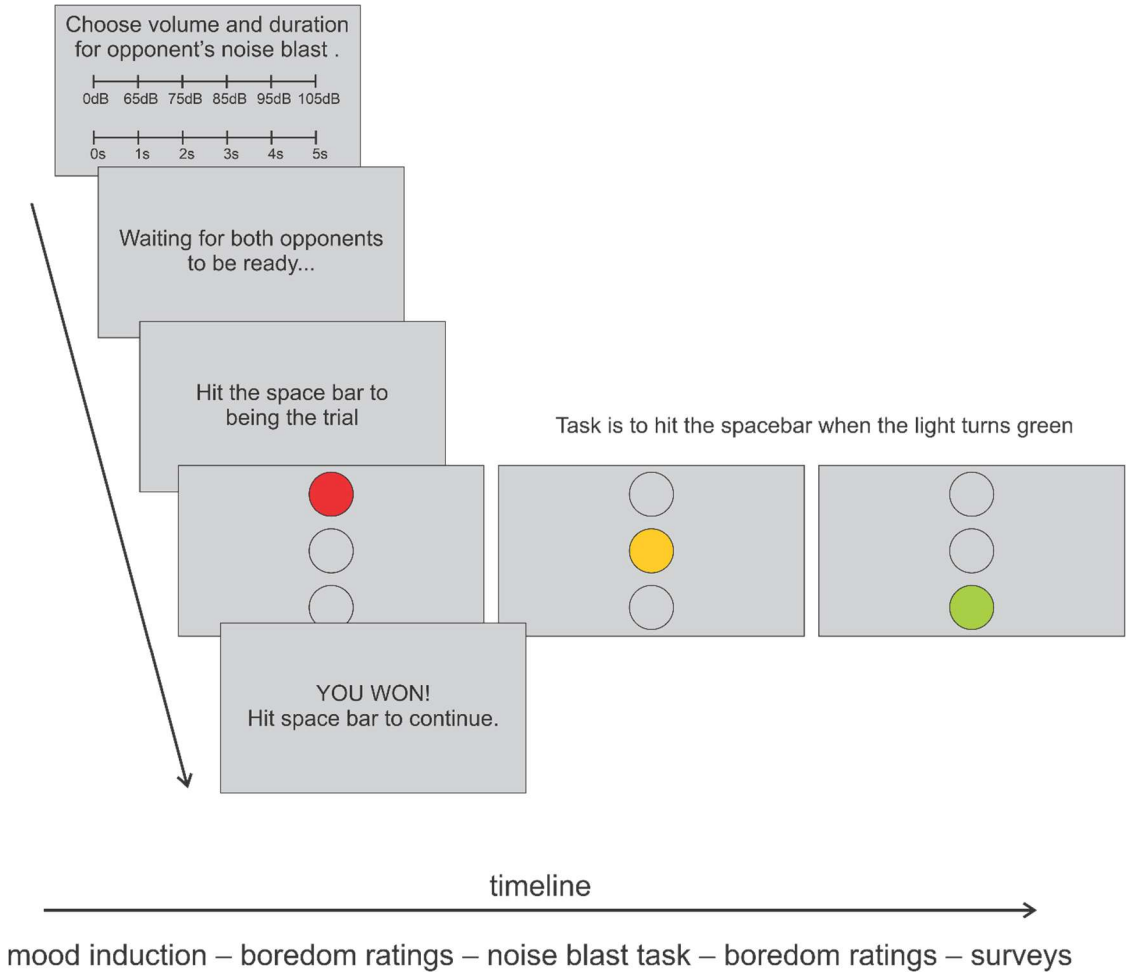


Figure 3.1. Depiction of one trial and experiment timeline. Participants first chose the volume and duration of a noise blast that would be administered to their opponent should they win. After screens indicating the program was waiting for both opponents to be ready (a strategy to enhance believability of the deception) participants hit the spacebar to commence the trial. The task was to then hit the spacebar as quickly as possible when the "traffic light" turned green. Predetermined feedback (based on 15 or 20 wins for each participant) was then delivered before the next trial was started with another spacebar press.

3.2.4 Data Analysis

First, the effectiveness of the mood induction was examined via an independent samples *t*-test comparing levels of state boredom between the Boredom and Interest conditions. Next, changes in state boredom over the course of the task were examined using a mixed factorial ANOVA with Condition (Boredom or Interest) as a between-participants factor and Probe Number (each of the five probes that appeared during the task) as a within-participants factor. To analyze participants' choices during the task, a composite score of duration and volume was calculated to represent aggression intensity. This was done by standardizing duration and volume choices within conditions and summing these standardized scores (Buckels et al., 2013). Aggression strength was analyzed using a mixed factorial ANOVA, with Condition as a between-participants factor and Trial (each of the 20 trials during the task) as a within-participants factor. Where the assumption of sphericity was violated, results of the ANOVAs are presented with Greenhouse-Geisser corrections.

Additionally, relations between the trait variables (psychopathy, sadism, and boredom proneness, treated as continuous variables) and participants' behavioural data during the task were examined. To this end, correlations between the trait and task data were computed before creating several models testing whether state or trait boredom moderated the relations between the trait variables and aggression strength. Each model included psychopathy (overall, primary or secondary) or sadism as the predictor, state boredom or boredom proneness as the moderator and aggression strength as the outcome variable. Sensitivity analyses were conducted for each of the main analyses in the manuscript. Using G*Power, with α set at .05 and power at .95, it was determined that the sample was sufficiently

powered to detect small effects. Specifically, effect sizes of $d = .55$ for the manipulation check, $f^2 = .10$ for the ANOVA examining changes in boredom over time, $f^2 = .07$ for the ANOVA examining changes in aggression over time, and $f^2 = .10$ for the moderation analyses could be detected.

For the t-test and ANOVAs, visualizing the residuals using QQ-plots revealed that all data was approximately normally distributed. Regarding the homoscedasticity assumption, Levene's tests were employed prior to conducting the t-test and ANOVAs. The data for these analyses met the assumption, except for a minor deviation within one of the 20 levels of the Trial variable in the ANOVA assessing the effect of condition and trial on mean aggression.

For the moderation analyses, diagnostic plots were used to assess many of the key assumptions. Specifically, QQ-plots were once again used to assess the normality of the residuals, scale-location plots were used to evaluate the assumption of homogeneity of variances, and plotting the residuals against the fitted data allowed for determination of whether data met the assumption of linearity. Additionally, a Durbin-Watson test was used to test the assumption of independence. While observed minor violations of the assumptions of normality and homogeneity of variances were observed for some analyses, our data met the remaining assumptions. Importantly, regressions are fairly robust to such minor violations so long as the assumptions of independence and linearity are met (Ernst & Albers, 2017). Nevertheless, to account for these minor violations, a Hubert-White Sandwich Estimator was used to obtain robust standard error estimates. To mitigate potential issues related to multicollinearity due to the high correlations between the trait variables, all predictors and moderators in the moderation analyses were standardized.

3.3 Results

3.3.1 Manipulation Check

Participants in the Boredom Condition reported significantly higher levels of boredom ($M = 4.84$, $SD = 1.57$) when compared to participants in the Interest condition immediately following the mood inductions ($M = 2.88$, $SD = 1.46$), $t(171) = 8.48$, $p < .001$, $d = 1.29$ (Figure 3.2). Although ratings of boredom dropped closer to those of the interest group following the first block of trials (Figure 3.2), the effects of the mood induction persisted over the course of the experiment, with participants in the Boredom Condition reporting greater levels of boredom compared to the Interest condition, $F(1, 171) = 6.00$, $p = .015$, $\eta p^2 = 0.03$. There was also a main effect of Probe Number, $F(2.35, 402.65) = 86.74$, $p < .001$, $\eta p^2 = 0.10$, such that boredom levels rose over successive trials of the task in both conditions. No interaction was found between Condition and Probe Number, $F(2.35, 402.65) = 2.36$, $p = .086$, $\eta p^2 = 0.00$ (Figure 3.2). The results show that we had a strong initial manipulation for boredom that persisted to some extent throughout the task.

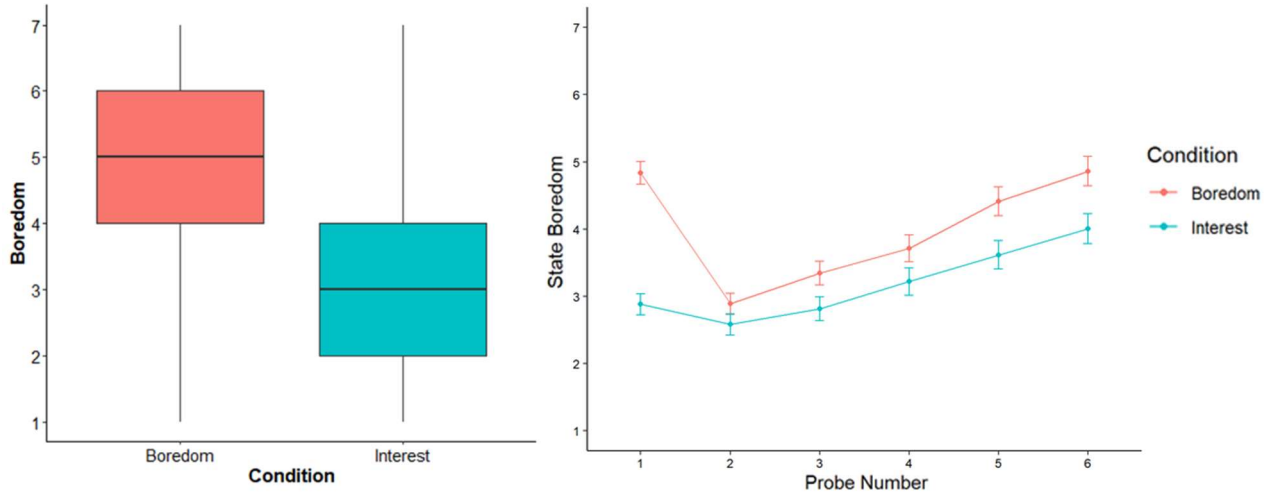


Figure 3.2. Boxplot depicting state boredom for the Boredom and Interest conditions immediately following the mood induction (left). Line graph illustrating changes in boredom over the course of the task as a function of condition (right). Error bars in the line graph represent +/- 1 standard error of the mean.

3.3.2 Volume and Duration Responses by Condition

While the analyses focused on the composite score of aggression, for the sake of completeness, participants' mean volume and duration responses are presented in Figure 3.3 along with their aggression strength during the task. Results of the mixed factorial ANOVA revealed no main effect of Condition, $F(1, 171) = 0.00$, $p = 1.00$, $\eta p^2 = 0.00$. There was, however, a main effect of Trial, $F(9.06, 1549.19) = 25.36$, $p < .001$, $\eta p^2 = 0.05$, such that aggression strength decreased over successive trials. No interaction was found between Condition and Trial, $F(9.06, 1549.19) = 1.18$, $p = .305$, $\eta p^2 = 0.00$.

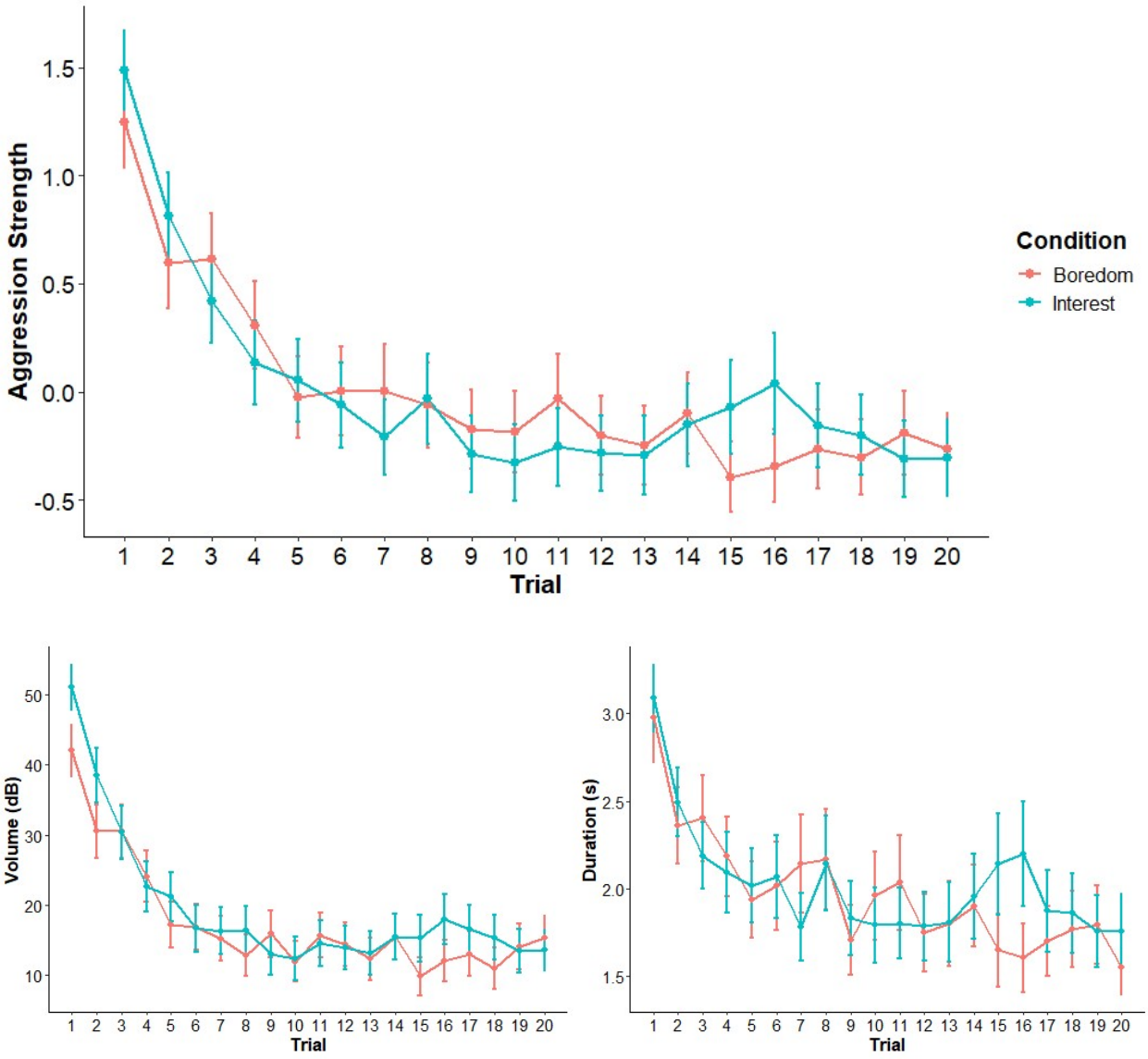


Figure 3.3. Line graph showing mean levels of aggression strength as a function of condition over successive trials of the task (top). Line graphs depicting participants' average volume responses in decibels (left) and duration responses in seconds (right) based on condition and trial. Error bars represent +/- 1 standard error of the mean.

3.3.3 Trait Measures and Participants' Choices

Correlations between the trait measures, mean aggression strength and mean boredom are presented in Table 3.1. Significant correlations were found between boredom proneness and psychopathy, as well as with both trait dimensions of psychopathy. Secondary

psychopathy showed a significantly greater relationship with boredom proneness when compared to primary psychopathy (z = -5.48, p < .001). State boredom was also significantly correlated with psychopathy and secondary psychopathy, but not primary psychopathy (Table 3.1).

Given that boredom initially differed between the two mood induction conditions, while aggression strength did not, the analyses focused on the relationships between trait measures, state boredom, and aggression strength for the entire sample, rather than splitting the analyses by condition. By doing so, it was possible to investigate the relationship between state boredom and pain infliction independently of the condition. However, no significant association was found between boredom and pain infliction in the overall sample, as neither state boredom nor boredom proneness correlated with increased aggression strength. Overall levels of psychopathy, primary psychopathy and sadism were positively associated with aggression strength (Table 3.1).

Table 3.1. Correlations between trait measures and noise blast outcomes for the overall sample

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6	7
Overall Sample										
1. Psychopathy	48.76 (9.39)	0.43	0.28	-	.91***	.78***	.56***	.61***	.19*	.16*
2. Primary Psychopathy	28.47 (6.61)	0.48	0.35		-	.45***	.35***	.61***	.21**	.12
3. Secondary Psychopathy	20.29 (4.32)	0.39	0.11			-	.69***	.39***	.10	.16*
4. Boredom Proneness	29.30 (10.21)	0.05	-0.66				-	.30***	.11	.16*
5. Sadism	19.71 (7.88)	1.54	2.99					-	.32***	.04
6. Aggression Strength	0.00 (1.43)	1.98	4.51						-	.05
7. Mean State Boredom	3.55 (1.63)	0.13	-1.10							-

Note. $N = 173$. Descriptive statistics were calculated before standardizing variables.
* $p < .05$. ** $p < .01$. *** $p < .001$.

3.3.4 Moderations

Although the inductions successfully increased state boredom in the boring induction compared to the interesting induction, they did not significantly affect behaviour (Figure 3.3). Despite this, boredom was examined as a moderator in the relationship between trait measures and aggression strength in the combined sample. As the prevalence of psychopathy is higher in men (Sanz-García et al., 2021) and the sample was predominantly female, gender (coded as a binary variable, with participants who did not respond "male" or "female" removed) was controlled for in these analyses. State boredom moderated the relationship between psychopathy and aggression strength (b = -.01, SE = .01, β = -.17, t(161) = -2.18, p = .031), as well as the relation between primary psychopathy and aggression strength (b = -.02, SE = .01, β = -.18, t(161) = -2.23, p = .027), such that those high in these traits and low in state boredom tended to adopt more aggressive responses (Table 3.2 and Figure 3.4). The same pattern was not observed for secondary psychopathy or sadism. Boredom proneness was not a significant moderator between any of the trait measures and aggression strength (ps < .05; Table 3.3).

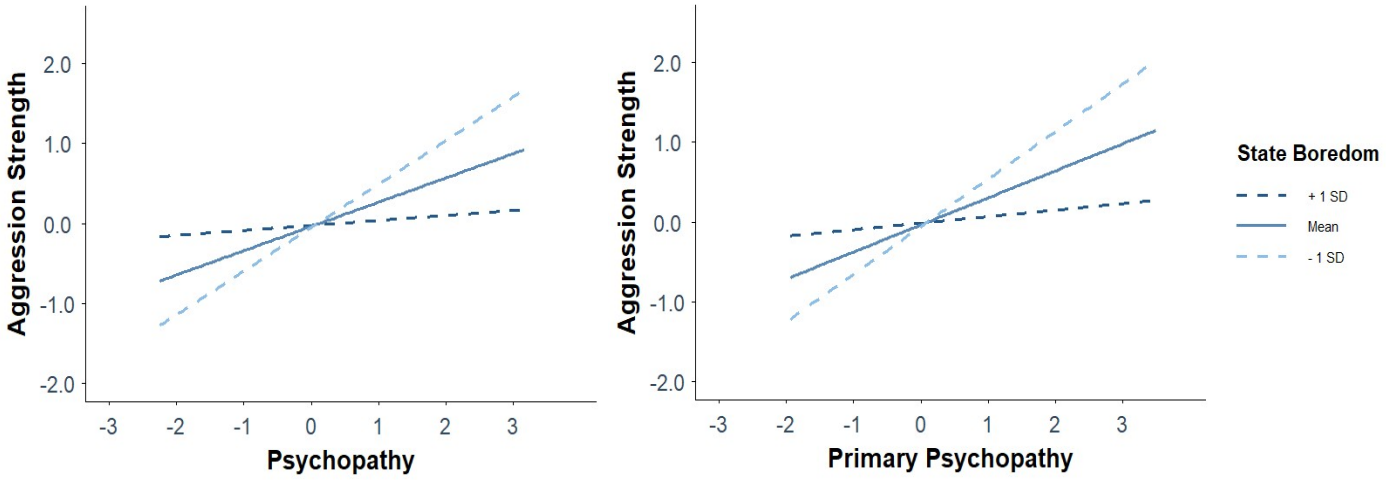


Figure 3.4. Graphs illustrating the relation between either psychopathy (left) or primary psychopathy (right) and aggression strength as a function of state boredom levels, after controlling for gender. $N = 166$.

Table 3.2. Moderation table of state boredom moderating the relationship between trait measures and aggression strength, controlling for gender

Trait Measures	Variables	*B*	*SE*	β	*t*	*p*	*F*	R^2
Psychopathy								
	Intercept	-0.04	0.11	-0.05	-0.32	.746	$F(4, 161) = 4.75$, $p = .001$	.11
	Gender (Male)	0.64	0.39	0.44	1.66	.099		
	State Boredom	0.01	0.12	0.01	0.11	.910		
	Psychopathy	0.30	0.11	0.21	2.72**	.007		
	State Boredom*Psychopathy	-0.24	0.11	-0.17	- 2.18*	.031		
Primary Psychopathy								
	Intercept	-0.03	0.11	-0.05	-0.31	.755	$F(4, 161) = 5.22$, $p < .001$	.11
	Gender (Male)	0.61	0.38	0.42	1.60	.113		
	State Boredom	0.02	0.11	0.02	0.19	.850		
	Primary Psychopathy	0.34	0.12	0.23	2.84**	.005		
	State Boredom*Primary Psychopathy	-0.26	0.12	-0.18	-2.23	.027		
Secondary Psychopathy								
	Intercept	-0.07	0.12	-0.07	-0.64	.520	$F(4, 161) = 2.75$, $p = .030$	.06
	Gender (Male)	0.72	0.40	0.50	1.78	.076		
	State Boredom	0.04	0.12	0.03	0.38	.707		
	Secondary Psychopathy	0.17	0.12	0.12	1.48	.142		
	State Boredom*Secondary Psychopathy	-0.15	0.11	-0.10	-1.37	.173		
Sadism								
	Intercept	0.04	0.12	0.00	0.34	.735	$F(4, 161) = 7.68$, $p < .001$	.16
	Gender (Male)	0.07	0.35	0.05	0.20	.846		
	State Boredom	0.05	0.11	0.03	0.46	.645		
	Sadism	0.53	0.19	0.37	2.75**	.007		
	State Boredom*Sadism	-0.22	0.16	-0.15	-1.36	.174		

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. $N = 166$.

Table 3.3. Moderation table of boredom proneness moderating the relationship between trait measures and aggression strength, controlling for gender

Trait Measures	Variables	*B*	*SE*	β	*t*	*p*	*F*	R^2
Psychopathy								
	Intercept	-0.04	0.13	-0.05	-0.32	.751	$F(4, 161) = 3.57$, $p = .008$	.08
	Gender (Male)	0.68	0.40	0.47	1.69	.092		
	Boredom Proneness	0.03	0.15	0.02	0.19	.852		
	Psychopathy	0.27	0.15	0.19	1.80	.074		
	State Boredom*Psychopathy	-0.09	0.10	-0.06	-0.88	.378		
Primary Psychopathy								
	Intercept	-0.06	0.12	-0.07	-0.51	.610	$F(4, 161) = 3.79$, $p = .006$	.09
	Gender (Male)	0.65	0.39	0.45	1.66	.100		
	Boredom Proneness	0.08	0.12	0.06	0.70	.485		
	Primary Psychopathy	0.27	0.12	0.18	2.24*	.026		
	State Boredom*Primary Psychopathy	-0.08	0.09	-0.05	-0.87	.387		
Secondary Psychopathy								
	Intercept	-0.05	0.14	-0.06	-0.34	.738	$F(4, 161) = 2.61$, $p = .038$	.06
	Gender (Male)	0.74	0.41	0.51	1.81	.073		
	Boredom Proneness	0.12	0.18	0.09	0.68	.500		
	Secondary Psychopathy	0.09	0.19	0.07	0.49	.622		
	State Boredom*Secondary Psychopathy	-0.08	0.12	-0.06	-0.68	.499		
Sadism								
	Intercept	0.01	0.14	-0.02	0.08	.934	$F(4, 161) = 6.13$, $p < .001$	.13
	Gender (Male)	0.21	0.36	0.15	0.59	.554		
	Boredom Proneness	0.03	0.15	0.02	0.18	.856		
	Sadism	0.48	0.22	0.33	2.17*	.032		
	State Boredom*Sadism	-0.05	0.19	-0.03	-0.26	.795		

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. $N = 166$.

3.4 Discussion

This chapter investigated how state boredom and trait boredom proneness might moderate the relationship between individual differences in psychopathy and sadism, and unprovoked aggressive behavior towards others. Specifically, it explored whether higher levels of state boredom or trait boredom proneness would strengthen the association between psychopathy and sadistic traits and the tendency to engage in unprovoked aggression. Psychopathy, primary psychopathy, and secondary psychopathy were all significantly correlated with boredom proneness, with secondary psychopathy showing a stronger correlation to boredom proneness when compared to primary psychopathy. Overall, psychopathy, primary psychopathy, and sadism were correlated with increased aggression strength, consistent with our hypothesis that those with higher levels of these traits would be more aggressive compared to those with lower levels of these traits. This aligns well with prior work showing that both psychopathy (Moreira et al., 2024; Skeem et al., 2007) and sadism (Buckels et al., 2013; Pfattheicher et al., 2021, 2023) predict antisocial behaviours. Additionally, there is evidence to suggest that primary psychopathy traits drive aggressive behaviour regardless of level of provocation (Bresin et al., 2022). However, secondary psychopathy was not significantly correlated with increased aggression strength. Although theoretical and empirical work have consistently linked secondary psychopathy to aggression, it has predominantly been associated with reactionary and impulsive aggression (Cox et al., 2013; Kimonis et al., 2011, 2012; Skeem et al., 2007; Skeem et al., 2003). Prior work has shown that those high in secondary psychopathy demonstrated reduced physical aggression in response to provocation when they were distracted, suggesting that aggression

is tied to reactivity to emotional cues in these individuals (Bresin et al., 2022). As their "opponent" never "chose" to administer a noise blast, it is possible that the task did not elicit emotional reactions in those with high levels of secondary psychopathy, thus attenuating their aggressive tendencies. Taken together, these findings are in line with previous evidence showing that primary psychopathy traits predict unprovoked aggression, whereas secondary psychopathy traits do not (Reidy et al., 2008, 2011).

Previous work has found that boredom exacerbated sadistic aggression even in those with low dispositional sadism (Pfattheicher et al., 2021). Contrary to the original hypotheses, although the mood inductions effectively increased state boredom levels, this did not significantly impact aggression strength. Moreover, state boredom did not significantly correlate with increased aggression strength. This may indicate that boredom alone is not a strong enough motivator to inflict pain on another person when the other person is not retaliating. Although it is worth pointing out that boredom levels were generally lowest at the beginning of the task (when aggression levels were highest; Figure 3.2) and did not get past the middle of the scale by the end of the task. It is also true that on average the highest volume levels chosen did not breach the middle of the scale (approximately 50 dB). It may be the case that our induction of boredom, while effective was not strong enough and that participants opted for relatively mild "noise blasts" regardless. It is also plausible that pain infliction on another person may be more prominently motivated by other factors, such as psychopathic and sadistic traits.

Nevertheless, prior work has shown that boredom exacerbates sadistic behaviour amongst individuals high in trait sadism (Pfattheicher et al., 2021). As sadism and

psychopathy are distinct but related constructs that involve a predisposition to both boredom and pain infliction, it stood to reason that psychopathy would show a similar trend, with boredom acting as a positive moderator between psychopathy and sadistic aggression. This prediction is also in line with prior work that has shown both sadism and psychopathy to be independent predictors of unprovoked aggression (Reidy et al., 2011). Surprisingly, the moderations showed that state boredom moderated the relation between primary psychopathy and aggression strength in the opposite direction to what was initially hypothesized. Individuals with high levels of psychopathy traits and *low* levels of state boredom were found to administer white noise blasts of greater volume and duration. For individuals high in psychopathy, heightened levels of boredom may be indicative of disengagement from the task due to attentional failures (Hunter & Eastwood, 2018), resulting in diminished aggression strength towards their opponents. In contrast, low state boredom may represent a desire to "win" the game, leading to greater engagement with the task and increased aggression strength towards their opponent. This explanation aligns with prior work suggesting that primary psychopathy is associated with increased instrumental aggression – that is, the tendency to engage in purposeful, goal-directed aggression (Blair, 2007; Hart & Dempster, 1997; Skeem et al., 2007; Skeem et al., 2003).

Another possibility is that those higher in primary psychopathy do not experience boredom as saliently when compared to those lower in these traits and thus are not as affected by in-the-moment feelings of boredom. Theoretical models such as the dual-process theory suggest that the neural pathways for primary and secondary psychopathy differ, such that deficits in affective reactivity underlie primary psychopathy traits (e.g., lack of empathy)

and impairments in cognitive-executive functioning underlie secondary psychopathy traits such as impulsivity (Fowles & Dindo, 2009; Patrick et al., 2009). Evidence from prior studies support this, showing that those high in primary psychopathy are less emotionally reactive to negative stimuli (Benning et al., 2005; Vaidyanathan et al., 2011; Venables et al., 2015). Although these studies did not specifically look at boredom, it is possible that those with higher levels of primary psychopathy show similar reductions in emotional reactivity in response to boredom. As boredom can be a low arousal state (Danckert et al., 2018), boredom combined with diminished affective reactivity may result in insufficient activation to initiate aggressive behaviour. Consequently, boredom may not amplify antisocial behaviour in these individuals to the same extent compared to those with higher levels of secondary psychopathy, who tend to be more impulsive and emotionally volatile. This may explain why state boredom had a dampening effect on the relation between primary psychopathy and aggression strength.

Contrary to previous research, boredom did not increase aggression in those with high sadistic traits (Pfattheicher et al., 2021, 2023). This may reflect the possibility that individuals high in sadism engage in aggression toward others, including innocent opponents, regardless of their boredom levels. This behavior may stem from intrinsic motivations, such as deriving pleasure from harming others (Buckels et al., 2013; Chester et al., 2019). Prior work has shown that sadists aggressed against both innocent opponents and provocateurs, even when doing so required additional time and energy (Buckels et al., 2013; Chester et al., 2019). Those with higher sadistic traits reported greater positive affect and pleasure when inflicting pain upon others, suggesting that aggressive pleasure motivates sadistic behaviours

in these individuals (Chester et al., 2019). Retaliatory aggression towards provocateurs and towards innocent targets were positively correlated with sadism, even after controlling for psychopathy traits (Buckels et al., 2013; Chester et al., 2019). Unexpectedly, innocent victims were more likely to be the target of stronger sadistic aggression, suggesting that situational factors only play a limited role in sadistic aggression (Chester et al., 2019). In contrast, individuals with psychopathy traits only aggressed against an innocent person when it was easy (Buckels et al., 2013), suggesting that while sadists are intrinsically motivated to inflict pain upon others, there may be other factors that influence pain infliction in individuals with psychopathy traits.

Boredom proneness was not a significant moderator between any of the trait measures and aggression strength. It is possible that due to the manipulation of state boredom, and because state boredom rose in both conditions over the course of the study, that trait boredom proneness did not strongly relate to the outcome measures. This is consistent with prior work suggesting that feelings of boredom are more attributable to environmental influences (such as monotonous tasks and constraints on autonomy) rather than the individual (Chin et al., 2017). As the "opponent" the participants were playing against never retaliated, and participants won 15/20 trials, participants may have perceived the task to be monotonous. Indeed, boredom levels rose through the task in both conditions *at similar rates*, although it was higher on average for the Boredom Condition. In this context, the diminished aggression observed over time (Figure 3.2) may have reflected a desire to end the experiment early out of boredom.

One limitation of this study is that the mood induction, which was administered immediately prior to the task, exhibited only transient effects (Figure 3.2). As such, state boredom may not have exerted as strong an effect as hoped. However, this is consistent with extant work showing that mood inductions only last a few minutes (Gillies & Dozois, 2021; Hunter & Eastwood, 2018; Monno et al., 2024). Nonetheless, future work could utilize a concurrent induction/measure design, in which boredom is induced throughout the experimental task to assess the immediate effects of boredom (Havermans et al., 2015; Nederkoorn et al., 2016; Pfattheicher et al., 2021; Tam & Inzlicht, 2024). While baseline ratings of boredom prior to the mood inductions could not be determined, state boredom ratings immediately following the inductions did indicate that state boredom was significantly higher in the Boredom induction compared to the Interesting induction. Additionally, previous studies using a wide variety of boredom inductions have used post-induction probes to gauge their effects (Koval & Todman, 2015; Markey et al., 2014; Nederkoorn et al., 2016; Pfattheicher et al., 2021). As a result, it is reasonable to conclude that the manipulation check was effective. Nonetheless, collecting state boredom measures both prior to and immediately after a boredom induction would prove useful as a definitive manipulation check.

In addition, although measures were taken to increase the credibility that participants were playing against a real opponent, it is possible that some participants did not believe the deception. As such, participants responses may not accurately reflect how they would react in an ecologically valid context. Future studies could address this issue by including a question

at the end of the study asking participants to rate the extent to which they believed in the deception or having participants play against an actual confederate.

Ultimately, the findings from this chapter provide novel insight showing that boredom may in fact *diminish* the likelihood of inflicting pain on others in those with higher levels of psychopathy traits, rather than exacerbate it. The following chapter examines how trait measures (i.e., boredom proneness and sadism) influence the relationship between psychopathy and pain infliction, independent of a state boredom manipulation. It also examined a different form of pain infliction (i.e., social pain), given the interpersonal and affective deficits seen in psychopathy and the pervasiveness of social interactions in daily life.

Chapter 4: Boredom Proneness, Psychopathy, and Social Pain Infliction

4.1 Introduction

The current chapter examined the penchant for causing social pain in individuals with higher levels of psychopathic traits, with a particular emphasis on the differences between primary and secondary psychopathy. Although psychopathy is frequently associated with criminal and violent behaviours, the presence of psychopathic traits does not inherently necessitate engagement in these behaviors—instead, such behaviors should be regarded as correlates rather than fundamental components of psychopathy (Boduszek et al., 2016, 2017; Corrado et al., 2015; Skeem & Cooke, 2010a, 2010b). As such, one aspect of psychopathy that warrants further examination is the tendency to inflict *social* pain on others. Individuals with high psychopathic traits exist in the general population and are particularly prevalent in professions in which fearlessness and unemotionality may be a benefit, such as surgeons and CEOs (Babiak et al., 2010; Dutton, 2012; Fritzon et al., 2019). Although these individuals may not engage in the level of criminal or antisocial behaviour that would warrant a criminal record (Babiak, 1995), they nonetheless act in ways that cause social pain to others, including abusive supervision (Mathieu & Babiak, 2016) and causing distress to co-workers (Mathieu et al., 2014). They are more likely to engage in selfish, uncooperative behaviour, such as pursing a personal advantage despite it being harmful to another person (Gunschera et al., 2022; Pletti et al., 2017). In addition, psychopathy has been consistently linked to online trolling behaviour, a form of social pain infliction (Buckels et al., 2014, 2019, 2019; Craker & March, 2016; Lee, 2025) as well as bullying (van Geel et al., 2017). These behaviours do not stem from an inability to comprehend social and societal expectations—rather,

psychopathic individuals do not spontaneously incorporate this understanding into their decision-making process (Gong et al., 2019). Given that these social decision-making deficits frequently lead to adverse outcomes for others, a detailed examination of their underlying mechanisms is warranted (Brazil et al., 2013; Koenigs et al., 2012).

While social decision-making in psychopathy has been examined, the influence of boredom on these relationships has yet to be investigated in depth. Much prior work has utilized moral dilemma scenarios and judgements of moral acceptability to understand social decision-making (Brazil et al., 2022; Cardinale & Marsh, 2015; Cima et al., 2010; Hauser et al., 2021; Marsh & Cardinale, 2014; Pletti et al., 2017; Seara-Cardoso et al., 2016; Tassy et al., 2013). Social decision-making has also been examined using social-economic decision-making games (e.g., Prisoner's Dilemma, Trust Game; Balafoutas et al., 2021). However, many of these studies examine social decision-making when personal gain is involved to provide a clear motivation for participants and to align with real-world scenarios where self-interest often plays a significant role. Few studies have examined social decision-making in everyday social interactions in psychopathy, particularly when there is no personal benefit to be gained (as was the case in the previous chapter where unprovoked physical aggression was the metric). Doing so would allow us to better isolate the underlying motivations that influence social decision-making in psychopathy. Additionally, many real-life social interactions do not involve personal benefits. Examining these interactions could provide insights into how individuals high in psychopathic traits navigate everyday social situations.

It is possible that the penchant for interpersonal manipulation seen in primary psychopathy will lead individuals high in this trait to satisfy their desire to cause harm to others via social pain infliction. Individuals high in secondary psychopathy may also seek to

inflict social pain but for distinct reasons. That is, the impulsive and sensation-seeking tendencies characteristics of secondary psychopathy may drive individuals to inflict social pain on others as a means of satisfying their need for stimulation and arousal. While both primary and secondary psychopathy are correlated with boredom susceptibility (Hare & Neumann, 2008; Levenson et al., 1995), it is plausible that individuals higher in secondary psychopathy are more highly boredom prone and engage in antisocial behaviours as a means to cope with boredom, given the common underlying factor of high levels of impulsivity. That is, prior research has shown that boredom prone individuals report greater levels of impulsivity (Watt & Vodanovich, 1992), lower levels of self-control (Isacescu et al., 2017; Isacescu & Danckert, 2018), and higher levels of sensation-seeking (Kass & Vodanovich, 1990), all traits which may promote antisocial behaviours (Boylan et al., 2021; Wolff et al., 2020). This is also consistent with the findings from both experimental chapters presented thus far, which showed that secondary psychopathy had a significantly stronger positive relation with boredom proneness and negative relation with self-control when those same relations were compared directly to primary psychopathy (Table 2.1 and Table 3.1). Nonetheless, the interplay between boredom and the two variants of psychopathy remains unclear.

One final possibility is that, regardless of psychopathy variant, individuals high in psychopathy may inflict pain instead to satisfy sadistic inclinations. Indeed, sadistic tendencies associated with psychopathic traits may reflect a genuine, implicit disposition to cause harm (Spantidaki Kyriazi et al., 2025). Sadism and psychopathy have both been linked to antagonism, hostility, and reduced empathy (Blötner & Mokros, 2023). Additionally, prior literature has found sadism to be a driver of pain infliction behaviours (Buckels, 2023;

Buckels et al., 2013; Pfattheicher et al., 2021, 2023). The aim of the current research was to explore how boredom proneness, sadistic tendencies, and the distinct variants of psychopathy interact to influence social pain infliction.

To do this, six novel social pain scenarios depicting social interactions in a variety of contexts were developed and validated to explore the relations between psychopathy, boredom proneness, sadism and social pain infliction. The hypotheses are fourfold: first, those higher in general psychopathy will be more likely to inflict social pain on others. Second, the highly boredom prone are more likely to engage in social pain infliction. Third, the likelihood of individuals with higher psychopathic traits choosing to inflict social pain will be exacerbated by higher trait boredom proneness. The fourth hypothesis examined whether social pain infliction in individuals with higher psychopathic traits would also be moderated by sadistic tendencies. Finally, hypotheses one, three and four were re-run based on psychopathic variants (i.e., primary and secondary psychopathy) as an exploratory approach to determine whether the predicted outcomes would differ as a function of these variants.

4.2 Study 4A

4.2.1 Method

4.2.1.1 Participants

The hypothesized effects were anticipated to be relatively subtle; thus, it was decided a priori to collect data from approximately 500 participants in order to obtain sufficient power to detect small effect sizes (.146) at a 95% confidence. A total of 496 of undergraduate

students (286 female, 54 male, 14 transgender/non-binary, 1 preferred to self identify, 1 preferred not to say) with an age range of 17-54 years were recruited from an online participant pool (SONA) at the University of Waterloo. Participants were granted one course credit in exchange for their time and completed the study online using Qualtrics. All participants provided informed consent prior to taking part in the experiment and the study received approval from the University of Waterloo's Office of Research Ethics (protocol code 45427, approved July 23, 2023).

4.2.1.2 Procedure

Participants first completed a series of surveys on Qualtrics that included measures of psychopathy, sadism, and boredom proneness. The order of the surveys was not randomized. Demographic information (i.e., age, gender, faculty) were also collected. Participants were then presented with six first-person narrative scenarios. They were required to read each narrative and then choose from one of four response options that differed in their level of pro/anti-sociality. Responses were not labeled as either pro- or antisocial (e.g., participants did not see the mild social pain option labelled as "mild social pain"). An example scenario with four response options is outlined below (see Appendix B for the remaining scenarios):

> You have plans to meet Sarah, one of your childhood friends, for coffee. You arrive at the coffee shop a little early and order your regular. Out of the corner of your eye, you see Sarah walk in. You can immediately see that her normally tidy brown hair is a mess, and that her shirt is buttoned incorrectly. She sits down in front of you with a worried look on her face.
>
> "How are you?" You ask.
>
> "Not so good," she says, her voice breaking. "A few weeks ago, Ryan told me that our relationship wasn't working for him anymore and moved his stuff out of our apartment." Her eyes well up with tears. "He won't return any of my calls, I have no idea what went wrong. He just left me and our dog, Bean, and I didn't even get a chance to say goodbye."

"I got fired because I've been such a mess and I haven't been able to get my work done on time, and now I definitely can't afford the apartment alone. I'm worried that Bean and I are going to be homeless. Bean keeps crying because he misses his dad, and I don't know how to make him feel better because I'm hurting too. I've been trying to find work, but it's just been so difficult to get out of bed and I still can't find a job. I just don't know what to do, I'm terrified that we will end up homeless in the next couple of months once my savings run out." She unclenches her fists, and you can see her fingernails are raw and ragged from biting them. "I tried to ask my parents for help, but they just told me that I'm an adult and I need to figure out how to manage things on my own. I really don't know what to do, what do you think?"

You look at her tired face, and after a period of brief thought decide to respond with this:

- (Option 1) Moderate positive (no social pain): "Oh wow, I'm really sorry all this happened, it must be very difficult. Is there anything I can do to help?"
- (Option 2) Mild positive (no social pain): "It sounds like a lot has happened, it sounds very difficult. I appreciate that you felt like you could talk to me about this."
- (Option 3) Mild social pain: "Oh wow, it sounds like you have a lot going on, but dwelling and complaining about it won't change anything."
- (Option 4) Moderate social pain: "Well, keeping Bean when you can't even afford rent is very irresponsible, and you should sell him to someone who can actually provide a good home for him. I agree with your parents that you need to grow up."

The scenarios were presented in the same order, with the order of response options randomized. After making their choices, participants then rated each of the response options in terms of valence (positive, negative, or neutral) and severity (e.g., mild, moderate, or severe) *for the character who received the response*. Participants were not informed of the intended valence or the intensity of each option during the study. Following this, they were asked to rate how much social pain they perceived each response option would cause the other person on a Likert scale of 1 to 10, with 1 being the lowest and 10 being the highest. Participants were then shown each of the four possible response options with an associated consequence and were asked to rate how well the consequence matched the response option on a Likert scale of 1 ("*not at all"*) to 5 ("*very much"*). These measures represented an attempt to validate the nature of the first-person narratives. An example is provided below:

> Response option: “Well, keeping Bean when you can’t even afford rent is very irresponsible, and you should sell him to someone who can actually provide a good home for him. I agree with your parents that you need to grow up.”
>
> Consequence: Sarah recoils as if you just punched her in the gut. She yells, “how could you even suggest that?” and storms out of the coffee shop.
>
> How well do you think this consequence matches the response option, with 1 being "not at all" and 5 being "very much"?

To mitigate the potential for response biases, participants were not told at the beginning of the study that it was intended to examine psychopathy and sadism. Instead, they were informed that the study examined the relation between personality traits and boredom proneness, and how these traits affected interpersonal decision-making. Participants were informed of this partial disclosure in the feedback form they received immediately following the study.

4.2.1.3 Measures

The same scales adopted in the previous two chapters were used to measure psychopathy, boredom proneness, and sadism (see Chapter 2, section 2.2.2, and Chapter 3, section 3.2.2).

4.2.1.4 Scenarios

Scenarios were written from a rich, first-person narrative to maximize reader engagement and were intended to capture everyday situations that individuals face in order to assess some of the more subtle ways in which psychopathic individuals may engage in antisocial behaviour (see example above and Appendix B). The scenarios simulated one-on-one interpersonal interactions with another person across various life domains (e.g., money problems, relationship issues) and differed from traditional moral dilemma scenarios, as

participants were not asked to choose between two potential options. Instead, participants were asked to choose between four response options, two of which were a priori deemed to be positive (moderate or mildly positive) and two of which were considered socially painful (moderate and mild social pain). This also allowed for the exploration of how psychopathic traits influenced decision-making in scenarios that are more reflective of day-to-day life. Gender of the characters was counterbalanced across scenarios, with three scenarios depicting interactions with a male and three depicting interactions with a female.

4.2.1.5 Data Analysis

First, correlations between the trait variables are presented, followed by analyses intended to validate the scenarios which involved assessing differences in ratings of valence, intensity, and social pain across the response options, as well as an assessment of judgements of the appropriateness of the associated consequences. In addition to validating the scenarios, correlations between these ratings and scores on the trait variables (i.e., measures of psychopathy, sadism, boredom proneness) were examined. To conduct these analyses, ratings were averaged across scenarios. Next, the relations between participants' choices in the scenarios and their scores on the trait measures were investigated. Since very few participants chose the socially painful options, to quantify participants' choices, participants' response selections for each of the scenarios were recoded, with choices of moderate or mild positive options coded as 0 and mild or moderate social pain options coded as 1. This allowed for an examination of participants' likelihood of choosing socially painful options (Tables 4.1 and 4.3). Additionally, summing these recoded responses across scenarios allowed for the

examination of whether boredom proneness or sadism moderated the relationship between psychopathy and the tendency to choose socially painful options.

Participants who did not provide responses to all pertinent questions in the study (whether in relation to the scenarios or on our trait measures) were excluded from further analysis. Due to a programming error, questions regarding ratings of social pain and the appropriateness of the consequences were included later in the course of data collection. Consequently, a subset of participants did not provide responses on these items. Importantly, participants who did not respond to the social pain and appropriateness questions were not necessarily the same participants who failed to respond to items presented earlier in the data collection process. Thus, to avoid excessive loss of data, the analyses were divided into two sections before removing participants listwise: one involving participants' ratings of valence and intensity, as well as their choices ($N_{analyzed}$ = 356), and another involving participants' ratings of social pain and the appropriateness of the consequences ($N_{analyzed}$ = 238). Sensitivity analyses conducted in G*Power indicated that there was sufficient power to detect small effect sizes in the analyses of interest (f^2 values ranged between .02 to .08).

For the moderation analyses, diagnostic plots were used to assess many of the key assumptions. Specifically, QQ-plots were used to assess the normality of the residuals, scale-location plots were used to evaluate the assumption of homogeneity of variances, and plotting the residuals against the fitted data allowed us to determine whether data met the assumption of linearity. Additionally, a Durbin-Watson test was used to test the assumption of independence. The data met the assumptions for normality, homogeneity of variance, and independence. To mitigate potential issues related to multicollinearity due to the high

correlations between the trait variables, all predictors and moderators in the mixed effects logistic regressions and moderation analyses were standardized.

4.2.2 Results

4.2.2.1 Scenario Validation

All response options were rated appropriately in terms of valence, intensity, and amount of social pain. That is, positive options were rated as such (and vice versa), severity ratings correctly distinguished mild from moderate options, and social pain ratings tracked in the intended direction. Additionally, participants generally felt that the outcomes or consequences outlined for each option were appropriate (Figure 4.1).

To examine whether individuals high and low in psychopathy differed in their ratings of the scenarios, psychopathy scores were split into tertiles. A series of independent samples *t*-tests were then conducted with psychopathy tertile (high or low) as the independent variable. The dependent variables were averaged ratings for each category of response options (i.e., moderate positive, mild positive, mild social pain, moderate social pain) or composite scores representing ratings across all categories of response options. The composite score for valence was created by coding responses matching the tone of the option (e.g., rating a moderately positive option as positive or a mild social pain option as negative) as 1 and non-matching responses (e.g., rating a mild positive option as negative) as 0. The proportion of responses that matched the valence of the response option served as the dependent variable. The composite score for intensity, social pain and the appropriateness of the options were created by reverse-coding participants' responses on the socially painful options and subsequently averaging responses across all options.

In terms of valence ratings (n = 118 and n = 119 for the high and low tertile groups, respectively), those high in psychopathy significantly differed from those low in psychopathy, $t(235) = -3.82$, $p < .001$, $d = 0.50$, such that those high in psychopathy rated the moderate positive option to be less positive, $t(235) = -3.60$, $p < .001$, $d = 0.47$, and both negative options to be less negative ($t(235) = 3.91$, $p < .001$, $d = 0.51$ for mild social pain and $t(235) = 3.78$, $p < .001$, $d = 0.49$ for moderate social pain). Social pain ratings differed between high and low psychopathy (n = 79 and n = 80 for the high and low tertile groups, respectively), $t(157) = 4.44$, $p < .001$, $d = 0.70$, such that both positive options were rated as less positive ($t(157) = 3.88$, $p < .001$, $d = 0.62$ for moderate positive and $t(157) = 2.84$, $p = .005$, $d = 0.45$ for mild positive), and both social pain options were rated as less socially painful in those high in psychopathy when compared to those low in psychopathy ($t(157) = -2.01$, $p = .046$, $d = 0.32$ for mild social pain and $t(157) = -3.63$, $p < .001$, $d = 0.58$ for moderate social pain). Neither intensity ratings nor ratings of appropriateness of consequence differed between high and low levels of psychopathy. For descriptive statistics and a more detailed breakdown of how these ratings differed in primary and secondary psychopathy, please see Appendix B (Tables B1-B4).

Ratings of valence, intensity, social pain, and appropriateness of consequence did not differ between high and low boredom proneness (ps > .05). Similarly, ratings of valence, intensity, and appropriateness of consequence did not differ between high and low levels of sadism (ps > .05). However, ratings of social pain did differ significantly between those high and low in sadism, $t(157) = 3.82$, $p < .001$, $d = 0.58$, such that both positive options were rated as less positive ($t(157) = 2.98$, $p = .003$, $d = 0.47$ for moderate positive and $t(157) = 2.44$, $p = .016$, $d = 0.39$ for mild positive), and the moderate social pain option was rated as

less socially painful, $t(157) = -2.69$, $p = .008$, $d = 0.43$, in those high in sadism compared to those low in sadism.

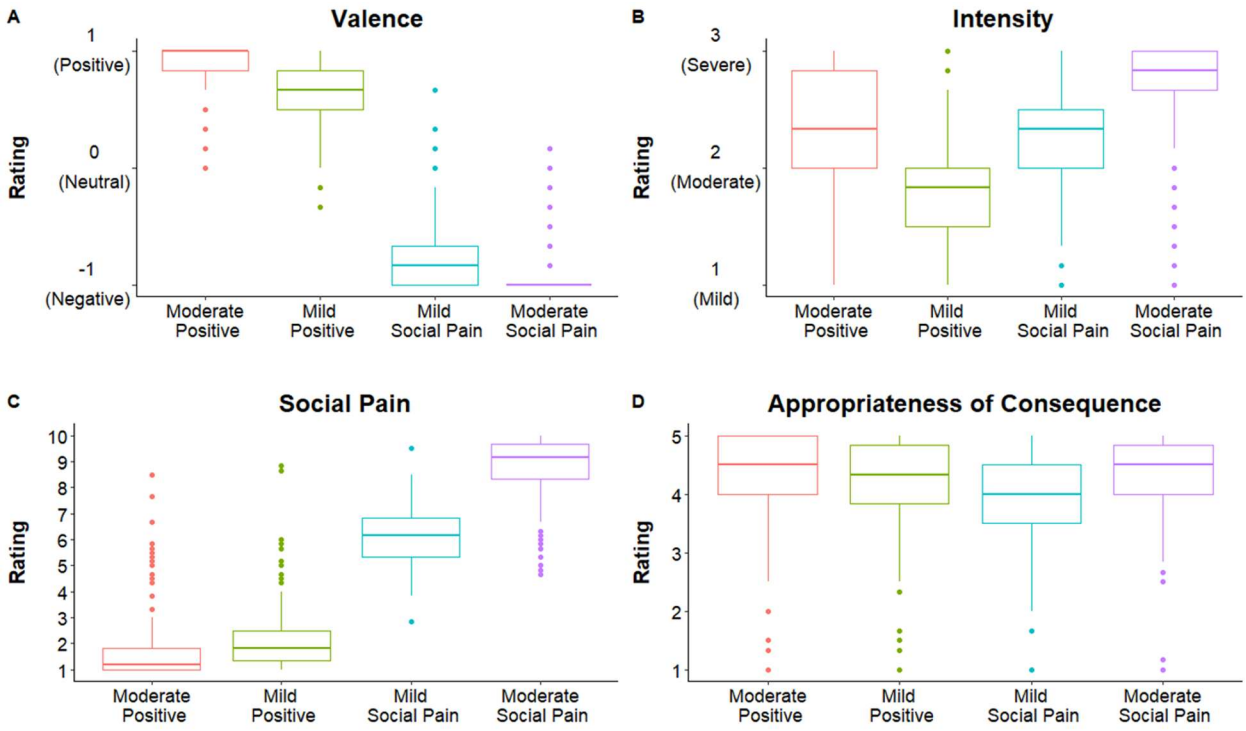


Figure 4.1. Response option validation results. Box and whisker plots of (A) valence ratings, (B) intensity ratings, (C) social pain ratings, and (D) consequence ratings for each response option.

4.2.2.2 Choice Options

To gain insight into whether the trait variables predicted participants' likelihood of choosing socially painful options, mixed effects logistic regressions were conducted, with participants who never chose one of the social pain options coded as 0, and participants who chose at least one of the social pain options coded as 1. The scenarios, as well as gender, boredom proneness, sadism, and psychopathy were entered as fixed effects and participants were entered as random effects to test how likely participants were to choose a socially

painful option. As the prevalence of psychopathy is higher in men (Sanz-García et al., 2021) and the sample was predominantly female, these analyses also controlled for gender. Given that the majority of the sample consisted of men and women, gender was coded as a binary variable (male or female), which resulted in the loss of 16 participants from the analysis (N = 340). This analysis was repeated with psychopathy split into its primary and secondary components. The results from the mixed effects logistic regressions showed that psychopathy alone was a significant predictor of choosing socially painful options (Table 4.1). When psychopathy was split into primary and secondary psychopathy, only primary psychopathy remained a significant predictor of choosing socially painful options, $\beta = 0.60$, $SE = 0.23$, $z = 2.67$, $p = .008$ (Table B5; Appendix B).

Additionally, one of the scenarios was found to significantly predict higher rates of choosing socially painful options (Scenario 4; Appendix B). Separate mixed effects logistic regressions run without this scenario continued to show that both psychopathy, $\beta = 1.34$, $SE = 0.36$, $z = 3.73$, $p < .001$ (Table B6; Appendix B) and primary psychopathy, $\beta = 0.99$, $SE = 0.29$, $z = 3.38$, $p < .001$ (Table B7; Appendix B) acted as significant predictors of choosing socially painful options. A logistic regression with *only* the significant scenario showed the same pattern, with psychopathy, $\beta = 1.17$, $SE = 0.30$, $z = 4.08$, $p < .001$ (Table B8; Appendix B) and primary psychopathy, $\beta = 0.89$, $SE = 0.24$, $z = 3.64$, $p <. 001$ (Table B9; Appendix B) remaining significant predictors. This suggests that the results are not solely driven by this scenario.

Table 4.1. Mixed effects logistic regression of psychopathy predicting the choice of a social pain option

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	-0.31	0.79	-0.39	.695
Scenario 2	1.03	0.63	1.65	.099
Scenario 3	0.62	0.66	0.94	.346
Scenario 4	1.35	0.61	2.21	.027*
Scenario 5	0.45	0.68	0.66	.509
Gender (Male)	0.59	0.47	1.26	.209
Boredom Proneness	-0.11	0.22	-0.50	.618
Sadism	0.32	0.20	1.64	.102
Psychopathy	0.80	0.26	3.05	.002**

Note. After coding gender as binary, $N = 340$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

4.2.2.3 Correlations between Trait Measures

Significant correlations were found between psychopathy and boredom proneness, sadism and boredom proneness, and psychopathy and sadism (Table 4.2). As in Chapters 2 and 3, secondary psychopathy was found to be more highly correlated with boredom proneness when compared to primary psychopathy. That is, when directly contrasted, the relation between secondary psychopathy and boredom proneness was significantly larger than the same relation with primary psychopathy ($z = -9.57$; $p < .001$). The relation between primary psychopathy and sadism was significantly larger than the same relation with secondary psychopathy ($z = 4.01$; $p < .001$). Psychopathy, as well as both variants of psychopathy, and sadism were significantly correlated with choosing socially painful options. The relation between primary psychopathy and choosing socially painful options was significantly greater than the same relation with secondary psychopathy ($z = 2.30$; $p = .021$).

Boredom proneness was not significantly correlated with choosing socially painful options (Table 4.2).

Table 4.2. Correlations between main variables

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6
1. Psychopathy	51.20 (9.11)	0.09	-0.54	-	.90***	.76***	.50***	.55***	.26***
2. Primary Psychopathy	30.39 (6.52)	0.23	-0.37		-	.40***	.25***	.54***	.27***
3. Secondary Psychopathy	20.81 (4.25)	-0.04	-0.27			-	.69***	.34***	.14**
4. Boredom Proneness	29.68 (10.01)	0.02	-0.62				-	.21***	.08
5. Sadism	19.49 (6.68)	1.13	1.37					-	.31***
6. Choice	0.13 (0.43)	4.54	26.89						-

Note. Descriptive statistics were calculated before standardizing variables. $N = 356$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

4.2.2.4 Moderation Analyses

To examine whether boredom proneness or sadism moderated the relation between psychopathy or its subscales and frequency of choosing socially painful options, participants' choices (0 for positive or 1 for socially painful) were summed across scenarios. Moderation analyses were then conducted to examine whether boredom proneness was a significant moderator of the relation between psychopathy and choosing socially painful options. Gender was again controlled for in these analyses ($N = 340$). This was repeated for the full psychopathy scale, as well as for primary and secondary psychopathy, and sadism separately. Neither boredom proneness nor sadism significantly moderated the relationship between psychopathy and choosing socially painful options. The same non-significant results were observed when psychopathy was split into primary and secondary variants ($ps > .05$).

4.2.3 Discussion

Results of Study 4A showed that primary psychopathy was a main driver of choosing to inflict a socially painful consequence on another. This relation was not evident in secondary psychopathy, perhaps indicative of differences in self-control. That is, impulsivity is characteristic of secondary psychopathy, and the scenarios depicted here did not involve impulsive behaviours. Additionally, prior work has shown that individuals higher in primary psychopathy traits (i.e., affective and interpersonal features) were more likely to endorse personal harm to others compared to those low in this trait (Patil, 2015; Ritchie & Forth, 2016). Moreover, interpersonal traits have previously been found to predict verbal aggression (e.g., verbal arguments, insults, attacks; Thomson et al., 2019). Taken together, this suggests that engaging in behaviours that are harmful towards another person may be driven by a lack

of concern for others, consistent with the interpersonal and affective deficits seen in primary psychopathy. Although psychopathy and both variants were correlated with choosing socially painful options, boredom proneness was not a significant moderator between these traits and social pain infliction. Similarly, sadism did not moderate the relation between these traits and choosing socially painful options, suggesting neither boredom alleviation nor sadistic tendencies influence social pain infliction in those with high psychopathic traits. These unexpected results prompted the next study which attempted to replicate the current findings in a new sample. As very few participants chose the mild or moderately painful social options, this restricted range of responses may not have captured sufficient variability to observe any potential relations with boredom proneness. To address this, Study 4B included a measure of a participants' likelihood of choosing each option, rated on a 10-point Likert scale, to provide the necessary variability to detect relations with boredom proneness.

4.3 Study 4B

This study aimed to replicate the findings from the previous study while addressing the concern that few people chose the moderate social pain option in Study 4A. To do this, the same scenarios were used with the exception that questions regarding the appropriateness of consequences were replaced with questions about how likely participants would be to choose each response option.

4.3.1 Method

4.3.1.1 Participants

A total of 310 of undergraduate students (237 female, 61 male, 4 transgender/non-binary, 1 preferred to self identify, 2 preferred not to say) with an age range of 17-54 years were recruited from an online participant pool (SONA) at the University of Waterloo. All participants provided informed consent prior to taking part in the experiment and the study received approval from the University of Waterloo's Office of Research Ethics.

4.3.1.2 Procedure

The methods and scales used were the same as Study 4A. However, questions asking participants to rate how appropriate the consequences were for each response option were eliminated and instead were replaced with questions asking how *likely* participants would be to choose each response option on a Likert scale of 1 (not at all) to 10 (very much).

4.3.1.3 Data Analysis

The analyses for this study were similar to those in Study 4A, with the exception of additional analyses examining likelihood ratings and moderations examining whether

boredom proneness and sadism moderated the relationship between likelihood ratings and trait measures. Participants were asked to rate the valence, intensity, and level of social pain associated with each option, as well as their likelihood of choosing each option. Several participants did not provide responses on the items assessing their likelihood of choosing socially painful options. Therefore, to avoid excessive loss of data and remain consistent with the data preprocessing methods in Study 4A, two separate listwise deletions of participants with missing data were performed prior to data analysis. Since the participants with missing likelihood ratings were not necessarily the same participants with missing responses on the remaining items, a listwise deletion was performed prior to analysing the data involving participants' ratings of the valence, intensity and levels of social pain associated with each option ($N_{analyzed}$ = 219). A second listwise deletion was performed prior to analysing participants' ratings of social pain and likelihood ratings ($N_{analyzed}$ = 211). Sensitivity analyses conducted in G*Power showed that there was sufficient power to detect small effects on the analyses of interest (f^2 values ranged between .04 and .10).

For the moderation analyses, key assumptions were assessed using the same method as Study 4A (section 4.2.1.5). The data met the assumptions for normality, homogeneity of variance, and independence. All predictors and moderators in the mixed effects logistic regressions and moderation analyses were standardized to mitigate potential issues related to multicollinearity due to the high correlations between the trait variables.

4.3.2 Results

4.3.2.1 Scenario Validation

The findings from Study 4A were replicated, with participants rating the intensity, valence, and level of social pain for the response options similarly to how they were intended and showing the same pattern of results as observed in the previous study (Figure 4.2). Ratings of likelihood also followed the expected pattern, with participants reporting that they were more likely to choose the positive options over the negative ones (Figure 4.2).

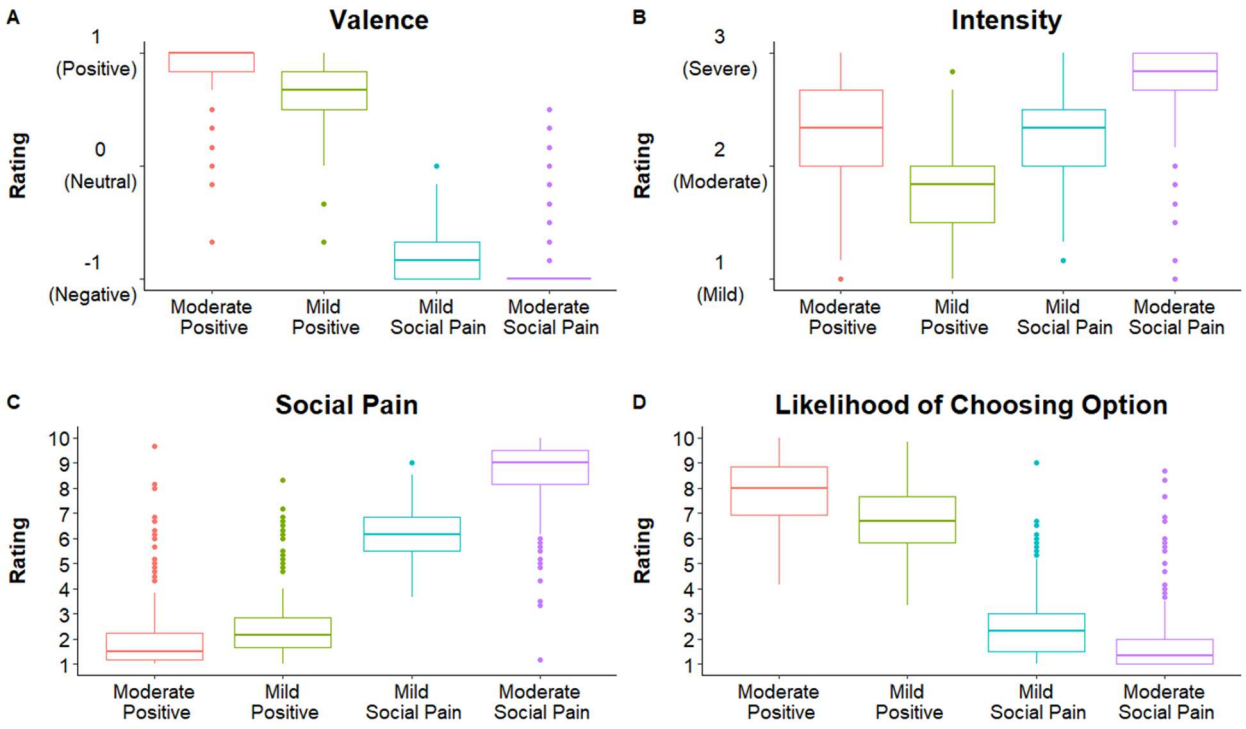


Figure 4.2. Box and whisker plots of (A) valence ratings, (B) intensity ratings, (C) social pain ratings, (D) likelihood of choosing each option ratings.

As in Study 4A, independent samples *t*-tests were conducted to determine whether individuals in the high or low psychopathy tertiles differed in their ratings of the response

options. Composite scores for valence, intensity and social pain were created using the same methods as the previous study. In terms of valence ratings (n = 73 for both high and low tertiles), those high in psychopathy significantly differed from those low in psychopathy, $t(144) = -3.49$, $p < .001$, $d = 0.58$, such that those high in psychopathy rated the moderate positive option to be less positive, $t(144) = -2.68$, $p = .008$, $d = 0.44$, and both negative options to be less negative ($t(144) = 3.70$, $p < .001$, $d = 0.61$ for mild social pain and $t(144) = 2.71$, $p = .007$, $d = 0.45$ for moderate social pain). Social pain ratings differed between high and low psychopathy (n = 70 and n = 71 for the high and low tertile groups, respectively), $t(139) = 6.61$, $p < .001$, $d = 1.11$, such that both positive options were rated as less positive ($t(139) = 6.08$, $p < .001$, $d = 1.02$ for moderate positive and $t(139) = 5.28$, $p < .001$, $d = 0.89$ for mild positive), and both social pain options were rated as less socially painful when compared to those low in psychopathy ($t(139) = -2.88$, $p = .005$, $d = 0.49$ for mild social pain and $t(139) = -5.86$, $p < .001$, $d = 0.99$ for moderate social pain). Intensity ratings did not differ between high and low levels of psychopathy. For a more detailed breakdown of how these ratings differed in primary and secondary psychopathy, please see Tables B10-B12 in Appendix B.

Consistent with the findings from Study 4A, valence, intensity, and social pain ratings did not differ between high and low boredom proneness (ps > .05). There was no significant difference in valence or intensity ratings between high and low sadism (ps > .05); however, social pain ratings significantly differed, $t(139) = 4.64$, $p < .001$, $d = 0.78$. Those high in sadism rated both positive options as less positive ($t(139) = 3.69$, $p < .001$, $d = 0.62$ for moderate positive and $t(139) = 3.67$, $p < .001$, $d = 0.62$ for mild positive), and both negative

options as less socially painful, ($t(139) = -2.73$, $p = .007$, $d = 0.46$ for mild social pain and $t(139) = -4.27$, $p < .001$, $d = 0.72$ for moderate social pain).

4.3.2.2 Choice Options

In contrast to Study 4A, the mixed effects logistic regressions showed that only sadism and psychopathy significantly predicted choosing socially painful options, whereas boredom proneness showed the inverse relationship (Table 3). When psychopathy was split into primary and secondary psychopathy neither primary nor secondary psychopathy significantly predicted choosing a socially painful response option (ps > .05; Table B13; Appendix B). Two scenarios were found to predict significantly higher rates of choosing the social pain option (Scenarios 2 and 4; Appendix B). A separate mixed effects logistic regression run without these scenarios showed that only psychopathy remained a significant predictor, $\beta = 0.77$, $SE = 0.33$, $z = 2.30$, $p = .021$ (Table B14; Appendix B). When psychopathy was split into variants, sadism ($\beta = 0.53$, $SE = 0.26$, $z = 2.08$, $p = .038$) and secondary psychopathy ($\beta = 0.68$, $SE = 0.30$, $z = 2.28$, $p = .022$) were significant predictors of choosing socially painful options (Table B15; Appendix B). When these regressions were run again with only the two significant scenarios, sadism was a positive predictor, $\beta = 0.56$, $SE = 0.23$, $z = 2.49$, $p = .013$, while boredom proneness was a negative predictor, $\beta = -0.48$, $SE = 0.24$, $z = -2.05$, $p = .040$ (Table B16; Appendix B). When psychopathy was split into primary and secondary psychopathy, neither variant was a significant predictor of choosing socially painful options (Table B17; Appendix B).

Table 4.3. Mixed effects logistic regression of psychopathy and sadism predicting the choice of a social pain option

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	0.00	0.84	0.00	1.000
Scenario 2	1.86	0.66	2.84**	.005
Scenario 3	0.74	0.73	1.02	.310
Scenario 4	1.52	0.67	2.27*	.023
Scenario 5	0.91	0.71	1.28	.202
Gender (Male)	0.36	0.37	0.99	.321
Boredom Proneness	-0.36	0.18	-2.02*	.044
Sadism	0.54	0.17	3.12**	.002
Psychopathy	0.51	0.20	2.56*	.010

Note. After coding gender as binary, $N = 213$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

4.3.2.3 Correlations

The correlational results replicate the findings from Study 4A. Both primary and secondary psychopathy were positively correlated with boredom proneness, with the relation between secondary psychopathy and boredom proneness significantly larger than the same relation with primary psychopathy ($z = -5.36$; $p < .001$), as was the case in Chapters 2 and 3. Sadism was also positively correlated with boredom proneness, as was psychopathy. Sadism was significantly correlated with psychopathy, primary psychopathy, and secondary psychopathy. Unlike the Study 4A, the relation between primary psychopathy and sadism was not significantly larger than the same relation with secondary psychopathy ($p > .05$). Psychopathy, both variants of psychopathy, and sadism were significantly correlated with choosing socially painful options. Contrary to Study 4A, the relation between primary psychopathy and choosing socially painful options was not significantly greater than the

same relation with secondary psychopathy ($p > .05$). Boredom proneness was not significantly correlated with choosing socially painful options ($p > .05$; Table 4.4).

Table 4.4. Correlations between main variables

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6
1. Psychopathy	49.26 (9.15)	0.27	-0.34	-	.91***	.74***	.40***	.59***	.32***
2. Primary Psychopathy	29.39 (6.71)	0.49	0.04		-	.39***	.21**	.54***	.31***
3. Secondary Psychopathy	19.87 (4.15)	0.19	-0.29			-	.56***	.43***	.22**
4. Boredom Proneness	28.49 (10.05)	0.11	-0.65				-	.29***	.02
5. Sadism	19.35 (6.25)	1.07	1.38					-	.40***
6. Choice	0.21 (0.52)	2.76	8.46						-

Note. $N = 219$, * $p < .05$. ** $p < .01$. *** $p < .001$.

4.3.2.4 Moderation Analysis for Choice

In terms of the options participants chose in response to the scenarios, boredom proneness did not significantly moderate the relationship between psychopathy and choosing socially painful options, nor the relationship between the psychopathy variants and choosing socially painful options. These findings are consistent with those from Study 4A. Sadism also was not a significant moderator of psychopathy and choice of a socially painful option, and this relationship persisted when psychopathy was split into variants (*p*s < .05).

4.3.2.5 Likelihood of Choosing a Response Option

As was the case in Study 4A, very few people chose the mild or moderate socially painful options. To deal with this restriction of range, the likelihood of choosing each response was added with a 10-point Likert scale as the response range. For this question, psychopathy and sadism were both positively correlated with increased self-reported likelihood of choosing both the mild and moderate socially painful options and negatively correlated with the likelihood of choosing the moderately positive option. Primary and secondary psychopathy showed the same pattern, with a greater likelihood of choosing the mild and moderate socially painful options and a lower likelihood of choosing the moderately positive option (Table 4.5). The relation between primary psychopathy and choosing both the mild ($z = 2.60$; $p = .009$) and the moderate pain option ($z = 2.50$; $p = .013$) was significantly larger than the same relation with secondary psychopathy. Boredom proneness was not significantly correlated with the likelihood of choosing any of the response options (*p*s < .05).

Table 4.5. Correlations for trait measures and likelihood of choosing response options

Variables	*M* (*SD*)	Skew	Kurtosis	6	7	8	9
1. Psychopathy	50.34 (9.47)	0.28	-0.45	-.34***	.02	.57***	.52***
2. Primary Psychopathy	30.17 (6.81)	0.41	-0.17	-.35***	-.01	.55***	.50***
3. Secondary Psychopathy	20.17 (4.21)	0.21	-0.45	-.19**	.07	.39***	.34***
4. Sadism	20.37 (7.16)	1.00	0.56	-.40***	-.11	.53***	.52***
5. BPS	28.92 (9.37)	-0.01	-0.56	-.08	-.03	.12	.11
6. Moderate Positive	7.83 (1.42)	-0.59	-0.38	-	-	-	-
7. Mild Positive	6.67 (1.30)	-0.14	-0.30	-	-	-	-
8. Mild Social Pain	2.61 (1.42)	1.31	1.83	-	-	-	-
9. Moderate Social Pain	1.90 (1.50)	2.33	5.29	-	-	-	-

Note. $N = 211$. * $p < .05$. * $p < .05$. ** $p < .01$. *** $p < .001$.

4.3.2.6 Moderation Analyses for Likelihood Ratings

Despite the lack of correlations between boredom proneness and likelihood of choosing socially painful options, moderation analyses were also performed to examine whether boredom proneness moderated the relationship between psychopathy and self-reported likelihood of responding in a socially painful manner. Participants' likelihood of choosing negative options were averaged to create a single composite score. As in Study 4A, these moderation analyses controlled for gender ($N = 206$). Psychopathy, primary psychopathy, and secondary psychopathy were correlated with likelihood of choosing socially painful options ($r(209) = .57$, $p < .001$; $r(209) = .55$, $p < .001$; $r(209) = .39$, $p < .001$, respectively). Boredom proneness was a significant *positive* moderator between participants' average likelihood of choosing socially painful options and both psychopathy, $b = 0.17$, $SE = 0.09$, $\beta = 0.12$, $t(201) = 2.05$, $p = .042$, and primary psychopathy, $b = 0.21$, $SE = 0.09$, $\beta = 0.14$, $t(201) = 2.30$, $p = .023$, such that those high in these traits and also high in boredom proneness reported greater likelihood of choosing socially painful options (Figure 4.4; Table

B18; Appendix B). The same relation was not shown between boredom proneness and secondary psychopathy. Sadism also did not emerge as a significant moderator of the relation between psychopathy and likelihood of choosing socially painful options. Nor was it a significant moderator when psychopathy was split into its two variants (*p*s > .05).

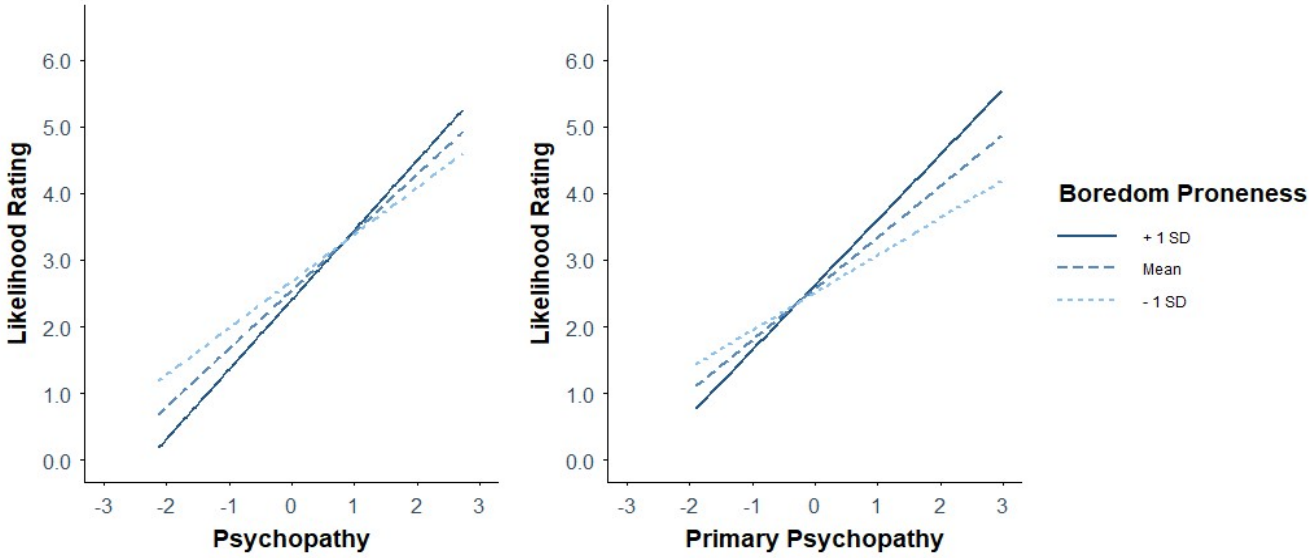


Figure 4.3. Line graphs depicting (left) the relation between psychopathy and likelihood of choosing socially painful options as a function of varying levels of boredom proneness, (right) the relation between primary psychopathy and likelihood of choosing socially painful options as a function of varying levels of boredom proneness. $N = 206$, after controlling for gender.

4.3.3 Discussion

Similar to Study 4A, psychopathy and both variants were correlated with choosing socially painful options. However, after accounting for other relevant variables, only sadism and psychopathy predicted choosing socially painful options, while neither primary nor secondary psychopathy did. This differs from the findings from 4A, which showed that primary psychopathy was a significant predictor of choosing socially painful options. Additionally, the relation between primary psychopathy and choosing socially painful

options was not significantly greater than the same relation with secondary psychopathy, in contrast to Study 4A. While the current data suggest that there is a distinction between primary and secondary psychopathy in terms of likelihood of choosing to inflict social pain, the findings remain inconsistent. It is possible that because there was nothing to gain in these scenarios, that those high in primary psychopathy did not consistently choose socially painful options, given their penchant for instrumental aggression (Blair, 2007; Hart & Dempster, 1997; Skeem et al., 2007; Skeem et al., 2003).

Consistent with Study 4A, boredom proneness did not significantly moderate the relationship between psychopathy and choosing socially painful options when those options were essentially coded in a binary manner (socially painful or not). However, when participants were forced to indicate the *likelihood* of choosing each option, boredom proneness significantly *positively* moderated the relationship between psychopathy and the likelihood of responding in a socially painful manner (Figure 4.3). The same pattern was also seen for primary psychopathy, but not secondary psychopathy. This suggests that when essentially binary options were presented (as in Study 4A), the limited range of responses masked the effects of boredom. However, the results for Study 4B, where a wider range of options were available, the influence of boredom proneness on social pain infliction became more apparent.

Sadism was not a significant moderator between psychopathy and choosing socially painful options, nor was it a moderator between psychopathy and likelihood of choosing socially painful options. This was true even when psychopathy was split into its two variants of primary and secondary psychopathy. These results echo those of Study 4A. Taken together, this suggests that individuals high in psychopathy will inflict social pain in

situations where there is nothing to gain to alleviate boredom rather than to satisfy sadistic urges.

4.4 General Discussion

Social decision-making deficits in psychopathy may lead to behaviours that result in personal gain, regardless of the harm that it may cause others and as such, a variety of studies have examined social decision-making when there is personal gain involved (see Hauser et al., 2023 for a review). However, there is limited evidence concerning how social decisions are made when there is no personal advantage to be gained. Examining psychopathic social decision-making without personal gain serves to isolate underlying motivations beyond self-interest and illuminate how psychopathic individuals navigate everyday social interactions. Hence, these studies allowed for an examination into the internal motivations underlying pain infliction on others (such as alleviating boredom) as opposed to external motivations. To do this, six novel scenarios were validated in which people had to choose from options that would or would not inflict social pain. For these scenarios participants rated the valence, intensity, and levels of social pain in a manner that suggested the scenarios successfully captured what they were intended to capture (Figure 4.1; Figure 4.2).

Ratings of valence significantly differed between high and low psychopathy, such that those high in psychopathy rated the moderately positive option as less positive and both social pain options as less negative. Social pain ratings also significantly differed, with those high in psychopathy rating both positive options to be less positive and both negative options to be less socially painful when compared to those low in psychopathy. These findings reflect the affective blunting during perspective-taking seen in psychopathy (Decety et al., 2013).

Additionally, diminished empathy for others' pain in psychopathy appears to mediated by reduced sensitivity to pain (Atanassova et al., 2025). This also echoes previous work showing that psychopathy was correlated with online trolling and a tendency to downplay the magnitude of others' pain (Buckels et al., 2014, 2019; Lee, 2025). Taken together, these factors may explain this emotional blunting and willingness to inflict social pain.

Psychopathy, primary psychopathy, secondary psychopathy, and sadism were correlated with choosing the socially painful options across both studies. However, only psychopathy emerged as a consistent predictor of social pain infliction after controlling for other variables. Although psychopathy was correlated with choosing socially painful options, neither boredom proneness nor sadism moderated this relationship, suggesting social pain infliction may be intrinsically motivated by psychopathic traits. This is consistent with the Low Fear Hypothesis of psychopathy, which posits that a subdued fear response in psychopathic individuals results in reduced avoidance of situations that are potentially harmful or embarrassing to themselves (Lykken, 1995). As such, these individuals may be equally likely to choose the socially painful and the non-socially painful options due to a lack of anticipatory anxiety or concern for the negative consequences that typically inhibit such behaviours in those with low levels of psychopathic traits. This finding is consistent with other research indicating that individuals with high levels of psychopathy exhibit similarly positive reactions to both affiliative and antagonistic stimuli and are inherently attracted to sadistic cues (Spantidaki Kyriazi et al., 2024, 2025).

Boredom proneness emerged as a significant moderator when participants rated the likelihood of choosing socially painful options. That is, individuals with higher psychopathic traits who were also highly boredom prone reported that they were more likely to choose the

socially painful options, corroborating existing empirical evidence showing that individuals high in both psychopathy and boredom proneness were more likely to engage in socially harmful behaviour (Lee, 2025). It is possible that social pain infliction acts as a distraction from the unpleasant feelings of boredom, consistent with our hypothesis that individuals high in psychopathy may inflict pain to alleviate boredom. Boredom proneness also strengthened the relation between likelihood of choosing socially painful options and primary psychopathy. This may potentially be explained by attenuated affective and empathetic experiences, such as reduced neural sensitivity to others' pain (Campos et al., 2023; Fan, 2023; Seara-Cardoso et al., 2015), combined with a need for stimulation to disrupt boredom. Individuals high in primary psychopathy are also insensitive to potential outcomes of socially harmful behaviour, such as punishment and social exclusion (Osumi, 2019; Seeger et al., 2024), and are less sensitive to affiliation (Waller et al., 2021) and potentially threatening social situations (Seeger et al., 2024), which may result in a willingness to inflict pain without fear of repercussion. As boredom proneness has been linked to a variety of maladaptive behaviours (see Chapter 1), those who are high in both boredom proneness and psychopathy may engage in increased socially harmful behaviours for stimulation or amusement, particularly as they lack the emotional and empathetic inhibitions that typically prevent such actions.

Although secondary psychopathy was also correlated with choosing socially painful options, boredom proneness did not moderate this relationship. It may be the case that those high in secondary psychopathy are more likely to inflict pain as a reactive response to contextual factors. This is in part, supported by research showing that decisions to inflict pain among those high in secondary psychopathy traits are driven by adverse childhood

experiences and environmental influences, including early physical abuse, emotional abuse, and neglect (Hong et al., 2016). Individuals high in secondary psychopathy traits may also be more sensitive and react more emotionally to threatening social situations (Seeger et al., 2024). Taken together, this suggests that the social context and level of interpersonal engagement play a critical role in eliciting aggressive or socially painful behaviors in individuals with secondary psychopathy. The absence of significant moderation by boredom proneness further indicates that these behaviors are less about seeking stimulation or alleviating monotony and more about reactive responses to emotionally charged or threatening social scenarios.

Sadism also did not moderate the relationship between psychopathy and choosing socially painful options, nor did it moderate the relationship between psychopathy and likelihood of choosing socially painful options. These results appear counterintuitive, particularly because individuals high in psychopathy are dispositionally drawn to sadistic cues (Spantidaki Kyriazi et al., 2025) and derive a sense of pleasure from engaging in cruel actions (Bonfá-Araujo et al., 2022; Kowalski et al., 2020; Lobbestael et al., 2020). As sadism and psychopathy share overlapping features (e.g., antagonism, impulsivity, low empathy) and measurement frameworks (Blötner & Mokros, 2023; Paulhus et al., 2021), sadism may not add unique variance beyond the existing psychopathic traits in predicting pain infliction behaviours.

This chapter explored the propensity for social pain infliction amongst individuals high in psychopathic traits, with a particular focus on how these traits interact with boredom proneness. Given that few studies have examined how those high in psychopathy navigate

everyday social interactions, particularly when there is nothing to gain, this chapter provided valuable insight into the factors that influence social pain infliction in psychopathy.

Chapter 5: General Discussion

5.1 General Summary of Findings

The concept of a bored psychopath is not a novel one. Prior evidence has shown that boredom exacerbates antisocial behaviour in those with dark traits (Lee, 2025; Pfattheicher et al., 2021, 2023); however, few studies to date have examined how boredom proneness affects the relationship between psychopathy and harmful behaviours, a gap this thesis aimed to address. In Chapter 2 the embodied feeling of boredom and other emotions was examined. The results from this chapter showed that there was no specific emotional profile for boredom associated with psychopathy and that primary psychopathy was associated with diminished activation for both positive and negative emotions. The latter finding is consistent with the affective and empathetic deficits documented in primary psychopathy (Campos et al., 2023; Fan, 2023). Chapter 3 investigated how state and trait boredom would influence unprovoked physical pain infliction and showed that only state boredom moderated the relationship between psychopathy and pain infliction but in the opposite direction to what was expected. In other words, state boredom *diminished* the effect of psychopathy on physical pain infliction. Chapter 4 examined how trait boredom proneness would influence social pain infliction and found that trait boredom proneness *positively* moderated the relation between psychopathy and the likelihood of choosing socially painful options.

Across studies, psychopathy, as well as both variants of psychopathy, were correlated with pain infliction behaviours and boredom proneness. Secondary psychopathy consistently showed a stronger relation to boredom proneness when compared to primary psychopathy. However, boredom did not emerge as a reliable predictor of pain infliction, nor did it

consistently moderate the relation between psychopathy and pain infliction. One potential explanation is that pain infliction on others is more directly related to "core" psychopathy traits such as lack of empathy and remorse. Indeed, recent work has shown that those higher in psychopathy have reduced sensitivity to their own pain and consequently may have diminished pain empathy for others (Atanassova et al., 2025; Brazil et al., 2022). This, combined with an inherent attraction to sadistic cues, may explain in part why these individuals engage in sadistic behaviours (Spantidaki Kyriazi et al., 2024, 2025). Additionally, those with higher levels of psychopathy appear to retain the ability to cognitively identify with the emotions of others (Chapter 2) and even effectively simulate empathy and emotional reactivity to negative stimuli (Atanassova et al., 2025; Robinson & Rogers, 2015; Shane & Groat, 2018). Consequently, individuals high in psychopathy do not lack the ability to empathize and emotionally respond to others—rather they do not spontaneously do so. Although boredom did influence the relationship between psychopathy and pain infliction in some instances, these inconsistent effects suggest that pain infliction among those high in psychopathy traits, when there is no provocation nor anything to gain, is primarily driven by empathy and emotional deficits rather than as a response to boredom. This is further substantiated by the findings from Chapter 3 and 4 showing that neither state boredom nor boredom proneness was significantly correlated with increased pain infliction behaviours.

Nonetheless, boredom proneness positively moderated the relationship between psychopathy and self-reported likelihood of inflicting pain, consistent with emerging evidence suggesting that boredom proneness amplifies sadistic tendencies in individuals with

psychopathic traits and other dark personality characteristics (Lee, 2025; Pfattheicher et al., 2021, 2023). However, state boredom demonstrated a *dulling* effect on the relationship between psychopathy and pain infliction. These seemingly contradictory findings might be explained by the ongoing debate over whether state boredom is a high- or low-arousal cognitive-affective experience (Danckert et al., 2018; Westgate & Wilson, 2018). Physiological and self-report measures have provided support for both boredom as an arousing experience (Merrifield & Danckert, 2014) and an under-arousing experience (Jang et al., 2015; van Tilburg & Igou, 2012; van Tilburg et al., 2013). This is further substantiated by the results from Chapter 2, which indicated that the experience of boredom is activating for some and deactivating for others. This paradox further extends to behaviour, with state boredom having been associated with a number of both adaptive and maladaptive outcomes (Bieleke et al., 2022). Despite psychopathy being strongly correlated with boredom proneness, the embodied representation of boredom did not significantly differ as a function of either trait. This suggests that these findings are not indicative of an inability to feel bored—rather, that even within these specific populations, the experience of boredom varies greatly. Therefore, the nature of boredom's embodied experience may contribute to its inconsistent effects on individuals with psychopathy traits.

5.2 Limitations and Future Directions

Several limitations in this work are worth noting. Although the literature supports distinct primary and secondary variants of psychopathy, it is worth noting that primary and secondary psychopathy has been conceptualized in a number of different ways (Hicks & Drislane, 2018). Consequently, the conceptualization of primary and secondary psychopathy

in this thesis may not reflect the operational definitions used in previous studies, given the variability on how these constructs are measured and theorized across the psychopathy literature. For instance, there is evidence to suggest that external correlates more clearly differentiate primary and secondary variants compared to self-reports of psychopathic features (Sellbom & Drislane, 2021). That is, primary psychopathy has been associated with positive emotionality/extraversion, lower rates of fear and distress disorders, and few psychiatric comorbidities. Conversely, secondary psychopathy is correlated with negative emotionality, disinhibition, and both internalizing and externalizing problems, such as anxiety disorders and substance use problems (see Hicks & Drislane, 2018 for a review). In other words, both primary and secondary psychopathy may share similar levels of psychopathic and antisocial traits (e.g., callous-unemotional traits) but differ in terms of personality dimensions and comorbid psychopathologies (Hicks & Drislane, 2018; Sellbom & Drislane, 2021). Future work utilizing the primary versus secondary psychopathy distinction would benefit from cross-validation with other models to assess generalizability.

Additionally, it bears mentioning that there is ongoing debate about whether criminality/antisociality should be considered a central component in the construct of psychopathy. Some researchers argue that criminality should be considered a correlate, rather than a component, of psychopathy, as psychopathy is fundamentally a personality disorder whose core features—such as interpersonal and affective traits—can exist independently of criminal/antisocial conduct (Cooke & Michie, 2001; Skeem & Cooke, 2010a). However, others have argued that inclusion of antisocial items show greater conceptual, empirical, and statistical alignment with the construct of psychopathy, and that antisocial tendencies are

integral to this construct (Hare & Neumann, 2008; Lynam & Miller, 2012; Miller & Lynam, 2012; Neumann et al., 2007). Given that the studies in this thesis examined psychopathic traits in a non-criminal population, the exclusion of items related to criminality likely did not significantly affect the results. Nonetheless, it is possible that these studies did not sufficiently capture the full range of psychopathic traits, which may limit the generalizability of the findings to populations where such traits are more pronounced or central.

Furthermore, challenges remain when examining psychopathy using only self-report measures. There is evidence to suggest that there are discrepancies between physiological and self-report indices when assessing affective regulation and reactivity in those with psychopathic traits (Ellis et al., 2017). Additionally, a previous meta-analysis found that in samples of children and adolescents with high callous-unemotional traits, physiological indicators were the strongest predictors of impaired emotional responsiveness, while other measures yielded inconsistent results (Northam & Dadds, 2020). For instance, self-report and behavioural measures of emotional responsiveness differed from physiological measures in callous-unemotional adolescents, such that only the physiological measures showed diminished emotional reactivity (de Wied et al., 2012). Future replication of the work presented in this thesis could integrate physiological measures such as heart rate or galvanic skin responses during the tasks to determine whether lower physiological arousal correlates with increased pain infliction particularly among those high in primary psychopathy traits. Additionally, since secondary psychopathy was inconsistently linked to pain infliction behaviours, despite its links with boredom proneness, it is possible that factors such as emotional reactivity would drive these harmful behaviours more than boredom. Increased

physiological arousal during these tasks in those higher in secondary psychopathy traits may correlate with increased pain infliction behaviours, whereas lower physiological arousal could explain why they may refrain from inflicting pain. Moreover, Chapter 2 showed that the experience of boredom did not vary as a function of psychopathic traits or boredom proneness, and that state boredom can be experienced in varied ways. For instance, while psychopathy predicted decreased membership to the Deactivation profile, it did not predict membership to any other profile. Physiological indicators could help elucidate whether individuals high in these traits show increased physiological arousal to boredom. Ultimately, utilizing physiological measures in addition to self-report measures to examine emotional reactivity during decision-making would allow for a more nuanced examination of how these traits and physiological arousal interact to influence pain infliction.

Another limitation is that participants were recruited from university students in the general population and were predominantly from the Faculty of Arts, female, and aged 18-24, indicating a potential sampling bias. As such, it is likely this study did not capture the high end of psychopathy and sadism traits. These results should be interpreted with caution, as they may not be generalizable to individuals with clinical levels of psychopathy or forensic populations. However, these traits are normally distributed in this sample, likely reflecting the distribution in the general population. To mitigate potential gender effects, gender was entered as a control in the analyses in the regressions and moderations. Nonetheless, as psychopathy literature has predominantly been conducted on males (Cale & Lilienfeld, 2002; Dhingra & Boduszek, 2013), this may provide additional insight into how

psychopathy manifests behaviourally in females. Future studies could examine these relations in a male sample or a sample with greater levels of psychopathy.

Moreover, data loss was present throughout the studies presented, as participants who were missing responses on any of the survey items were excluded from the analyses. This method of data removal was selected for several reasons. First, single imputation methods such as mean imputation can artificially drive scores towards the mean. Second, multiple imputation methods may perform similarly or worse than listwise deletion, depending on the mechanism underlying the missing data (Pepinsky, 2018). Nonetheless, it is possible that participants who were high on our trait measures (e.g., boredom proneness, psychopathy) were more likely to miss items on the surveys. Thus, it is possible that these traits were underrepresented in our sample, further limiting the generalizability of the data.

Finally, although the studies in this thesis aimed to examine social pain infliction in the absence of external motivators such as personal gain or provocation, it is possible that these motivators are important determinants of choosing to inflict pain in those high in psychopathy. Indeed, provocation is an important precursor to aggression (Bettencourt et al., 2006) and can selectively influence clusters of psychopathic traits (Baskin-Sommers et al., 2015). Additionally, individuals high in psychopathy have been shown to choose a personal advantage despite the harm it may cause to another person (Pletti et al., 2017). Future studies could examine how state boredom and trait boredom proneness moderate the decision to inflict pain in psychopathy when there is an advantage to be gained.

5.3 Concluding Remarks

Both psychopathy and boredom have been associated with a host of maladaptive behaviours; however, few prior studies have explicitly examined how the two interact to influence pain infliction, a gap this thesis attempted to addressed. As individuals high in psychopathy lack the affective and empathetic motivations to refrain from such behaviours, despite the negative impacts, it is crucial to gain a more comprehensive understanding of the factors that underlie these behaviours, such as boredom. By examining pain infliction in psychopathy when there is no provocation nor anything to gain, the studies in this thesis were able to examine intrinsic motivators (e.g., boredom proneness and sadism) that contribute to causing harm to others. The findings from this thesis underscore the multifaceted nature of boredom as an emotional state, particularly in psychopathy, and highlight the importance of considering individual and contextual variability in its manifestation.

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Appendix: Appendix A—Supplementary Data for Chapters 2-4

Additional analyses are presented here using the three-factor model (Egocentricity, Callousness, Antisocial) of psychopathy to interpret the data from Chapters 2 through 4. Egocentricity reflects a manipulative interpersonal style, Callousness reflects low empathy and unemotional traits, and Antisocial reflects an impulsive lifestyle (Brinkley et al., 2008).

Chapter 2

Callousness was negatively correlated with affective empathy and self-control, whereas Egocentricity and Antisocial were positively correlated with boredom proneness and alexithymia and negatively correlated with self-control (Table B1). Similar to the findings using the two-factor model from Chapter 2, none of the three factors significantly predicted class membership for boredom (ps > .05). No significant effects of Egocentricity, Callousness, or Antisocial on overall activation or deactivation pixels indicated were found. This differed from the findings from Chapter 2, which showed that those high in primary psychopathy indicated fewer activation pixels compared to those high in primary psychopathy. As Callousness is a measure of the affective deficits seen in primary psychopathy, it would seem reasonable to assume that a significant main effect of Callousness would emerge for total number of activation pixels indicated, similar to primary psychopathy. However, the absence of such an effect is also in line with prior work showing that Callousness has inconsistent relations with measures of low empathy (Christian & Sellbom, 2016; Garofalo et al., 2019; Salekin et al., 2014; Sellbom, 2011).[3]

[3] The Cronbach's alphas were .84 for Egocentricity, .52 for Callousness, and .65 for Antisocial. These were .85 for primary psychopathy and .69 for secondary psychopathy.

Table A1. Correlations between main variables

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6	7	8
1. Egocentricity	18.93 (5.31)	0.72	0.11	-	.53***	.43***	.11	-.12	.27**	-.32***	.22**
2. Callousness	6.52 (1.91)	0.71	0.24		-	.20*	-.13	-.38***	.05	-.22*	.09
3. Antisocial	10.77 (2.81)	0.30	-0.11			-	-.15	.04	.60***	-.63***	.38***
4. Cognitive Empathy	62.54 (8.32)	0.03	0.34				-	.40***	.17	-.12*	-.08
5. Affective Empathy	35.57 (5.07)	-0.28	0.02					-	.07	-.03	.00
6. Boredom Proneness	28.29 (10.18)	0.16	-0.63						-	-.59***	.50***
7. Self-Control	40.44 (8.98)	0.16	-0.48							-	-.32***
8. Alexithymia	53.61 (12.15)	-0.01	-0.55								-

Note. $N = 149$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Chapter 3

Egocentricity, Callousness, and Antisocial were all significantly correlated with boredom proneness, with Antisocial showing a stronger correlation to boredom proneness compared to the Egocentricity and Callousness (Table B2). This relationship was seen in both Chapter 3 and 4, consistent with secondary psychopathy being more highly correlated with boredom proneness (that is, considering the Antisocial distinction to map more or less onto the construct of secondary psychopathy; Brinkley et al., 2008). Egocentricity was correlated with increased aggression strength, while Callousness was not. This is consistent with Egocentricity being positively correlated with aggression during the Taylor Aggression Paradigm regardless of provocation level, while Callousness was not (Bresin et al., 2022). Antisocial was correlated with increased aggression strength, whereas secondary psychopathy was not. Previous work has shown that aggression on the Taylor Aggression Paradigm was not significantly correlated with Antisocial nor secondary psychopathy when there was low provocation (Bresin et al., 2022). It is possible that the low internal consistency for the Antisocial scale in this study ($\alpha = .58$) may have contributed to the inconsistency in these findings.

Boredom proneness did not moderate the relation between any of the three factors and aggression strength, consistent with the findings from Chapter 3. State boredom negatively moderated the relation between Egocentricity and aggression strength, ($b = -.29$, $SE = .10$, $\beta = -.20$, $t(161) = -2.82$, $p = .005$), but did not emerge as a significant moderator for the other two factors. This is in line with the findings from Chapter 3 showing that state boredom negatively moderated the relation between primary psychopathy and aggression

strength, if one assumes that the Egocentricity distinction represents the manipulative interpersonal style of primary psychopathy.[4]

[4] The Cronbach's alphas were .81 for Egocentricity, .53 for Callousness, and .58 for Antisocial. These were .83 for primary psychopathy and .72 for secondary psychopathy.

Table A2. Correlations between trait measures and noise blast outcomes for the overall sample

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6	7
Overall Sample										
1. Egocentricity	17.66 (4.80)	0.44	-0.17	-	.39***	.45***	.32***	.56***	.18*	.10
2. Callousness	6.53 (1.95)	1.06	1.64		-	.36***	.33***	.49***	.14	.12
3. Antisocial	10.68 (2.54)	0.20	-0.21			-	.72***	.46***	.16*	.15*
4. Boredom Proneness	29.30 (10.21)	0.05	-0.66				-	.30***	.11	.16*
5. Sadism	19.71 (7.88)	1.54	2.99					-	.32***	.04
6. Aggression Strength	0.00 (1.43)	1.98	4.51						-	.05
7. Mean State Boredom	3.55 (1.63)	0.13	-1.10							-

Note. $N = 173$. Descriptive statistics were calculated before standardizing variables.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Chapter 4

Study 4A. Egocentricity and Callousness were significantly correlated with choosing socially painful options (Table B3). All three factors were significantly correlated with boredom proneness. Egocentricity was a significant predictor of choosing socially painful options in the mixed effect logistic regressions, $\beta = .49$, $SE = 0.21$, $z = 2.27$, $p = .023$. No other trait measures were significant predictors (ps > .05). Boredom proneness was not a significant moderator between any of the three factors and choosing socially painful options (ps > .05). These findings aligned with the results from 4A.

The Antisocial factor was not significantly correlated with choosing socially painful options. This conflicts with prior work showing impulsive traits tend to be associated with verbal aggression (Verona et al., 2023). However, secondary psychopathy was positively correlated with choosing socially painful options, suggesting that the secondary psychopathy scales may have captured these behaviours with more conceptual accuracy. Sadism was a positive moderator between Callousness and choosing socially painful options, ($b = .10$, $SE = .04$, $\beta = .22$, $t(335) = 2.26$, $p = .025$), but did not significantly moderate any other relationship (ps > .05). As those high in Callousness show diminished sensitivity for others' distress (Branchadell et al., 2024), as well as a lack of empathy, it is possible that harmful behaviours towards others are motivated by sadistic urges.[5]

[5] The Cronbach's alphas were .80 for Egocentricity, .59 for Callousness, and .63 for Antisocial. These were .82 for primary psychopathy and .68 for secondary psychopathy.

Table A3. Study 4A: Correlations between main variables

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6
1. Egocentricity	18.93 (4.80)	0.27	-0.45	-	.44***	.41***	.30***	.48***	.29***
2. Callousness	6.78 (1.93)	0.75	0.86		-	.21***	.12*	.48***	.30***
3. Antisocial	10.90 (2.67)	0.13	-0.16			-	.69***	.33***	.08
4. Boredom Proneness	29.68 (10.01)	0.02	-0.62				-	.21***	.08
5. Sadism	19.49 (6.68)	1.13	1.37					-	.31***
6. Choice	0.13 (0.43)	4.54	26.89						-

Note. $N = 356$. * $p < .05$. ** $p < .01$. *** $p < .001$.

***Study 4B*.** Egocentricity, Callousness, and Antisocial were all correlated with choosing socially painful options (Table B4). All three factors were significantly correlated with boredom proneness. None of the three factors significantly predicted choosing socially painful options in the mixed effect logistic regressions (*p*s > .05). Neither boredom proneness nor sadism were significant moderators between the three factors and choosing socially painful options (*p*s > .05). Sadism did not significantly moderate the relationship between any of the three factors and likelihood of choosing socially painful options (*p*s > .05). The Egocentricity, Callousness, and Antisocial factors were correlated with increased likelihood of choosing both socially painful options (Table B5). Egocentricity and Callousness were also correlated with decreased likelihood of choosing the moderately positive option. All three factors were correlated with the likelihood of choosing socially painful options ($r(209) = .54$, $p < .001$; $r(209) = .41$, $p < .001$; $r(209) = .31$, $p < .001$, respectively). These results were consistent with the findings from Study 4B.

Boredom proneness positively moderated the relation between Egocentricity and likelihood of choosing socially painful options ($b = .26$, $SE = .09$, $\beta = .18$, $t(201) = 2.85$, $p = .005$), but did not significantly moderate any other relationship. This is in line with Study 4A, which showed that boredom proneness was a positive moderator of the relation between primary psychopathy and likelihood of choosing socially painful options.[6]

[6] The Cronbach's alphas were .79 for Egocentricity, .69 for Callousness, and .62 for Antisocial. These were .84 for primary psychopathy and .70 for secondary psychopathy.

Table A4. Study 4B: Correlations between main variables

Variables	*M* (*SD*)	Skew	Kurtosis	1	2	3	4	5	6
1. Egocentricity	18.93 (5.31)	0.72	0.11	-	.55***	.38***	.21**	.52***	.32***
2. Callousness	6.52 (1.91)	0.71	0.24		-	.28***	.23***	.43***	.20**
3. Antisocial	10.77 (2.81)	0.30	-0.11			-	.55***	.48***	.21**
4. Boredom Proneness	28.49 (10.05)	0.11	-0.65				-	.29***	.02
5. Sadism	19.35 (6.25)	1.07	1.38					-	.40***
6. Choice	0.21 (0.52)	2.76	8.46						-

Note. $N = 219$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table A5. Correlations for trait measures and likelihood of choosing response options

Variables	*M* (*SD*)	Skew	Kurtosis	6	7	8	9
1. Egocentricity	18.64 (4.79)	0.47	-0.11	-.29***	.04	.54***	.52***
2. Callousness	6.62 (2.07)	0.64	-0.12	-.44***	-.15	.41***	.36***
3. Antisocial	10.58 (2.60)	0.24	-0.24	-.11	.02	.31***	.26***
4. Sadism	20.37 (7.16)	1.00	0.56	-.40***	-.11	.53***	.52***
5. BPS	28.92 (9.37)	-0.01	-0.56	-.08	-.03	.12	.11
6. Moderate Positive	7.83 (1.42)	-0.59	-0.38	-	-	-	-
7. Mild Positive	6.67 (1.30)	-0.14	-0.30	-	-	-	-
8. Mild Social Pain	2.61 (1.42)	1.31	1.83	-	-	-	-
9. Moderate Social Pain	1.90 (1.50)	2.33	5.29	-	-	-	-

Note. $N = 211$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Overall, egocentricity showed the most consistent relations to pain infliction behaviours. This echoes prior work showing that interpersonal traits were robustly correlated with both physical (Chapter 3) and verbal (Chapter 4) aggression (Verona et al., 2023). These results were also consistent with Egocentricity being linked to a lack of responsiveness to social values (Salekin et al., 2014), and suggests that traits related to interpersonal manipulation and antagonism relate more to causing pain to others rather than does Callousness, which reflects low empathy and emotional coldness. However, affective traits (as ostensibly captured by the Callousness factor) have previously been associated with direct forms of aggression such as physical and verbal aggression (Verona et al., 2023); these relations were not consistently found in the studies in this thesis. While Callousness is associated with diminished sensitivity for others' suffering (Branchadell et al., 2024), it may inconsistently drive pain infliction behaviours when unprovoked. Nonetheless, Callousness was still associated with socially harmful behaviours (i.e., verbal aggression), suggesting that diminished empathy and emotionality do play some role in pain infliction. It is also possible that sadism can motivate harmful behaviours in those with high Callousness when there is nothing to gain, as they may instead engage in these behaviours to satisfy sadistic urges. However, this effect was not consistently shown and should be examined in more depth in future work. Another potential explanation is that the psychometric issues with the Callousness factor (i.e., poor convergent and discriminant validity, poor internal consistency) may have obscured the effects of this domain on behaviour (Salekin et al., 2014). The Antisocial domain was also inconsistently correlated with pain infliction behaviours, seemingly conflicting with evidence suggesting that these traits are the most consistent predictors of most types of aggression (Thomson et al., 2019; Verona et al., 2023). However,

it is possible that since the tasks in this thesis were specifically formulated so as to not provoke retaliation or include aspects of personal gain, that they may not have consistently drawn out the impulsive tendency towards antisocial actions. This is in line with prior work showing that those high in secondary psychopathy are more likely to behave aggressively as an emotional response to provocation; when those emotional cues are disrupted, they show significant reductions in aggressive behaviour (Bresin et al., 2022). As such, the lack of provocation in the studies of this thesis may have attenuated emotional responses and subsequent aggressive behaviour in those high in Antisocial and secondary psychopathy traits. Thus, these results were largely consistent with the findings from the studies using the two-factor model.

Appendix: Appendix B—Supplementary Data for Chapter 4

Social Pain Infliction Scenarios

Scenarios with response options and corresponding valence/intensity/consequences of each option. Note, participants did *not* see the terms "moderate positive" etc. These are presented here to indicate which category the response option belonged to.

Scenario 1: Emily, online trolling

You are sitting on your couch, scrolling through your phone, and relaxing after a long day. You take a sip of your beverage and stretch, glad that you are done work for the day. You open a social media platform you frequently use and absent-mindedly scroll through. A picture catches your eye. It is an old co-worker, Emily, that you no longer work with and have not seen in a while. You were friendly when you were working together but were never very close friends. Emily posted a picture of her in a nice blue dress, with a caption that says: "I am so proud of myself for learning to love myself and my body the way it is! I think I look pretty damn good, and I am finally confident enough to say that. Let me know what you think!"

You have an anonymous account and know that it cannot be traced back to you. You decide to privately message something back to her. What do you say?

- Moderate positive: "I'm glad to see that you are doing well and feeling more confident! You look great and it's awesome that you are feeling good about yourself."
    - Consequences: "Thank you so much!" Emily replies back. "This kind of support means so much to me!"

- Mild positive: “It’s nice that you are feeling good about yourself, I hope that you can continue to do so.”
    - Consequences: “Thank you!” Emily responds. “That is nice of you to say, and I appreciate it!”
- Mild social pain: “It’s so brave of you to post a picture of yourself looking like this! I would be concerned about people making fun of me if I looked like that.”
    - Consequences: “I guess I’m trying to care less about what other people think, but I really don’t appreciate this kind of comment,” Emily replies.
- Moderate social pain: “You are clearly insecure if you’re seeking validation on the internet, and that makes you ugly on the inside and outside.”
    - Consequences: “Wow, why would you say such a hurtful thing? What did I ever do to you? Screw you!” Emily responds back. You go back to check the picture and notice that it is now deleted.

Scenario 2: Jason, relationship advice:

You are talking to one of your friends, Jason, about issues in his most recent relationship over lunch. Jason started dating Kelly a few months ago and has brought her to a few events with your friend group. From what you know, she seems to treat Jason well, but you are not a fan of her because she is rather loud and tends to interrupt people while they are talking.

“So, what’s been going on?” You ask, taking a bite out of your meal.

“Man, I just can’t get rid of the feeling that something’s wrong or that she’s hiding something from me,” Jason says, pushing his food around his plate with his fork. “I mean,

everything seems fine, but I just can't get rid of this nagging feeling. There was this incident last week that we got into an argument about." Jason sighs and shakes his head. "She's been spending a lot of time with this male coworker of hers, and I barely get to see her anymore."

"Has she done anything to make you feel like something is wrong?" You ask.

"Well, I don't have any concrete evidence, but I just can't shake this feeling," Jason says. "She says it's just a busy time at work and they're working on a big project together, but I just can't help but feel like she's hiding something from me."

You have never seen Kelly do anything wrong or heard about any suspicious behaviour, and in fact, her words and actions indicate that she loves Jason very much. What do you say to Jason?

- Moderate positive (no social pain): "I'm sorry you feel this way. If it helps, she really seems to love you a lot and I've never heard of her doing anything that would say otherwise."
    - Consequences: "Thanks," Jason sighs, visibly relaxing. "I think I'm going to go home and talk to her honestly about how I've been feeling."
- Mild positive (no social pain): "It sounds like she hasn't done anything to make you doubt her. It might be good to take a little more time to think about it."
    - Consequences: "Yeah, I think you're right," Jason says. "I probably shouldn't jump to conclusions."
- Mild social pain: "There has to be a reason you feel this way, you should trust your gut. I was never too fond of her anyway, she's really loud and annoying."

    - Consequences: “Hey, take it easy, she’s still my girlfriend, we’re not even sure if she’s done anything wrong yet,” Jason says, frowning. “It’s just a gut feeling.”
- Moderate social pain: “I didn’t want to be the one to tell you this, but I have heard from other people that she’s been talking about being attracted to someone else.”
    - Consequences: You can see the anger on Jason’s face. “Excuse me, I think I have to go and have a talk with Kelly,” he mutters, as he slaps some money on the table and storms out of the restaurant.

Scenario 3: Josh, friendship (money)

Your phone rings. You look at your phone and see that it is your friend, Josh, who you hang out with on a regular basis. Over the years, you have enjoyed the perks of being his friend, including going to fancy restaurants and being invited to exclusive events.

“Hey, how’s it going? You ask.

“Not good,” Josh responds, his voice trembling. “I’m in a bad situation and I’m not sure what to do from here.” You can clearly hear the concern in his voice. “I decided to invest most of my savings because I thought it was a sure bet, and I just lost it all. I’m completely broke. I feel so stupid, I can’t believe I made such a huge mistake.”

“Oh, wow,” you reply, surprised at this sudden change in events.

“Yeah, I still can’t believe it. I’m still reeling. I can’t even afford my place anymore. I’ve always had money, I don’t even know what to do from here,” Josh says, his voice cracking. “I don’t even know where to start. What do you think I should do?”

What do you say to Josh?

- Moderate positive: "I'm sorry to hear that, Josh. Let's sit down and go over your options. There are ways to recover from this and we can work together to come up with a plan to get you back on your feet."
    - Consequences: "Thank you, that means a lot," Josh sighs with relief. "I was feeling so lost and alone, but I feel better knowing that you're here to help."
- Mild positive: "Don't worry, Josh. It's not the end of the world. We'll figure it out together. Let's get something to drink and brainstorm some ideas."
    - Consequences: "Thanks, I appreciate your positive attitude," Josh said with a small sigh. “I'm feeling really overwhelmed right now and I would really appreciate some help."
- Mild social pain: "Well, that was pretty stupid of you to put all your money in one place. You should have thought about the risks before making such a risky investment."
    - Consequences: "I know, I know," Josh said, sounding ashamed. "But I was hoping you could help me come up with a solution instead of just making me feel worse."
- Moderate social pain: "I can't believe you were so reckless with your money, you should have known better. I don't think I can continue to be friends with someone who makes such irresponsible decisions."
    - Consequences: There is a moment of silence on the other end of the phone. "How dare you judge me like that," Josh said, his voice shaking. "I already

feel terrible about what happened and now you're making it worse. Maybe we shouldn't be friends anymore if you're going to be so unsupportive."

Scenario 4: Maya. friend asks for opinion (group)

Your friend, Maya, invites you and some other friends over for a dinner party. You arrive at her apartment and knock on the faded wooden door. She answers the door with a smile and beckons you in. You notice that her normally tidy apartment is slightly messy, with stacks of paper and art supplies hastily shoved aside. You can see a few of your friends sitting on the couch sipping drinks and decide to join them. You see that there are some paintings carefully laid out on the coffee table in front of them.

"What's all this?" You ask.

"Oh, I love painting and I've always dreamed about being able to share my passion with the world. People have always said my paintings were good, so I figured I'd try to sell them online," Maya responds.

"How's business going?" You ask, as you pick up one of the paintings from the table to take a closer look.

"Well, it's been months and I've only sold one and that was to my mom," Maya replies, gesturing towards the paintings in annoyance. "So, yeah, I would say it's not going great. I don't even need the money, I mean I know that my paintings are good, I want other people to also think that my paintings are good. It's different when my friends or family say it, because then I feel like they're saying it out of obligation, but if a stranger wants to buy my art, that would be a pretty good indication that my paintings are good, right?" Maya sighs, running a hand through her hair in frustration. "It's always been a dream of mine, but at this point I just feel like a failure."

What would you say to Maya?

- Moderate positive: “It takes a lot of courage to start your own business, and establishing it can take time! You should still be proud of yourself for trying something new.”
    - Consequences: Your other friends chime in and offer comfort and support. Maya is more hopeful, and has decided to work on improving her skills and finding additional venues to advertise and sell her projects.
- Mild positive: “Ah, I’m sorry to hear that things aren’t going well with the business. You never know what the future holds though, so don’t worry about it too much.”
    - Consequences: Your other friends agree and offer comfort and support. Maya is hopeful that business will pick up during the upcoming holiday season.
- Mild social pain: “I can tell that you’re passionate about this, but being passionate about it doesn’t necessarily mean your work will be appreciated or sell.”
    - Consequences: Your other friends are silent and look uncomfortable. Maya is mildly annoyed because she feels like you don’t believe in her, and is less talkative to you throughout the dinner party.
- Moderate social pain: “It seems like you’re wasting a lot of time and effort on something that is clearly not working. Maybe you should try doing something you’re actually good at.”
    - Consequences: Your other friends are shocked at your response, and tell you that it was a hurtful thing to say. Maya is offended that you are suggesting that she not talented and asks you to leave.

Scenario 5: Sarah, friend asks for advice (one-on-one)

You have plans to meet Sarah, one of your childhood friends, for coffee. You arrive at the coffee shop a little early and order your regular. Out of the corner of your eye, you see Sarah walk in. You can immediately see that her normally tidy brown hair is a mess, and that her shirt is buttoned incorrectly. She sits down in front of you with a worried look on her face.

"How are you?" You ask.

"Not so good," she says, her voice breaking. "A few weeks ago, Ryan told me that our relationship wasn't working for him anymore and moved his stuff out of our apartment." Her eyes well up with tears. "He won't return any of my calls, I have no idea what went wrong. He just left me and our dog, Bean, and I didn't even get a chance to say goodbye." "I got fired because I've been such a mess and I haven't been able to get my work done on time, and now I definitely can't afford the apartment alone. I'm worried that Bean and I are going to be homeless. Bean keeps crying because he misses his dad, and I don't know how to make him feel better because I'm hurting too. I've been trying to find work, but it's just been so difficult to get out of bed and I still can't find a job. I just don't know what to do, I'm terrified that we will end up homeless in the next couple of months once my savings run out." She unclenches her fists, and you can see her fingernails are raw and ragged from biting them. "I tried to ask my parents for help, but they just told me that I'm an adult and I need to figure out how to manage things on my own. I really don't know what to do, what do you think?"

You look at her tired face, and after a period of brief thought decide to respond with this:

- Moderate positive (no social pain): “Oh wow, I’m really sorry all this happened, it must be very difficult. Is there anything I can do to help?”
    - Consequence: “Yes, please,” Sarah says, wiping the tears from her eyes and sighing in relief. “I would really appreciate any help you can give.” The two of you spend the afternoon looking for job openings and have found some resources that she can access for the time being to help her.
- Mild positive (no social pain): “It sounds like a lot has happened, it sounds very difficult. I appreciate that you felt like you could talk to me about this.”
    - Consequences: Sarah wipes the tears from her eyes. “Thank you for listening,” she says, “I don’t really know who to talk to and it’s been really difficult. It’s nice to at least be able to talk to someone.”
- Mild social pain: “Oh wow, it sounds like you have a lot going on, but dwelling and complaining about it won’t change anything.”
    - Consequence: Sarah opens her mouth as if to protest, but then just slumps down in her chair looking defeated. She mumbles an excuse about having to check to see if she left her stove on and hurries away.
- Moderate social pain: “Well, keeping Bean when you can’t even afford rent is very irresponsible, and you should sell him to someone who can actually provide a good home for him. I agree with your parents that you need to grow up.”
    - Consequences: Sarah recoils as if you just punched her in the gut. She yells, “how could you even suggest that?” and storms out of the coffee shop.

Scenario 6: Bill, acquaintance (insecurity) (Reference Scenario)

It's a Friday night, and you decide to go out to a restaurant by your place to get some food. You open the door and are greeted by the smell of your favourite dish. You sit down at the bar and order your food, idly watching the television above the bar. From somewhere behind you, you hear your name. You turn around and see a man wearing a ragged baseball cap and dirty overalls that you know but can't quite place.

"I thought it was you," the man says, reaching out to shake your hand. "I haven't seen you since we went to school together." You realize that the man is Bill, an old classmate.

"Oh yeah, it's been a while, how's it going, Bill?"

"Pretty good, how are you? Is this seat taken?" He asks, gesturing to the seat next to you.

"Nope, seat's open," you respond. He sits down next to you and orders a drink.

"So, how's life? Where are you working now?" You ask.

"It's actually been pretty good, after trade school I decided to start my own plumbing business. Business has been good, we just recently hired a couple of apprentices so that we can expand." He takes another sip of his drink, and sighs. "You know, with how fast the business is growing, I sometimes worry that I'm not smart enough to manage it. I mean, what the hell do I know about business. It's been good so far, but I wonder if it'll crash and burn, and people will think that I'm stupid because of it. I just barely graduated high school." He fiddles with his napkin, scrunching it up between his fingers. "I don't want people to think I'm just a stupid plumber."

You can tell that he is feeling insecure about his intelligence and is looking to you for reassurance. How do you respond?

- Moderate positive (no social pain): “Being less educated does not mean that you are less intelligent. It definitely takes intelligence to be able to run a successful business as you are.”
    - Consequences: “Thank you for saying that, it really means a lot to me,” Bill says, breathing a sigh of relief. “I’m glad I ran into you today.”
- Mild positive (no social pain): “From the sounds of it, you’re doing fine. I wouldn’t worry about what other people think too much.”
    - Consequences: “Yeah, I guess you’re right,” Bill says, taking another swig of his drink. “I’m probably just overthinking this. Thanks for talking to me.”
- Mild social pain: “I mean, for someone who didn’t go to school you’re alright, people probably don’t expect you to be super smart.”
    - Consequences: “I mean, I would still like people to think that I’m smart,” Bill replies, slightly insulted. “I just don’t want people to think that I’m stupid.”
- Moderate social pain: “It doesn’t matter whether people think you’re smart, it’s not like being a plumber will ever be super impressive or require a lot of intelligence.”
    - Consequences: “What is that supposed to mean?” Bill asks angrily. “I didn’t ask for your terrible opinion.” He slaps some money down on the counter and storms out.

Supplemental Tables

Table B1. Descriptive statistics and *t*-tests involving ratings of valence for those high and low in overall, primary and secondary psychopathy

Trait	Dependent Variable	High Tertile *M* (SD)	Low Tertile *M* (SD)	*t*-test
Psychopathy				
	Composite Score	0.81 (0.13)	0.87 (0.08)	$t(235) = -3.82$, $p < .001$
	Moderate Positive	0.90 (0.18)	0.96 (0.08)	$t(235) = -3.60$, $p < .001$
	Mild Positive	0.67 (0.24)	0.66 (0.25)	$t(235) = 0.22$, $p = .828$
	Mild Social Pain	-0.69 (0.32)	-0.83 (0.22)	$t(235) = 3.91$, $p < .001$
	Moderate Social Pain	-0.90 (0.21)	-0.97 (0.10)	$t(235) = -3.78$, $p < .001$
Primary Psychopathy	Composite Score	0.81 (0.13)	0.87 (0.07)	$t(235) = -4.73$, $p < .001$
	Moderate Positive	0.89 (0.18)	0.96 (0.08)	$t(235) = -3.68$, $p < .001$
	Mild Positive	0.65 (0.24)	0.65 (0.25)	$t(235) = 0.14$, $p = .892$
	Mild Social Pain	-0.69 (0.31)	-0.84 (0.21)	$t(235) = 4.35$, $p < .001$
	Moderate Social Pain	-0.90 (0.21)	-0.98 (0.06)	$t(235) = -4.33$, $p < .001$
Secondary Psychopathy	Composite Score	0.83 (0.12)	0.84 (0.13)	$t(235) = -1.02$, $p = .307$
	Moderate Positive	0.92 (0.16)	0.94 (0.15)	$t(235) = -0.92$, $p = .356$
	Mild Positive	0.68 (0.25)	0.65 (0.26)	$t(235) = 0.76$, $p = .447$
	Mild Social Pain	-0.71 (0.30)	-0.79 (0.25)	$t(235) = 2.13$, $p = .034$
	Moderate Social Pain	-0.90 (0.20)	-0.94 (0.16)	$t(235) = 1.82$, $p = .071$

Note. For overall psychopathy, primary and secondary psychopathy, there were 118 participants in the high tertile and 119 in the low tertile.

Table B2. Study 4A: Descriptive statistics and *t*-tests involving ratings of intensity for those high and low in overall, primary and secondary psychopathy

Trait	Dependent Variable	High Tertile *M* (SD)	Low Tertile *M* (SD)	*t*-test
Psychopathy				
	Composite Score	1.81 (0.28)	1.75 (0.28)	$t(235) = 1.73$, $p = .084$
	Moderate Positive	2.33 (0.47)	2.32 (0.57)	$t(235)$ -0.14, $p = .886$
	Mild Positive	1.76 (0.41)	1.77 (0.39)	$t(235) = -0.17$, $p = .862$
	Mild Social Pain	2.19 (0.42)	2.30 (0.40)	$t(235) = -2.01$, $p = .046$
	Moderate Social Pain	2.64 (0.46)	2.78 (0.38)	$t(235) = -2.64$, $p = .009$
Primary Psychopathy	Composite Score	1.81 (0.28)	1.77 (0.31)	$t(235) = 0.93$, $p = .351$
	Moderate Positive	2.31 (0.50)	2.32 (0.57)	$t(235) = -0.14$, $p = .886$
	Mild Positive	1.78 (0.42)	1.76 (0.39)	$t(235) = 0.34$, $p = .736$
	Mild Social Pain	2.20 (0.41)	2.24 (0.41)	$t(235) = -0.88$, $p = .378$
	Moderate Social Pain	2.65 (0.44)	2.74 (0.44)	$t(235) = -1.54$, $p = .125$
Secondary Psychopathy	Composite Score	1.82 (0.33)	1.77 (0.29)	$t(235) = 1.41$, $p = .161$
	Moderate Positive	2.31 (0.54)	2.27 (0.61)	$t(235) = 0.41$, $p = .683$
	Mild Positive	1.77 (0.41)	1.80 (0.40)	$t(235) = -0.43$, $p = .665$
	Mild Social Pain	2.15 (0.44)	2.26 (0.38)	$t(235) = -2.13$, $p = .036$
	Moderate Social Pain	2.63 (0.52)	2.74 (0.39)	$t(235) = -1.82$, $p = .070$

Note. For overall psychopathy, primary and secondary psychopathy, there were 118 participants in the high tertile and 119 in the low tertile.

Table B3. Study 4A: Descriptive statistics and *t*-tests involving ratings of social pain for those high and low in overall, primary and secondary psychopathy

Trait	Dependent Variable	High Tertile *M* (SD)	Low Tertile *M* (SD)	*t*-test
Psychopathy				
	Composite Score	3.10 (1.09)	2.50 (0.48)	$t(157) = 4.44$, $p < .001$
	Moderate Positive	2.27 (1.79)	1.44 (0.64)	$t(157) = -3.88$, $p < .001$
	Mild Positive	2.56 (1.65)	1.98 (0.75)	$t(157) = 2.84$, $p = .005$
	Mild Social Pain	6.05 (1.19)	6.38 (0.86)	$t(157) = -2.01$, $p = .046$
	Moderate Social Pain	8.49 (1.36)	9.13 (0.80)	$t(157) = -3.63$, $p < .001$
Primary Psychopathy	Composite Score	3.02 (1.05)	2.53 (0.48)	$t(157) = 2.82$, $p < .001$
	Moderate Positive	2.11 (1.77)	1.41 (0.63)	$t(157) = 3.20$, $p = .001$
	Mild Positive	2.43 (1.61)	1.95 (0.73)	$t(157) = 2.45$, $p = .015$
	Mild Social Pain	5.97 (1.08)	6.24 (0.86)	$t(157) = -1.71$, $p = .089$
	Moderate Social Pain	8.57 (1.32)	9.12 (0.80)	$t(157) = -3.18$, $p = .002$
Secondary Psychopathy	Composite Score	3.10 (1.08)	2.53 (0.55)	$t(157) = 4.22$, $p < .001$
	Moderate Positive	2.18 (1.73)	1.50 (0.79)	$t(157) = 3.23$, $p = .002$
	Mild Positive	2.45 (1.59)	1.99 (0.82)	$t(157) = 2.27$, $p = .025$
	Mild Social Pain	5.89 (1.15)	6.32 (0.96)	$t(157) = -2.61$, $p = .010$
	Moderate Social Pain	8.43 (1.42)	9.12 (0.98)	$t(157) = -3.57$, $p < .001$

Note. For overall psychopathy, primary and secondary psychopathy, there were 79 participants in the high tertile and 80 in the low tertile.

Table B4. Study 4A: Descriptive statistics and *t*-tests involving ratings of appropriateness for those high and low in overall, primary and secondary psychopathy

Trait	Dependent Variable	High Tertile *M* (SD)	Low Tertile *M* (SD)	*t*-test
Psychopathy				
	Composite Score	3.02 (0.28)	3.09 (0.23)	$t(157) = -1.90$, $p = .059$
	Moderate Positive	4.17 (0.81)	4.59 (0.56)	$t(157) = -3.83$, $p = .084$
	Mild Positive	4.09 (0.81)	4.36 (0.59)	$t(157) = -2.36$, $p = .019$
	Mild Social Pain	3.92 (0.64)	4.13 (0.63)	$t(157) = -2.05$, $p = .042$
	Moderate Social Pain	4.30 (0.31)	4.45 (0.53)	$t(157) = -1.66$, $p = .099$
Primary Psychopathy	Composite Score	3.07 (0.29)	3.09 (0.23)	$t(157) = -0.63$, $p = .525$
	Moderate Positive	4.19 (0.81)	4.57 (0.58)	$t(157) = -3.45$, $p < .001$
	Mild Positive	4.11 (0.79)	4.36 (0.61)	$t(157) = -2.30$, $p = .023$
	Mild Social Pain	3.83 (0.69)	4.12 (0.66)	$t(157) = -2.72$, $p = .007$
	Moderate Social Pain	4.22 (0.73)	4.45 (0.52)	$t(157) = -2.35$, $p = .020$
Secondary Psychopathy	Composite Score	3.04 (0.31)	3.10 (0.27)	$t(157) = -1.33$, $p = .187$
	Moderate Positive	4.14 (0.84)	4.50 (0.64)	$t(157) = -3.02$, $p = .003$
	Mild Positive	4.04 (0.82)	4.30 (0.64)	$t(157) = -2.16$, $p = .033$
	Mild Social Pain	3.87 (0.72)	4.06 (0.73)	$t(157) = -1.68$, $p = .096$
	Moderate Social Pain	4.21 (0.72)	4.35 (0.73)	$t(157) = -1.23$, $p = .221$

Note. For overall psychopathy, primary and secondary psychopathy, there were 79 participants in the high tertile and 80 in the low tertile.

Table B5. Study 4A: Mixed effects logistic regression of primary psychopathy predicting the choice of a social pain option

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	-0.31	0.79	-0.39	.695
Scenario 2	1.03	0.63	1.65	.099
Scenario 3	0.62	0.66	0.94	.346
Scenario 4	1.35	0.61	2.21*	.027
Scenario 5	0.45	0.68	0.66	.508
Gender (Male)	0.60	0.47	1.26	.206
BPS	-0.07	0.28	-0.25	.803
Sadism	0.32	0.20	1.60	.110
Secondary Psychopathy	0.31	0.29	1.07	.283
Primary Psychopathy	0.60	0.23	2.67**	.008

Note. After coding gender as binary, $N = 340$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B6. Study 4A: Mixed effects logistic regressions showing trait measures predicting the choice of social pain options without the significant scenario (Scenario 4).

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	-0.32	0.80	-0.40	.692
Scenario 2	1.07	0.64	1.68	.094
Scenario 3	0.64	0.67	0.96	.339
Scenario 5	0.46	0.69	0.67	.503
Gender (Male)	0.90	0.56	1.61	.108
BPS	-0.36	0.28	-1.28	.199
Sadism	0.06	0.24	0.25	.807
Psychopathy	1.34	0.36	3.73***	<.001

Note. Psychopathy predicts choosing a socially painful option. After coding gender as binary, N = 340. Scenario 6 was used as the reference scenario. Asterisks denote significant t values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B7. Study 4A: Mixed effects logistic regressions showing trait measures predicting the choice of social pain options without the significant scenario (Scenario 4), with psychopathy split into subtypes.

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	-0.32	0.80	-0.40	.692
Scenario 2	1.07	0.64	1.68	.094
Scenario 3	0.64	0.67	0.96	.339
Scenario 5	0.46	0.69	0.67	.503
Gender (Male)	0.91	0.56	1.62	.106
BPS	-0.32	0.36	-0.88	.378
Sadism	0.05	0.24	0.22	.824
Secondary Psychopathy	0.56	0.37	1.50	.133
Primary Psychopathy	0.99	0.29	3.38***	<.001

Note. Primary psychopathy predicts choosing a socially painful option. After coding gender as binary, $N = 340$. Scenario 6 was used as the reference scenario. Asterisks denote significant t values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B8. Study 4A: Logistic regression showing trait measures predicting the choice of social pain options with *only* the significant scenario (Scenario 4)

Variables	Estimate	*SE*	*z*	*p*
Intercept	-4.95	0.32	-15.38	<.001
Gender (Male)	0.85	0.46	1.86	.063
BPS	-0.34	0.24	-1.43	.153
Sadism	0.15	0.20	0.73	.464
Psychopathy	1.17	0.29	4.08***	<.001

Note. Psychopathy predicts choosing a socially painful option. After coding gender as binary, $N = 340$. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B9. Study 4A: Logistic regression showing trait measures predicting the choice of social pain options with *only* the significant scenario (Scenario 4), with psychopathy split into subtypes

Variables	Estimate	*SE*	*z*	*p*
Intercept	-4.95	0.32	-15.39	<.001
Gender (Male)	0.87	0.46	1.89	.059
BPS	-0.26	0.31	-0.86	.391
Sadism	0.13	0.21	0.64	.521
Secondary Psychopathy	0.44	0.31	1.42	.155
Primary Psychopathy	0.89	0.24	3.64***	<.001

Note. Primary psychopathy predicts choosing a socially painful option. After coding gender as binary, $N = 340$. Asterisks denote significant t values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B10. Study 4B: Descriptive statistics and *t*-tests involving ratings of valence for those high and low in psychopathy and both variants

Trait	Dependent Variable	High Tertile *M* (SD)	Low Tertile *M* (SD)	*t*-test
Psychopathy				
	Composite Score	0.76 (0.20)	0.85 (0.08)	$t(144) = -3.85$, $p < .001$
	Moderate Positive	0.86 (0.30)	0.96 (0.09)	$t(144) = -2.68$, $p = .008$
	Mild Positive	0.52 (0.34)	0.61 (0.25)	$t(144) = -1.81$, $p = .061$
	Mild Social Pain	-0.68 (0.27)	-0.82 (0.16)	$t(144) = 3.70$, $p < .001$
	Moderate Social Pain	-0.85 (0.31)	-0.96 (0.10)	$t(144) = 2.71$, $p = .007$
Primary Psychopathy	Composite Score	0.76 (0.20)	0.85 (0.08)	$t(144) = -3.55$, $p < .001$
	Moderate Positive	0.49 (0.33)	0.60 (0.25)	$t(144) = -2.54$, $p = .012$
	Mild Positive	0.65 (0.24)	0.65 (0.25)	$t(144) = -2.33$, $p = .021$
	Mild Social Pain	-0.70 (0.25)	-0.81 (0.19)	$t(144) = 2.74$, $p = .007$
	Moderate Social Pain	-0.85 (0.31)	-0.96 (0.10)	$t(144) = -2.86$, $p = .005$
Secondary Psychopathy	Composite Score	0.75 (0.19)	0.84 (0.13)	$t(144) = -3.13$, $p = .002$
	Moderate Positive	0.86 (0.30)	0.94 (0.16)	$t(144) = -1.98$, $p = .050$
	Mild Positive	0.51 (0.34)	0.61 (0.26)	$t(144) = -2.11$, $p = .037$
	Mild Social Pain	-0.65 (0.28)	-0.82 (0.19)	$t(144) = 4.12$, $p < .001$
	Moderate Social Pain	-0.84 (0.32)	-0.94 (0.15)	$t(144) = 2.54$, $p = .012$

Note. For overall psychopathy, primary and secondary psychopathy, there were 73 participants in each of the high and low tertiles.

Table B11. Study 4B: Descriptive statistics and *t*-tests involving ratings of intensity for those high and low in psychopathy and both variants

Trait	Dependent Variable	High Tertile *M* (SD)	Low Tertile *M* (SD)	*t*-test
Psychopathy				
	Composite Score	1.77 (0.24)	1.76 (0.26)	$t(144) = 41$, $p = .682$
	Moderate Positive	2.21 (0.45)	2.39 (0.52)	$t(144)$ -2.25, $p = .026$
	Mild Positive	1.75 (0.34)	1.82 (0.38)	$t(144) = -1.19$, $p = .237$
	Mild Social Pain	2.20 (0.40)	2.37 (0.38)	$t(144) = -2.70$, $p = .008$
	Moderate Social Pain	2.67 (0.42)	2.81 (0.35)	$t(144) = -2.30$, $p = .023$
Primary Psychopathy	Composite Score	1.78 (0.23)	1.74 (0.27)	$t(144) = 0.94$, $p = .350$
	Moderate Positive	2.24 (0.45)	2.38 (0.54)	$t(144) = -1.64$, $p = .103$
	Mild Positive	1.77 (0.32)	1.79 (0.39)	$t(144) = -0.34$, $p = .728$
	Mild Social Pain	2.23 (0.41)	2.39 (0.39)	$t(144) = -2.54$, $p = .012$
	Moderate Social Pain	2.66 (0.42)	2.80 (0.35)	$t(144) = -2.21$, $p = .029$
Secondary Psychopathy	Composite Score	1.78 (0.24)	1.79 (0.23)	$t(144) = -0.15$, $p = .884$
	Moderate Positive	2.27 (0.49)	2.40 (0.44)	$t(144) = -1.67$, $p = .098$
	Mild Positive	1.77 (0.36)	1.83 (0.38)	$t(144) = -1.03$, $p = .303$
	Mild Social Pain	2.24 (0.39)	2.30 (0.40)	$t(144) = -0.91$, $p = .366$
	Moderate Social Pain	2.67 (0.42)	2.78 (0.37)	$t(144) = -1.68$, $p = .095$

Note. For psychopathy, primary and secondary psychopathy, there were 73 participants in each of the high and low tertiles.

Table B12. Study 4B: Descriptive statistics and *t*-tests involving ratings of social pain for those high and low in overall, primary and secondary psychopathy

Trait	Dependent Variable	High Tertile *M* (SD)	Low Tertile *M* (SD)	*t*-test
Psychopathy				
	Composite Score	3.69 (1.40)	2.54 (0.43)	$t(139) = 6.61$, $p < .001$
	Moderate Positive	3.05 (2.12)	1.45 (0.65)	$t(139) = 6.08$, $p < .001$
	Mild Positive	3.30 (1.86)	2.05 (0.70)	$t(139) = 5.28$, $p < .001$
	Mild Social Pain	5.91(0.98)	6.36 (0.87)	$t(139) = -2.88$, $p = .006$
	Moderate Social Pain	7.74 (1.82)	9.12 (0.77)	$t(139) = -5.86$, $p < .001$
Primary Psychopathy	Composite Score	3.75 (1.39)	2.66 (0.74)	$t(139) = 5.83$, $p < .001$
	Moderate Positive	3.15 (2.12)	1.66 (1.08)	$t(139) = 5.27$, $p < .001$
	Mild Positive	3.42 (1.84)	2.24 (0.93)	$t(139) = 4.78$, $p < .001$
	Mild Social Pain	5.97 (1.08)	6.42 (0.84)	$t(139) = -2.78$, $p = .006$
	Moderate Social Pain	7.66 (1.83)	9.02 (1.03)	$t(139) = -5.45$, $p < .001$
Secondary Psychopathy	Composite Score	3.63 (1.43)	2.68 (0.56)	$t(139) = 5.21$, $p < .001$
	Moderate Positive	2.96 (2.15)	1.65 (0.88)	$t(139) = 4.74$, $p < .001$
	Mild Positive	3.26 (1.83)	2.18 (0.86)	$t(139) = 4.50$, $p < .001$
	Mild Social Pain	5.59 (1.03)	6.30 (1.00)	$t(139) = -1.85$, $p = .067$
	Moderate Social Pain	7.84 (1.88)	8.93 (0.91)	$t(139) = -4.24$, $p < .001$

Note. For overall psychopathy, primary and secondary psychopathy, there were 70 participants in the high tertile and 71 participants in the low tertile.

Table B13. Study 4B: Mixed effects logistic regression of trait measures predicting the choice of a social pain option, with psychopathy split into subtypes

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	-0.00	0.84	0.00	1.00
Scenario 2	1.86	0.65	2.83	.005**
Scenario 3	0.74	0.73	1.01	.311
Scenario 4	1.52	0.67	2.26	.024*
Scenario 5	0.91	0.71	1.27	.203
Gender (Male)	0.37	0.36	1.01	.313
BPS	-0.42	0.19	-2.18	.030*
Sadism	0.54	0.17	3.21	.001**
Secondary Psychopathy	0.36	0.19	1.86	.063
Primary Psychopathy	0.29	0.18	1.63	.104

Note. Sadism predicts choosing a socially painful option. Boredom proneness negatively predicts choosing a socially painful option. After coding gender as binary, $N = 213$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B14. Study 4B: Mixed effects logistic regressions of trait measures predicting the choice of social pain options after removing the significant scenarios (Scenario 2 and Scenario 4).

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	0.00	0.84	0.00	1.00
Scenario 3	0.76	0.74	1.03	.305
Scenario 5	0.93	0.72	1.29	.197
Gender (Male)	0.11	0.59	0.19	.847
BPS	-0.17	0.28	-0.63	.532
Sadism	0.50	0.26	1.92	.055
Psychopathy	0.77	0.33	2.30*	.021

Note. Psychopathy predicts choosing a socially painful option. After coding gender as binary, $N = 213$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B15. Study 4B: Mixed effects logistic regressions of trait measures predicting the choice of social pain options after removing the significant scenarios (Scenario 2 and Scenario 4) and splitting psychopathy into subtypes.

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 1	0.00	0.84	0.00	1.00
Scenario 3	0.75	0.74	1.02	.306
Scenario 5	0.93	0.72	1.29	.198
Gender (Male)	0.06	0.60	0.10	.919
BPS	-0.33	0.29	-1.13	.257
Sadism	0.53	0.26	2.08*	.038
Secondary Psychopathy	0.68	0.30	2.28*	.022
Primary Psychopathy	0.34	0.28	1.24	.214

Note. Sadism and secondary psychopathy predict choosing a socially painful option. After coding gender as binary, $N = 213$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B16. Study 4B: Mixed effects logistic regressions of trait measures predicting the choice of social pain options with *only* the significant scenarios (Scenario 2 and Scenario 4)

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 4	-0.03	0.41	-0.81	.420
Gender (Male)	0.54	0.46	1.18	.238
BPS	-0.48	0.24	-2.05*	.040
Sadism	0.56	0.23	2.49*	.013
Psychopathy	0.35	0.25	1.38	.166

Note. Sadism predicts choosing a socially painful option. Boredom proneness negatively predicts choosing a socially painful option. After coding gender as binary, $N = 213$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B17. Study 4B: Mixed effects logistic regressions of trait measures predicting the choice of social pain options with *only* the significant scenarios (Scenario 2 and Scenario 4), with psychopathy split into subtypes

Variables	Estimate	*SE*	*z*	*p*
Scenario (Scenario 6)				
Scenario 4	-0.33	0.41	-0.81	.417
Gender (Male)	0.54	0.46	1.18	.239
BPS	-0.48	0.26	-1.83	.067
Sadism	0.56	0.23	2.48*	.013
Secondary Psychopathy	0.14	0.26	0.55	.585
Primary Psychopathy	0.26	0.23	1.16	.248

Note. Sadism predicts choosing a socially painful option. After coding gender as binary, $N = 213$. Scenario 6 was used as the reference scenario. Asterisks denote significant *t* values for regression coefficients.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table B18. Study 4B: Moderation table of boredom proneness moderating the relationship between psychopathy and primary psychopathy and averaged likelihood ratings of responding in a socially painful manner

Variables	*B*	*SE*	β	*t*	*p*	*F*	R^2
Psychopathy							
Intercept	2.51	0.10	-0.09	25.77	<.001	$F(4, 201) = 26.58, p < .001$	.35
Gender (Male)	0.18	0.19	0.13	0.93*	.353		
BPS	-0.13	0.09	-0.09	-1.51	.132		
Psychopathy	0.86	0.09	0.61	9.72***	<.001		
BPS*Psychopathy	0.17	0.08	0.12	2.05*	.042		
Primary Psychopathy							
Intercept	2.52	0.10	-0.08	26.01	<.001	$F(4, 201) = 10.67, p < .001$	.18
Gender (Male)	0.21	0.20	0.14	1.05	.294		
BPS	0.06	0.09	0.04	0.70	.487		
Primary Psychopathy	0.76	0.09	0.53	8.84***	<.001		
BPS*Primary	0.21	0.09	0.14	2.30*	.023		

Note. Average likelihood scores were calculated averaging participants' ratings of their likelihood of choosing mild or moderately negative options. $N = 206$.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Appendix: Appendix C—Measurement Scales

Levenson Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995)

Responses are assessed on a 4-point Likert scale ranging from 1 ("*disagree strongly*") to 4 ("*agree strongly*"). Note: * indicates a reversed scored item.

1. Success is based on survival of the fittest; I am not concerned about the losers.
2. I find myself in the same kinds of trouble, time after time.
3. For me, what's right is whatever I can get away with.
4. I am often bored.
5. In today's world, I feel justified in doing anything I can get away with to succeed.
6. I find that I am able to pursue one goal for a long time.*
7. My main purpose in life is getting as many goodies as I can.
8. I don't plan anything very far in advance.
9. Making a lot of money is my most important goal.
10. I quickly lose interest in tasks I start.
11. I let others worry about higher values; my main concern is with the bottom line.
12. Most of my problems are due to the fact that other people just don't understand me.
13. People who are stupid enough to get ripped off usually deserve it.
14. Before I do anything, I carefully consider the possible consequences.*
15. Looking out for myself is my top priority.
16. I have been in a lot of shouting matches with other people.
17. I tell other people what they want to hear so that they will do what I want them to do.
18. When I get frustrated, I often "let off steam" by blowing my top.
19. I would be upset if my success came at someone else's expense.
20. Love is overrated.
21. I often admire a really clever scam.
22. I make a point of trying not to hurt others in pursuit of my goals.
23. I enjoy manipulating other people's feelings.
24. I feel bad if my words or actions cause someone else to feel emotional pain.

25. Even if I were trying very hard to sell something, I wouldn't lie about it.
26. Cheating is not justified because it is unfair to others.

Short Boredom Proneness Scale (SBPS; Struk et al., 2017)

Items are scored on a Likert Scale ranging from 1 ("*strongly disagree*") to 7 ("*strongly agree*").

1. I often find myself at "loose ends," not knowing what to do.
2. I find it hard to entertain myself.
3. Many things I have to do are repetitive and monotonous.
4. It takes more stimulation to get me going than most people.
5. I don't feel motivated by most things that I do.
6. In most situations, it is hard for me to find something to door see to keep me interested.
7. Much of the time, I just sit around doing nothing.
8. Unless I am doing something exciting, even dangerous, I feel half-dead and dull.

Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994)

Items are rated on a 5-point Likert scale ranging from 1 ("*strongly disagree*") to 5 ("*strongly agree*"). Note: * indicates a reversed scored item.

1. I am often confused about what emotion I am feeling.
2. It is difficult for me to find the right words for my feelings
3. I have physical sensations that even doctors don't understand.
4. I am able to describe my feelings easily.*
5. I prefer to analyze problems rather than just describe them.*
6. When I am upset, I don't know if I am sad, frightened, or angry.
7. I am often puzzled by sensations in my body.
8. I prefer to just let things happen rather than to understand why they turned out that way.
9. I have feelings that I can't quite identify.
10. Being in touch with emotions is essential.*
11. I find it hard to describe how I feel about people.
12. People tell me to describe my feelings more.
13. I don't know what's going on inside me.
14. I often don't know why I am angry.
15. I prefer talking to people about their daily activities rather than their feelings.
16. I prefer to watch "light" entertainment shows rather than psychological dramas.
17. It is difficult for me to reveal my innermost feelings, even to close friends.
18. I can feel close to someone, even in moments of silence.*
19. I find examination of my feelings useful in solving personal problems.*
20. I look for hidden meanings in movies or plays.

Brief Self-Control Scale (BSCS; Tangney et al., 2004)

Items are scored on a 5-point Likert scale ranging from 1 ("*not at all like me*") to 5 ("*very much like me*"). Note: * indicates a reversed scored item.

1. I am good at resisting temptation.
2. I have a hard time breaking bad habits.*
3. I am lazy.*
4. I say inappropriate things.*
5. I do certain things that are bad for me, if they are fun.*
6. I refuse things that are bad for me.
7. I wish I had more self-discipline.*
8. People would say that 1 have iron self-discipline.
9. Pleasure and fun sometimes keep me from getting work done.*
10. I have trouble concentrating.*
11. I am able to work effectively toward long-term goals.
12. Sometimes I can't stop myself from doing something, even if I know it is wrong.*
13. I often act without thinking through all the alternatives.*

Questionnaire of Cognitive and Affective Empathy (QCAE; Reniers et al., 2011)

Responses are assessed on a 4-point Likert scale ranging from 1 ("*strongly disagree"*) to 4 ("*strongly agree*").

1. I can easily work out what another person might want to talk about.
2. I can tell if someone is masking their true emotion.
3. I can sense if I am intruding, even if the other person does not tell me.
4. I am good at predicting how someone will feel.
5. I am good at predicting what someone will do.
6. I am quick to spot when someone in a group is feeling awkward or uncomfortable.
7. I can pick up quickly if someone says one thing but means another.
8. I can easily tell if someone else is interested or bored with what I am saying.
9. I can easily tell if someone else wants to enter a conversation.
10. Other people tell me I am good at understanding how they are feeling and what they are thinking.
11. I try to look at everybody's side of a disagreement before I make a decision.
12. Before criticizing somebody, I try to imagine how I would feel if I was in their place.
13. When I am upset at someone, I usually try to "put myself in his shoes" for a while.
14. I always try to consider the other fellow's feelings before I do something.
15. I sometimes try to understand my friends better by imagining how things look from their perspective.
16. I can usually appreciate the other person's viewpoint, even if I do not agree with it.
17. I sometimes find it difficult to see things from the "other guy's" point of view.*
18. Before I do something I try to consider how my friends will react to it.
19. I find it easy to put myself in somebody else's shoes.
20. I am happy when I am with a cheerful group and sad when the others are glum.
21. It worries me when others are worrying and panicky.
22. People I am with have a strong influence on my mood.
23. I am inclined to get nervous when others around me seem to be nervous.
24. I usually stay emotionally detached when watching a film.*
25. I am usually objective when I watch a film or play, and I don't often get completely caught up in it.*
26. I often get deeply involved with the feelings of a character in a film, play, or novel.
27. It is hard for me to see why some things upset people so much.*
28. I often get emotionally involved with my friends' problems.
29. Friends talk to me about their problems as they say that I am very understanding.
30. It affects me very much when one of my friends seems upset.
31. I get very upset when I see someone cry.

Comprehensive Assessment of Sadistic Tendencies (CAST-12; Buckels, 2023)

The scale is scored on a 5-point Likert scale with 1 indicating "*strongly disagree*" and 5 indicating "*strongly agree*".

1. I was purposely mean to some people in high school.
2. I enjoy making jokes at the expense of others.
3. I have purposely tricked someone and laughed when they looked foolish.
4. Perhaps I shouldn't have, but I never got tired of mocking certain classmates.
5. I love to watch YouTube clips of people fighting.
6. In video games, I like the realistic blood spurts.
7. I enjoy watching cage fighting (or MMA), where there is no escape.
8. I sometimes replay my favorite scenes from gory slasher films.
9. I enjoy physically hurting people.
10. I enjoy tormenting people.
11. I have the right to push certain people around.
12. I have dominated others using fear.