Clarifying the Associations between Psychopathy and Attachment in Adult Non-Institutionalised Samples

Elliott Christian

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Declaration of Contribution to Thesis

I declare that the following thesis, which is composed of four manuscripts, is my own work. The research presented was conducted primarily under the supervision of Dr. Martin Sellbom and Dr. Ross Wilkinson. Their contributions to the manuscripts are acknowledged by their shared authorship for each of the manuscripts. Contributions from Dr. Sellbom and Dr. Wilkinson have included advice regarding the nature of the constructs investigated and their literatures, advice regarding statistical analyses, and comment regarding the drafted versions of the manuscripts. All writing and analyses were conducted by myself with the aforementioned guidance. While the nature of the ideas that began this thesis are my own, they have undoubted been influenced by my supervisors through our discussions. It should also be noted that as the manuscripts included in this thesis are in various stages of peer review, ideas from reviewers and editors have been incorporated into the manuscripts, though these ideas have not qualitatively altered the nature of the ideas originality presented.

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Elliott Christian

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Dr. Martin Sellbom

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Dedication

To my partner, Laura Jean King, for your seemingly endless love and support. I could not have done this without you

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To my grandfather and grandmother, Heric and Lorna Christian, who always encouraged my education, I wish you could have been here to see this.

Abstract

Psychopathy is a personality construct characterised by a range of destructive and disruptive interpersonal behaviours, however, there is limited information regarding how this construct relates to behaviour within intimate social relationships. One theory which could be useful in understanding not only the interpersonal processes of psychopathy, but potentially its etiology, is attachment theory. While a small literature regarding the association between psychopathy and attachment has been developed in recent years, there have been a number of discrepancies between studies and a number of areas of attachment theory left unexplored. Across a series of studies we investigated the associations between psychopathy and general attachment styles, attachment styles in specific normative relationships (e.g., mother, father, romantic partner and friends), and the actual presence of attachment bonds in large, adult, non-institutionalised samples using self-report measures. In our results, we demonstrated that there are consistent associations between individual differences in attachment styles and psychopathy, which tend to differ depending on the attachment dimension, component of psychopathy or specific attachment relationship under consideration. We also found deficits in the presence of attachment bonds associated with psychopathy, as indicated by reports of less attachment behaviour within one's intimate social network, smaller intimate social network size and differences in social network composition. While this finding is consistent with theoretical descriptions of psychopathy, the effect sizes were small. Overall, our results are supportive of the application of attachment theory to understand the interpersonal processes of psychopathy and provide preliminary support for further consideration of attachment theory in psychopathy's etiology. Given that we only found limited deficits regarding the capacity to form an attachment bond, taken together, our results suggest that it may be more important to examine the quality of bonds formed in psychopathic individuals rather than the mere presence or absence of bonds.

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A Brief Note Regarding Formatting

This thesis is being submitted as a thesis by compilation (also known as thesis by publication), which is composed of several articles that are based on original research in various stages of publication. Due to that nature of the format, there are differences between Australian English and American English (as several of the articles are published in American journals) between sections of the text because the articles which have been published must be presented in their published format. For ease of reading, we have also used continuous numbering of footnotes throughout the manuscript and maintained a single running head throughout the document, though these would be different in the published forms of the manuscripts. We have also changed to number of the tables and figures to include reference to which manuscript they belong to (e.g. Table 1.1 for the first table in the first manuscript) with supplementary tables and figures and figures not included as part of any specific manuscript labelled as if they were from a fifth chapter (e.g. Table 5.1. to refer to the first of these tables). Finally, references for each individual paper are included at the ends of their respective chapters, while references for the general introduction, general discussion and foreword to each chapter are included in a separate reference list at the end of the document.

Clarifying the Associations between Psychopathy and Attachment in Adult Non-Institutionalised Samples

Psychopathy is a personality construct typically characterised by features such as callousness, diminished empathy, manipulativeness, egocentricity, impulsivity and irresponsibility, though definitions may differ between different models of the construct (Cleckley, 1941; Cooke & Michie, 2001; Cooke, Hart, Logan, & Michie, 2012; Hare, 2003; Lilienfeld & Andrews, 1996; Lykken, 1995; Lynam & Miller, 2015; Patrick, Fowles, & Krueger, 2009). Despite extensive research demonstrating the problematic interpersonal behaviours associated with psychopathy (e.g., violence, sexual coercion, counterproductive workplace behaviours, risky sexual behaviours, sadism; Babiak, Neumann, & Hare, 2010; Boddy, 2014; Hawes, Boccaccini, & Murrie, 2013; Lalumiere & Quinsey, 1996; Leistico, Salekin, DeCoster, & Rogers, 2008; Reidy, Shelley-Tremblay, & Lilienfeld, 2011), there has been relatively limited research regarding the interpersonal processes underlying the construct. One theory that may be useful in this domain is attachment theory (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1973, 1980, 1982), as it is a theory of emotional and interpersonal processes which has a strong empirical base (see Cassidy & Shaver, 2008; Mikulincer & Shaver, 2007). While a small literature regarding the associations between psychopathy and attachment has developed in recent years (Brennan & Shaver, 1998; Conradi, Boertien, Cavus, & Verschuere, 2015; Craig, Gray, & Snowden, 2013; Frodi, Dernevik, Sepa, Philipson & Bragesjö, 2001; Mack, Hackney, & Pyle 2011; Miller et al., 2010; Miller, Jones, & Lynam, 2011; Pasalich, Dadds, Hawes, & Brennan, 2012; Savard, Brassard, Lussier, & Sabourin, 2015; Schimmenti, et al. 2014), findings in this field have shown some inconsistencies and have tended to only focus on a single aspect of attachment theory, leaving much of the theoretical framework of attachment theory unexplored. Therefore, the purpose of this thesis was to investigate and clarify the associations between

psychopathy and attachment, before extending our research into areas of attachment theory that have yet to have been investigated in this field.

Psychopathy: Conceptualisation and Nomothetic Network

Psychopathy is a term used to refer to a complex and typically malevolent personality construct (Hare 1996, 2003). While the precise antecedents and origins of psychopathy are not entirely clear,[1] there is a general consensus that Cleckley's (1941) descriptions of the 'so-called psychopathic personality' have broadly laid the ground work for modern conceptualisations of the construct. Based on his observations as a practicing psychiatrist in a mental health facility, Cleckley (1941) described a number of cases studies of individuals whom he believed to suffer from a psychopathic personality disorder. From his cases, he described 21 features as characteristic of psychopathy, which was later reduced to 16 features in subsequent editions of his book (Cleckley, 1976). His descriptions included features such as superficial charm, lying, lacking shame or remorse, unreliability, poverty of affect, egocentricity, incapacity for object love, absence of neuroses and a failure to learn from past mistakes, to name a few. Interestingly, there is an interpersonal characterisation to many of the features which define psychopathy, which typically make reference to some tendency to exploit others (e.g. superficial charm, lying) or failure to empathise (e.g. egocentricity, lack of remorse).

Latent Factor Models in Incarcerated Populations

In the current literature, one of the most common ways in which to conceptualise psychopathy is with factor analytic models of the construct, typically from those developed in incarcerated populations (e.g. Hare, 1980). Arguably the most influential of the factor analytic models have been those developed using the Psychopathy Checklist – Revised (PCL-

[1] Most researchers would likely consider Pinel's (1801) descriptions of 'manie sans delire' or Prichard's (1835) descriptions of 'moral insanity' as forerunners to modern descriptions of psychopathy.

R; Hare, 2003), which was heavily influenced by Cleckley's (1941) descriptions, as the features described by Cleckley (1941) were included in the analyses (Hare, 1980). Using factor analytic techniques, Hare and colleagues found that the features of psychopathy can be accounted for using two latent factors (Hare, 1991; Harpur, Hare, & Hakstian, 1989); an affective/interpersonal factor (e.g. diminished empathy, manipulativeness, grandiosity, superficial charm, shallow emotions) and a behavioural deviance factor (e.g. impulsivity, irresponsibility, juvenile delinquency, criminal versatility, recidivism). Researchers investigating psychopathy have subsequently found that each of these factors tends to correlate differently with variables of interest, with the affective/interpersonal factor correlating more with constructs such as fearlessness and proactive violence (Patrick, Bradley, & Lang, 1993; Reidy et al., 2011; Woodworth & Porter, 2002), while the behaviour deviance factor tends to correlate more with recidivism, reactive violence and externalising behaviours (Hawes et al., 2013; Leistico et al., 2008; Patrick, Hicks, Krueger, & Lang, 2005). In addition to understanding the latent structure of psychopathy, the advent of the two-factor PCL-R led to a number of other advances in psychopathy research. These advances included standardised measurement of the construct, interest in psychopathy measurement for violence risk assessment (given the association between psychopathy and violence; Salekin, Rogers, & Sewell, 1996) and differentiation of psychopathy from the Diagnostic and Statistical Manual of Mental Disorder's conceptualisation of the construct, Antisocial Personality Disorder (APD; APA; American Psychiatric Association, 2013), due to limited overlap between APD and the affective/interpersonal features of psychopathy (Hare, Hart, & Harpur, 1991; Hart & Hare, 1989).

Following on from the PCL-R two-factor model of psychopathy, there has been a proliferation of factor analytical models using the PCL-R (Cooke & Michie, 2001; Hare, 2003; Hare & Neumann, 2006). Significant debate has surrounded the development of the

three-factor model PCL-R, which separates the affective (e.g. diminished empathy, shallow emotions) and interpersonal features (e.g. manipulative, pathological lying, superficial charm) and removes overt references to criminal behaviour from the behavioural deviance factor (now characterised by impulsivity, sensation seeking, and irresponsibility), arguing that criminal and antisocial behaviour is a consequence rather than a part of psychopathy (Cooke, Michie, Hart, & Clark, 2004; Cooke & Michie, 2001; Skeem & Cooke, 2010). Alternatively, Hare and colleagues (Hare, 2003; Hare & Neumann, 2006, 2010) have opted to retain items relating to antisocial behaviour, placing them in a fourth factor (characterised by persistent and varied antisocial behaviour across the lifespan) while continuing to separate the affective and interpersonal features, and arguing that psychopathy is an inherently antisocial construct. While researchers investigating the model fit of the PCL-R three- and four-factor models has generally found appropriate fit for either model (Cooke, Michie, & Hart, 2006; Hare & Neumann, 2006), a recent study has found stronger model fit for the three-factor model over the four-factor model (Storey, Hart, Cooke, & Michie, 2015). There also continues to be concerns regarding criterion contamination in the four-factor model (in prediction of recidivism) given that antisociality in the PCL-R is measured via criminal behaviour (Cooke & Skeem, 2010a, 2010b). Nevertheless, debate continues on how to best understand the latent structure of psychopathy in the PCL-R.

Non-Institutionalised Populations: Expansion, Latent Factor Models and Self-Report Psychopathy Scales

While the conceptualisation of psychopathy was initially developed in incarcerated samples and influenced heavily by the PCL-R, researchers have also expanded the study of psychopathy to community and student populations (Levenson, Kiehl, & Fitzpatrick, 1995; Lilienfeld & Andrews, 1996; Lynam & Miller, 2015). This expansion has been supported by taxometric studies suggesting that psychopathy is better thought of as a continuous construct

on which individuals vary by degree rather than kind (Guay, Ruscio, Knight, & Hare, 2007; Edens, Marcus, Lilienfeld, & Poythress, 2006; Marcus, John, & Edens, 2004; Murrie et al., 2007; Walters, Brinkley, Magaletta, & Diamond, 2008; Walters et al., 2007). In addition, findings from incarcerated samples have generally been replicated in university and community samples, such as the associations between psychopathy and violence, substance use, antisocial behaviour and sexual misconduct (Birkley, Giancola, & Lance, 2013; Kastner & Sellbom, 2012; Kosson, Kelly, & White, 1997; Marcus & Norris 2014; Miller, Wilson, Hyatt, & Zeichner, 2015; Muñoz, Khan, & Cordwell, 2011; Neumann & Hare, 2008; Reidy, Zeichner, Miller, & Martinez, 2007; Wall, Sellbom, & Goodwin, 2013).

The expansion of the concept of psychopathy into non-incarcerated populations has taken several forms. Some researchers have developed downward extensions or versions of the two- three- and four-factor PCL-R to apply to non-institutionalised samples (Brinkley, Diamond, Magaletta, & Heigel, 2008; Levenson et al., 1995; Paulhus et al., in press). Some researchers have applied the five-factor model of personality to describe psychopathy as an extreme variant of normal personality (Lynam & Miller, 2015; Miller, Lynam, Widiger, & Leukefeld, 2001). Alternatively, Lilienfeld and Andrews (1996) developed an entirely new measure of psychopathy, the Psychopathic Personality Inventory (PPI), as a 'bottom-up' approach to understanding psychopathy without reference to criminality. In its revised (PPI-R; Lilienfeld & Widows, 2005) and short forms (PPI-SF; Kastner, Sellbom, & Lilienfeld, 2012), the PPI is organised into a two-factor model.[2] One factor, appears to be similar to the behaviour deviance factors seen in the PCL-R models of psychopathy, excluding criminal behaviour, while the other factor reflects a combination of stress immunity, social dominance, and social potency. This 'fearless-dominance' factor has been influential in that it

[2] Sometimes the PPI-R is organised into a three-factor model which also includes Coldheartedness, which is a factor which is considered to be similar to an affective factor in the PCL-R.

was not previously represented in PCL-R models of psychopathy. However, there has been some contention regarding the inclusion of fearless-dominance in the concept of psychopathy, with some arguing that its associations are typically stronger with variables indicating adjustment rather than dysfunction (Lynam & Miller, 2012; Miller & Lynam, 2012), while others have argued it is necessary in combination with other features of psychopathy to distinguish it from general antisocial behaviour (Lilienfeld et al., 2012). Debates in this area have yet to have been resolved.

It should also be noted that expansion of the investigation into non-incarcerated samples has been accompanied by a growing use of self-report psychopathy measures (Levenson et al., 1995; Lilienfeld & Widows, 2005; Lynam & Miller, 2015; Patrick et al., 2009; Paulhus, Neumann, & Hare, in press). There has been some concern regarding the measurement of a construct which is in part defined by lying and manipulation via self-report. However, contrary to expectations researchers have found that individuals higher on psychopathy do not tend to present themselves in an overly favourable manner in most studies (Ray et al., 2013) and results using self-report measures tend to be consistent with those found with interview and file review assessments (Camp, Skeem, Barchard, Lilienfeld, Poythress, 2013; Lynam, Whiteside, & Jones, 1999; Marcus & Norris 2014; Seibert, Miller, Few, Zeichner, & Lynam, 2011; Vitacco, Neumann, & Pardini, 2014).

While the evidence developed to date has generally been supportive of the use of self-report measures to investigate psychopathy (e.g. Levenson et al., 1995; Lilienfeld & Widows, 2005; Lynam et al., 1999), this is not to suggest that self-report measures of psychopathy are not without weaknesses with many measures presenting with areas in need of improvement (see Sellbom, Lilienfeld, Fowler, & McCrary, in press for review of self-report psychopathy methodology). For example, the Levenson Self Report Psychopathy scales (LSRP) are a 26 item short form self-report measure of psychopathy, originally

designed to mimic the two factor model of the PCL-R (Levenson et al., 1995). A more recent analysis of the latent structure of the LSRP has suggested that it may be more accurate to represent the scale with three factors using only 19 items from the original scale (Brinkley et al., 2008). This version of the LSRP, which includes Egocentricity (i.e. interpersonal), Callous (i.e. affective) and Antisocial (i.e. behavioural features) subscales that roughly correspond to the three-factor model of the PCL-R proposed by Cooke and Michie (2001), has been replicated and has demonstrated improvements in construct validity over the original 26 item two-factor model (Sellbom, 2011). Unfortunately, the LSRP suffers from deficits in construct coverage (particularly relating to diminished empathy in the Callous subscale), low internal consistencies in two of the subscales (i.e. Callous $\alpha \approx .60$ and Antisocial $\alpha \approx .60$) and deficits in construct validity (i.e. positive associations between the Callous subscale and anxiety and higher than desired correlations between the subscales and negative emotionality; Sellbom et al., in press). Like many self-report measures of psychopathy, while the LSRP presents with a number of positive features (i.e. its brevity, it's in the public domain, generally supported construct validity), it would likely benefit from additional revisions and further validation.

Triarchic Theory of Psychopathy

One of the more recent developments regarding psychopathy theory has been the triarchic model of psychopathy (Patrick et al., 2009), which represents an attempt at an empirically based conceptual theory which synthesises previous models of psychopathy. As the name suggests, the triarchic theory of psychopathy separates psychopathy into three components; boldness, which refers to the fearless-dominance component of psychopathy identified predominantly through the PPI (Lilienfeld & Widows, 2005); meanness, which refers to the affective/interpersonal components of psychopathy identified in latent factor models (e.g. Hare, 2003; Levenson et al., 1995; Paulhus et al., in press); and disinhibition,

which refers to the impulsive and irresponsible behaviours identified in latent factor models (e.g. Hare, 2003; Levenson et al., 1995; Lilienfeld & Widows, 2005; Paulhus et al., in press). While the triarchic theory of psychopathy is only a new model, it is receiving growing support using its operationalised measure, the Triarchic Psychopathy Measure (TriPM; Patrick, 2010; for supporting studies see; Blagov, Patrick, Oost, Goodman, & Pugh, 2015; Patrick & Drislane, 2015; Sellbom & Phillips, 2013; Sica et al., 2015; Stanley, Wygant, & Sellbom, 2013). This support has included validation in incarcerated and non-incarcerated populations (i.e., university and community samples; Anderson, Sellbom, Wygant, Salekin, & Krueger, 2014; Patrick, 2010; Sellbom & Phillips, 2013).

Current Role of Relational Theories and Experiences in Psychopathy Research

While there has been considerable research conducted on psychopathy in order to operationalise it and understand the disruptive behaviour associated with it (e.g., violence), the interpersonal processes associated with psychopathy and the development of the construct are not well understood. Currently, the predominate theories of psychopathy have focused primarily on biological contributions to the construct, [3] which typically make reference to a biological deficit leading to psychopathy such as a diminished capacity to experience fear (Lykken, 1995), a diminished capacity to recognise or experience conspecific's emotions, particularly fear and sadness (Blair, 2006; Moul, Killcross, & Dadds, 2012), or diminished capacity to reorient one's attentions once engaged (Zeier, Maxwell, & Newman, 2009). While these theories have certainly forwarded the understanding of psychopathy and the processes underlying it, there is an underrepresentation of interpersonal, social and environmental contributions to psychopathy within and amongst psychopathy theories, despite evidence to the contrary (e.g., Farrington, 2006; Gao, Raine, Chan, Venables, & Mednick, 2010; Marshall & Cooke, 1999).

[3] Referring here to etiological theories, rather than the structural theories previously reviewed.

However, a focus on bio-cognitive contributions in psychopathy theories does not mean a total absence of interpersonal, social or environmental contributions to psychopathy in these theories (e.g., Lykken's model of psychopathy reference parenting capacity, Dadds and colleagues make reference to difficulty bonding; Dadds & Hawes, 2006; Dadds, Jambrak, Pasalich, Hawes, & Brennan, 2011), merely an underrepresentation in the literature. One theory which focuses on the interpersonal and environmental contributions to psychopathy is the Cognitive-Interpersonal theory of psychopathy proposed by Blackburn (1998). This model suggests that psychopathy is underpinned by a combination of schema's which are developed through interpersonal experiences and are self-fulfilling in nature (e.g. deceiving someone through lying may reinforce the schema that others are stupid, and therefore deserving of manipulation). While this model is interesting in its focus on interpersonal/cognitive factors and experiences underlying psychopathy and has received some empirical support (Salekin, Leistico, Trobst, Schrum, & Lochman, 2005), investigations of this model and the role of relational experiences more broadly has received limited attention in psychopathy research.

Attachment Theory: A Brief Background and Overview

Another theory which has received limited robust attention in psychopathy research is attachment theory. Attachment theory is a developmental theory drawing heavily on psychodynamic, evolutionary, ethological and cognitive theories to explain the nature and function of close interpersonal bonds in humans (Cassidy, 2008). Within attachment theory, Bowlby (1973, 1980, 1982) proposed that early in life infants form attachments (i.e. close emotional bonds) to their caregivers (typically their parents), which serve to maintain proximity to these caregivers and therefore increasing their likelihood of care and protection and subsequently, their survival to reproductive age. While children are known to form and maintain attachments to multiple figures early in their lives (Schaffer & Emerson, 1964), they

have generally been found to have a primary attachment relationship (Bowlby, 1982; Schaffer & Emerson, 1964), usually with a parent, who the child preferentially seeks to fulfil their attachment needs and therefore an influential relationship for the child. Although previous researchers have suggested that bonding is a secondary outcome associated with the reinforcement resulting from feeding (Freud, 1910/1957; Sears, Macoby, & Levin, 1957), Bowlby (1982) emphasises the inherent need for humans to form bonds early in life, an idea which has been supported by findings that feeding alone tends to be insufficient to produce bonding and that infants tend to form bonds even to abusive caregivers (Bowlby, 1956; Harlow, 1962; Schaffer & Emerson, 1964).

In order to increase proximity to caregivers, Bowlby (1982) proposed that individuals use 'attachment behaviours'. These are behaviours used by the individual in order to increase proximity to caregivers for the purposes of security and comfort, and thus indicate the presence of an attachment (Bowlby, 1982). The types of attachment behaviours used may vary between those aimed at drawing the individual's caregivers closer (e.g., crying) and those where the individual would seek to increase proximity of their own volition (e.g., a child walking to its mother). Attachment behaviours are thus distinguished from other behaviours which result in proximity to a caregiver, in that the motivation for attachment behaviours is the sense of security and comfort that comes with proximity, rather than another motivation (e.g., affiliation, food). Bowlby (1982) suggested that these attachment behaviours are organised into an attachment system, which regulates the proximity between a child and their caregivers. He proposed that this system becomes more active when the child perceives threats in their environment, which can include the obvious external threats to safety (e.g., a frightening animal) or more subtle cues such as separation from a caregiver or internal cues (e.g., sickness). When the system is less active or the child has developed sufficient 'felt security' for the situation, the child may venture from the caregivers to

explore, using the caregiver as a secure base and safe haven from which to return (Ainsworth, 1972; Bowlby, 1982, 1988; Sroufe & Waters, 1977).

Individual Differences in Attachment

An important component to attachment theory is the development of individual differences in attachment quality, more commonly known by the behavioural description of attachment styles (Ainsworth, 1964; Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1973). Bowlby (1982) proposed that, through repeated bids for support and comfort from caregivers, children develop beliefs and expectations or cognitive representations about relationships, which he referred to as internal working models. Thought to initially develop through the child's relationship with their primary attachment figure, these cognitive models include representations regarding the self (e.g., whether the individual is worth comfort or has the capacity to elicit support from others) and others in relationships (e.g., whether the caregiver is available or likely to be supportive), which serve as a foundation from which the child can then generalise to understand or plan for interactions in future relationships. Individual differences in the quality of internal working models emerge through differences in the caregiver's response to bids for support and comfort (Ainsworth, 1979; Bowlby, 1982), a link which has been causally validated (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; De Wolff & van IJzendoorn, 1997). At the behavioural level, internal working models of attachment are represented by attachment styles. In other words, attachment styles reflect organised patterns of behaviour driven by the beliefs and expectations regarding relationships within internal working models (Bowlby, 1982; Crowell, Fraley, Shaver, 2008; Mikulincer & Shaver, 2007).[4]

[4] The terms 'individual differences in attachment quality', 'individual differences in attachment', 'attachment styles', 'internal working models' and 'working models' are generally used interchangeably to refer to individual differences in the quality of an attachment in a given context.

There are several types of attachment style a child may develop, depending on their caregiving experiences (Ainsworth, 1964; Ainsworth et al., 1978). Consistent sensitive and appropriate caregiving tends to promote the development of a secure style of attachment, characterised by trust in the availability and support of others, as well as, self-efficacy and self-esteem in their capacity and worth in seeking support (Ainsworth et al., 1978). Researchers have found that secure attachments in children tend to promote a range of positive outcomes for the child including social competence, capacity to regulate emotions and reduction in the risk of psychopathology (see Weinfield, Sroufe, Egeland, & Carlson, 2008; DeKlyen & Greenberg, 2008). Alternatively, children who do not receive consistent, sensitive and appropriate caregiving tend to develop insecure attachment styles (Ainsworth et al., 1978; Weinfield et al., 2008), which tend to be associated with poorer outcomes for the child (e.g., diminished empathy, difficulty regulating emotions; Weinfield et al., 2008).

There are two major styles of attachment insecurity: avoidance attachment and anxious/ambivalent attachment (Ainsworth et al., 1978). Attachment avoidance is characterised by the minimisation or suppression of attachment needs, rigid independence, and distrust towards others, thought to arise from a history of cold and unresponsive caregiving. Anxious/ambivalent attachment is characterised by fear of or preoccupation with abandonment, often manifested in excessively ‘clingy’ behaviour or anger in response to minor separations, thought to arise from a history of inconsistent and inadequate caregiving. Importantly, while insecure attachment styles tend to be characterised by less desirable outcomes for the child (Weinfield et al., 2008), many have argued that insecure attachment styles represent an adaptive response to their environmental context (Bowlby, 1982; Main, 1990). For example, clingy behaviour in a child with an anxious/ambivalent attachment style may serve to increase their likelihood of pestering care and support from an inconsistent

caregiver, while a secure attachment style with this same caregiver may lead to the child receiving less care due to the inconsistent nature of the caregiver.

While attachment theory initially only included three types of attachment style (i.e., secure, avoidant, anxious/ambivalent), researchers Main and Solomon (1990) later proposed a fourth style, which they referred to as disorganised attachment.[5] Unlike the previously proposed attachment styles, which each represented some form of coherent and consistent response to the environment, disorganised attachment is characterised by a seemly incoherent, inconsistent and sometimes bizarre response to attachment system activation (Main & Solomon, 1990). Following a short separation from their parents, children with this style of attachment may hide from attachment figures, display apprehension, disorganised wandering, freezing, dazed expressions or conflicting behaviours (e.g., asking for their mother while moving away from her; Lyons-Ruth & Jacobvitz, 2008). Researchers investigating disorganised attachment styles have often found it to be associated with parental maltreatment and neglect (Cicchetti, Rogosch, & Toth, 2006; Van Ijzendoorn, Schuengel, & Bakermans–Kranenburg, 1999), and it tends to be associated with poorer outcomes for the child socially and psychologically (Cassidy & Mohr, 2001; Lyons-Ruth, 1996; Lyons-Ruth & Jacobvitz, 2008; Rholes, Paetzold, & Kohn, 2016).

Attachment in Adulthood

Although attachment theory has been seen to be primarily concerned with infant and child development, it has also been extended to understand close interpersonal relationships in adolescence and adulthood (Bartholomew & Horowitz, 1991; Collins & Read, 1990; Feeney, Noller, & Hanrahan, 1994; George, Kaplan, & Main, 1996; Hazan & Shaver, 1987; Hesse, 2008; Main, Kaplan, & Cassidy, 1985; Mikulincer & Shaver, 2007; Trinke & Bartholomew, 1997; Hazan & Zeifman, 1994), which is consistent with Bowlby's (1982)

[5] Sometimes referred to as disorganised/disoriented.

assertion that attachment is present in humans across their lifespan. Unlike attachment in childhood, in which attachment behaviour is predominately focussed on parental and close family relationships (Schaffer & Emerson, 1964), attachment behaviours in adulthood are also directed towards peer relationships such as romantic partners and close friends. However, parents have been found to continue as attachment figures for their children into adulthood and attachment to a range of other figures is not uncommon (e.g., siblings, extended family, deities; Doherty & Feeney, 2004; Fraley & Davis, 1997; Kirkpatrick & Shaver, 1992; Trinke & Bartholomew, 1997). The evolutionary motivations for attachment in adulthood also differs from childhood (Hazan & Shaver, 1987; Zeifman & Hazan, 2008). Whereas attachment is thought to motivate proximity and therefore protection until reproductive age in childhood (Bowlby, 1982), attachment in adulthood is thought to not only promote proximity to romantic partners and offspring, leading to increased care and protection, but has also been found to promote the individual's physical and mental health (Zeifman & Hazan, 2008).

Although there are differences between attachment in childhood and adulthood, in terms of the motivations, nature of the figures attachment is directed towards and even provision of support,[6] there are still fundamental consistencies which support the validity of and continuity of attachment into adulthood (Hazan & Shaver, 1987). More specifically, researchers have found that, similar to childhood, attachment bonds[7] are characterised by proximity seeking, distress when separated, use of the attachment figures as a safe haven in times of distress and as a secure base from which to explore the world securely (Doherty & Feeney, 2004; Fraley & Davis, 1997; Fraley & Shaver, 1998; Hazan & Zeifman, 1994;

[6] Attachment in childhood is generally characterised as asymmetrical in nature with the parent or other attachment figure providing support, whereas adult attachments are considered more symmetrical in nature as each relationship partner provides and receives support (Hazan & Shaver, 1987).
[7] Here we are referring specifically to the attachment bond and behaviours used to characterise an attachment bond rather than individual differences in the expression or representation of an attachment (i.e. attachment styles, or internal working models in the cognitive domain).

Trinke & Bartholomew, 1997), behaviours which have been documented in observational studies with adults (e.g. adults have been found to experience separation distress when faced with significant physical separations from loved ones; Fraley & Shaver, 1998). However, the individual's strategies for expressing this attachment behaviours may differ in complexity to that seen in a child. Like children, adults also tend to have a primary attachment figure who they preferentially express their attachment behaviours towards compared to other attachment figures (Hazan & Zeifman, 1994; Trinke & Bartholomew, 1997). Typically, this position is filled by a romantic partner in adulthood, but individuals without a romantic partner often fill this position with a close friend or parent, often continuing with their mother in westernised samples (Doherty & Feeney, 2004; Trinke & Bartholomew, 1997).

Similar to attachment research with children, individual differences in attachment quality (i.e. attachment style and internal working models of attachment) have also been investigated in adulthood, particularly in romantic relationships (Bartholomew & Horowitz, 1991; Collins & Read, 1990; Feeney, Noller, & Hanrahan, 1994; Hazan & Shaver, 1987).[8] Importantly, researchers have found a degree of stability in the attachment styles formed in early childhood through to early adulthood (Fraley, 2002; Groh et al., 2014; Pinquart, Feusner, & Ahnert, 2013), consistent with the argument within attachment theory that internal working models formed early in life go on to influence behaviours and internal working models in later relationships (Bowlby, 1982/1969; Main et al., 1985). In a 2002 meta-analysis, Fraley found a moderate longitudinal correlation between attachment style in infancy and attachment style in adulthood. Several more recent studies have suggested that this association may be slightly more modest compared to those found in Fraley's (2002)

[8] Within attachment theory there has been what is described as a schism between personality/social psychology researchers and psychodynamic/developmental researchers (Mikulincer & Shaver, 2007). While the psychodynamic/developmental literature has been invaluable in its contributions to the field, this thesis focuses more on the personality and social psychology literature as it is reflective of the author's training and the measures used in this thesis.

meta-analysis (Groh et al., 2014; Pinquart, Feusner, & Ahnert, 2013), but nonetheless do suggest continuity of individual differences in attachment from infancy through to adulthood. However, this is not to suggest that individual differences in attachment styles are entirely static, rather, there is degree of flexibility as initial working models are revised with new relational experiences and significant life events (Peirce & Lydon, 2001; Waters, Merrick, Treboux, Crowell, & Albersheim, 2000), in order to create a 'tolerably accurate' version of the individuals' relational environment (Bowlby, 1982). More recently, Fraley, Vicary, Brumbaugh and Roisman, (2011) found evidence to support a 'prototype model' in which internal working models of attachment are underlined by a stable latent factor across time, but also display a reasonable degree of variation, consistent with theorising regarding the stability of internal working models of attachment. Although individual differences in attachment quality may sometimes be referred to as a 'style' or 'type', researchers have demonstrated the continuous nature of attachment styles in both adults and children, suggesting that it is more appropriate to consider them on a continuum (Fraley & Spieker, 2003; Fraley & Waller, 1998; Roisman, Fraley, & Belsky, 2007).

In adulthood, individual differences in attachment style tend to be conceptualised along two dimensions: attachment avoidance and attachment anxiety (Brennan, Clark, & Shaver, 1998). These dimensions can be plotted in two dimensional space for ease of understanding and reflection of their association with earlier categorical models (see Appendix A: Figure 1). Individuals high on attachment avoidance tend to be characterised by coldness, rigid independence, avoidance of intimacy, defensive self-inflation and denial of attachment needs (e.g. felt security and intimacy in the context of an attachment bond; Bartholomew & Horowitz, 1991; Brennan et al., 1998). Mikulincer and Shaver (2007) describe attachment avoidance as a deactivation strategy in which the individual supresses their attachment needs due to their experience of cold and unresponsive caregiving. These

individuals develop internal working models in which others are considered unlikely to be of support. Individuals high on attachment anxiety are characterised by 'clinginess', fear of abandonment, need for approval, and excessive distress to unresponsive attachment figures (Bartholomew & Horowitz, 1991; Brennan et al., 1998; Feeney et al., 1994). Mikulincer and Shaver (2007) describe this as a hyperactivation strategy developed from a history of inconsistent caregiving in which the individual escalates their attachment behaviour to increase their likelihood of care and support. Individuals low on both attachment avoidance and attachment anxiety are thought to have secure attachments, in which the individual has learnt that others are dependable and trustworthy and that they (the individual) are worthy of supporting (Bartholomew & Horowitz, 1991; Brennan et al., 1998; Feeney et al., 1994). These individuals are often found to have the healthiest social and psychological outcomes in adulthood (see Mikulincer & Shaver, 2007). Individuals high on attachment avoidance and attachment anxiety are thought to have a fearful avoidant attachment style, sometimes considered as similar to disorganised attachment, characterised by haphazard and inconsistent attachment behaviour such as freezing and oscillating between attachment avoidance and attachment anxiety. Mikulincer and Shaver (2007) reported that these individuals often experience impoverished relationship histories and are often found to experience the worst social and psychological outcomes (e.g., psychopathology, diminished empathy, violence and poor relationship quality).

Context of Attachment Relationships

It is important to note that individual differences in adult attachments have been studied across a number of relational contexts. One of the most common relational contexts in which individual differences in attachment have been investigated is an individual's general attachment style across relationships. This general attachment style is thought to behaviourally reflect an individual's most chronically accessible internal working models of

attachment (Mikulincer & Shaver, 2007), also referred to as an individual's general attachment models. In childhood, general working models are likely to be heavily influenced by primary caregivers, usual parents (Bowlby, 1982), but in adulthood, experiences in peer relationships, such as with romantic partners and friends often display a stronger association with how an individual generally behaves in relationships (Klohnen, Weller, Luo, & Choe, 2005), which could reflect the tendency for internal working models to be revised with new relational experiences. Understanding general attachment models/styles can be useful in understanding how individuals generally behave in relationships, however, it is important to acknowledge that individuals form a number of attachment relationships with different figures across their lifespan and the internal working models of attachment they form in different relationships may not be consistent with the internal working models they have developed in other relationships (e.g. an individual may have an avoidant attachment to their mother, but a secure attachment to their father; Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Cozzarelli, Hoekstra, & Bylsma, 2000; Fox, Kimmerly, & Schafer, 1991; Klohnen et al., 2005). Understanding an individual's specific attachment relationships can be important as they not only tend to inform the nature of an individual's general attachment models (Peirce & Lydon, 2001), but they also tend to be more predictive of outcomes within that specific attachment relationship (Fraley, Heffernan, Vicary, & Brumbaugh, 2011; Klohnen et al., 2005). Despite the importance of specific attachment relationships, they tend to be an area of attachment theory which is examined far less often than general attachment models.

Psychopathy and Attachment: Theoretical and Nomothetic Associations

Currently there are a number of conceptual and empirical links to suggest consideration of the application of attachment theory to psychopathy. At the broadest theoretical level, psychopathy is a construct in part defined by affective and interpersonal

features, while attachment theory is an explanatory framework regarding affective and interpersonal processes. The individual differences component of attachment theory also shares more specific observable similarities with aspects of psychopathy. For example, the shallow emotions seen in the affective component of psychopathy and the suppression of emotions in attachment avoidance, as well as negative emotionality (i.e., anger) which is shared between the behavioural factor of psychopathy and attachment anxiety (Cooke & Michie, 2001; Hare, 2003; Mikulincer & Shaver, 2007). It is perhaps unsurprising then that there have been a number of researchers and theorists who have drawn links between psychopathy or psychopathy-like constructs and attachment (Bender & Yarnell, 1941; Bowlby, 1944, 1973; Levy, 1937; Patrick et al., 2009; Saltaris, 2002), including Bowlby (1944) who reported on a link between 'affectionless' children and separation from their parents in the first few years of life in a sample of 44 juvenile thieves. The predominant purpose for most theorists linking attachment to psychopathy has been to suggest the potential utility of applying attachment theory to the etiology of psychopathy (Patrick et al., 2009; Saltaris, 2002). However, recently, Conradi et al. (2015) has also suggested that the individual differences component of attachment theory may be useful in simply understanding the interpersonal processes present in psychopathy.

Empirically, there are a number of findings which suggest links between the nomological network of psychopathy and the individual differences components of attachment. Attachment insecurity (i.e. for romantic, parental and general attachment models) has been linked to a number of features consistent with psychopathy, including diminishing empathy, decreased cooperation, increased aggression, limited commitment to relationships, problems with anger and the propensity to lie (Birnie, McClure, Lydon, & Holmberg, 2009; Britton & Fuendeling, 2005; Gomez & McLaren, 2007; Kochanska, Aksan, & Carlson, 2005; Mikulincer & Shaver, 2007; Riggs & Kaminski, 2010; Slotter & Finkel, 2009). And

attachment avoidance has shown specific links to disinterest in intimacy (Spielmann, Maxwell, MacDonald, & Baratta, 2013). Features such as emotional stability and interpersonal competence are also shared between boldness and attachment security (Allen et al., 2002; Mikulincer & Shaver, 2008). Researchers have demonstrated causative links between attachment security and several of these variables (i.e., empathy) in student populations, with priming of secure attachment models being found to produce more empathetic responses, such as compassion and willingness to help others (Mikulincer et al., 2001; Mikulincer, Shaver, Gillath, & Nitzberg, 2005). In forensic populations, insecure attachment (i.e. either attachment avoidance and/or attachment anxiety) has been found to be overrepresented, particularly in the most problematic violent offenders, compared to community populations (Ogilvie, Newman, Todd, & Peck, 2014; Timmerman & Emmelkamp, 2006; van IJzendoorn, et al., 1997), consistent with research conducted on psychopathy (Hare, 1996; Porter & Woodworth, 2006; Porter, Woodworth, Earle, Drugge, & Boer, 2003; Woodworth & Porter, 2002). There is some evidence to suggest longitudinal associations between attachment insecurity and delinquency (Allen et al., 2002), or at least between attachment insecurity and variables which are themselves related to delinquency (e.g., aggression; Fonagy, Target, M. Steele, & H. Steele, 1997). Some researchers have also linked attachment avoidance to APD in a small forensic sample (van IJzendoorn, et al., 1997), but this finding has not been well replicated in community samples (Brennan & Shaver, 1998). While both attachment avoidance and attachment anxiety have typically been linked to many of the aforementioned variables (e.g. lower empathy), the motivations underlying attachment avoidance appear to relate more to values reflective of limited care for or interest in others, while attachment anxiety is generally more reflective of preoccupation regarding others leading to intrusiveness and personal distress (Mikulincer et al., 2003).

Conversely, there are also empirical links between psychopathy and the nomothetic network of the individual difference component of attachment theory. A number of studies, including some using prospective and retrospective methods, have found that psychopathy is associated with variables which would increase the likelihood of an individual developing an insecure attachment to their parents (e.g., inadequate parenting, abuse, maternal depression, low socioeconomic status; Farrington, 2006; Gao, Raine, Chan, Venables, & Mednick, 2010; Lang, af Klinteberg, & Alm, 2002; Marshall & Cooke, 1999). Similar to attachment researchers (e.g., Bowlby, 1944), modern psychopathy researchers have found longitudinal associations between early separation from caregivers and psychopathy (Gao et al., 2010). Psychopathy has also been linked to other behaviours in relationships which are consistent with attachment insecurity. Often these are behaviours more consistent with avoidant attachment (e.g., low commitment, low empathy, interpersonal cynicism, antagonism, interpersonal coldness; De Ganck & Vanheule, 2015; Jonason & Buss, 2012; Verona, Patrick, Curtin, Bradley, & Lang, 2004) and usually relate to the affective/interpersonal factor when investigated separate to the behavioural deviance factor with PCL-R based conceptualisations of psychopathy (Roose, Bijttebier, Decoene, Claes, & Frick, 2010; Seara-Cardoso, Neumann, Roiser, McCrory, & Viding, 2012; Verona et al., 2004). However, the behavioural deviance facets/factors also share empirical associations with variables important to attachment anxiety (e.g., negative emotionality [i.e. anxiety and anger]; Hare, 2003; Hicks & Patrick, 2006; Patrick, Edens, Poythress, Lilienfeld, & Benning, 2006), as do the fearless-dominance/boldness features with attachment security (e.g. low neuroticism, assertiveness, extroversion, emotional resilience, sensation seeking; Kutchen et al., 2016; Patrick et al., 2006; Sellbom & Phillips, 2013). This latter finding is interesting in the context of Lykken's (1995) suggestion that the "hero and the psychopath are twigs on the same genetic branch" (p. 118).

Psychopathy and Individual Differences in General Attachment

Currently, a small literature has developed regarding the direct empirical associations between psychopathy and individual differences in attachment. At the broadest level, individual differences in general attachment models represent a promising candidate for the association between psychopathy and attachment as they represent a relatively pervasive and stable set of characteristic interpersonal functioning (Mikulincer & Shaver, 2007). In other words, they are likely to not only be stable, similar to personality traits, but also applicable to a wide variety of situations as they represent how individuals behave in general across relationships. However, based on the current literature, it is difficult to accurately evaluate the associations between psychopathy and general attachment models due to a combination of issues regarding the methods used in a number of studies, including the operationalisation of constructs, sample size and use of comparison groups.

Methodological issues. One of current methodological issues in the literature regarding the association between psychopathy and individual differences in attachment is the use of un-validated measures. In their 1998 study, Brennan and Shaver found no significant association between psychopathy and individual differences in general attachment style using self-report measures in a large student sample. However, their measure of psychopathy was developed from a factor analysis of items constructed from the DSM criteria for different Personality Disorders represented in the DSM, in which many of the features of psychopathy are unrepresented (i.e. the affective/interpersonal component of the construct, see Hare et al., 1991; Hart & Hare, 1989), making it difficult to apply these findings to psychopathy. In another study based on a sample of incarcerated Italian individuals (N = 139), Schimmenti et al. (2014) concluded that psychopathy, as measured by the PCL-R, is positively associated with ‘devaluation of attachment bonds’ and indicators of a disorganised attachment style. However, ‘attachment devaluation’ in this study was

measured using two items from the PCL-R relating to relationships (i.e. ‘promiscuous sexual behaviour’ and ‘many short-term martial relationships’), items that are already included in the PCL-R because they correlate with other PCL-R items, and attachment style was measured by attempting to score excerpts of PCL-R interview notes related to childhood on Adult Attachment Interview (AAI) protocols (which is not only a procedure that has yet to be validated, but it also appears to be concerning as it is not clear as to whether a PCL-R based interview would produce information of sufficiency or relevance to score AAI protocols). It is perhaps more appropriate to describe the measurement used in these studies as invalid, rather than un-validated.

A second methodological issue to arise in the literature on the association between individual differences in general attachment styles and psychopathy is the reference point used to contextualise individual differences in attachment. More specifically, several studies do not clearly indicate who participants are rating their attachment towards (Craig et al., 2013; Miller et al., 2010; Miller et al., 2016), such as whether they are rating their attachment style in general, with parents, with romantic partners or any other type of relationship. Often researchers may believe they are investigating individual differences in general attachment styles, but many studies have used the Experiences in Close Relationships (ECR; Brennan et al. 1998) or its revised version (ECR-R; Fraley, Waller, & Brennan, 2000) to measure individual differences adult attachment, [9] a measure which is usually phrased towards romantic attachments. The absence of a clear relationship by which to contextualise an individual’s attachment makes it difficult to not only understand what attachment construct was being measured, but also how to place these studies within the broader literature.

[9] Arguably the most popular and well validated self-report measures of individual differences in attachment styles developed to date.

Thirdly, there are several studies in the attachment and psychopathy literature which suffer from more fundamental methodological issues. In a 2001 study, Frodi et al. found no significant associations between the two-factor PCL-R and attachment style categories in a sample of Swedish incarcerated males using the AAI. They then concluded that there was a non-significant trend towards dismissing attachment[10] in psychopathy. However, this study only included 14 participants, which raises concerns regarding the study's statistical power and representativeness. Also, in the Schimmenti et al. (2014) study of Italian offenders, in addition to issues which measurement, the conclusion that psychopathy was associated with indicators of a disorganised attachment style was based upon the reported AAI scores of the 10 highest PCL-R scorers in their sample, though no comparison group was used to compared these scores. These types of methodological issues make it difficult to make inferences regarding the relationship between individual differences in general attachment styles and psychopathy.

Current state of the literature. Given the methodological issues present in the literature, it is currently unclear as to what the association is between individual differences in general attachment styles and psychopathy. However, of the small number of studies with less significant methodological issues (generally those studies that did not clearly indicate who participants were rating their attachment towards), there are several consistencies in the findings which may be useful (Craig et al., 2013; Miller et al., 2010; Miller et al., 2016). Specifically, across three student samples, PPI-SF fearless-dominance and TriPM boldness were found to negatively correlate with attachment anxiety and attachment avoidance, while factor 2 psychopathy (i.e. the behavioural features)[11] and TriPM disinhibition were positively

[10] Dismissing attachment refers to a style of attachment which is conceptually quite similar to attachment avoidance, though it was developed from the perspective of the AAI, whereas the attachment avoidance in adults was developed from a self-report measurement literature.
[11] Using the PPI-SF and a composite measure of the behavioural features from several psychopathy scales.

associated with attachment insecurity (Craig et al., 2013; Miller et al. 2010; Miller et al., 2016).

Results regarding the affective/interpersonal features of psychopathy have differed somewhat between studies, though on balance seem to suggest a stronger role for attachment avoidance in this psychopathy domain. Craig et al. (2013) reported a significant positive relationship between TriPM meanness and attachment avoidance, but no significant association with attachment anxiety. Miller et al. (2010) reported small positive significant relationships between a composite of self-report scales of the affective/interpersonal features of psychopathy and both attachment avoidance and attachment anxiety, but that attachment anxiety was significantly weaker in its association. Finally, Miller et al. (2016) reported no significant association between attachment avoidance or attachment anxiety and PPI coldheartedness (the PPI scale for the affective features of psychopathy; Lilienfeld & Widows, 2005). While these studies could be useful in understanding the relationship between individual differences in general attachment styles and psychopathy, it is important to reiterate that this relationship it yet to be clearly and soundly investigated, indicated that the association between individual differences in general attachment styles and psychopathy is currently not well understood.

Psychopathy and Individual Differences in Attachment in Specific Relationships

Another area in which to explore the association between psychopathy and individual differences in attachment is attachment in specific relationships. This is an interesting gap in the literature as different specific attachment relationships each represent important and often influential relationships for individuals (Doherty & Feeney, 2004; Trinke & Bartholomew, 1997), which could be important for psychopathy. For example, insecure attachments to mothers early in life have been found to be predictive of a number of negative outcomes for individuals across their lifespan (e.g., low empathy, emotion dysregulation, resilience to

psychopathology; see Cassidy, 2008; DeKlyen & Greenberg, 2008; Dozier, Stovall-McCough, & Albus, 2008); father absence and disengagement has been found to predict a child's later psychosocial functioning and psychopathic like constructs in adulthood (K. Grossmann, K. E. Grossmann, Fremmer- Bombik, Kindler, & Scheuerer- Englisch, 2002; Oltman & Friedman, 1967; Volling & Belsky, 1992; Webster, Graber, Gesselman, Crosier, & Schember, 2014); friendships have found to be influential in an individual's attitudes and behaviours in a variety of areas relevant to psychopathy (e.g., risk taking, social deviance; Berndt, 1999; Henry, Slater & Oetting, 2005; Maxwell, 2002; West, Sweeting, & Ecob, 1999); negative romantic relationships have been found to have a number of detrimental outcomes for individuals regarding their mental and physical health (e.g., risky sexual behaviour, empathy for partners; Ross & Mirowsky, 2002; see Mikulincer & Shaver, 2007 for reviews regarding individual differences in romantic attachment in adulthood). However, there has been limited research conducted on the relationship between psychopathy and individual differences in specific attachment relationships.

Psychopathy and individual differences in romantic attachment styles. Several studies have investigated the associations between individual differences in romantic attachment models and psychopathy across student and community samples (Blanchard & Lyons, 2016; Conradi et al., 2015; Mack et al., 2011; Sarvard et al., 2015). Similar to findings with individual differences in general attachment models, the behavioural features of psychopathy have consistently positively correlated with both romantic attachment avoidance and attachment anxiety across a range of self-report measures of attachment styles and psychopathy. This is a finding which has been replicated across a variety of cultures (i.e. US, UK, Dutch and French) and in both university and community samples (Blanchard & Lyons, 2016; Conradi et al., 2015; Mack et al., 2011; Sarvard et al., 2015).

However, findings regarding the boldness/fearless dominance component of psychopathy and romantic attachment styles have been somewhat inconsistent. In one study, Conradi et al. (2015) found a positive association between boldness, as measured with the Youth Psychopathic Trait Inventory (Drislane et al., 2015) and ECR-R attachment avoidance and a null association between boldness and ECR-R attachment anxiety in a large Dutch student sample. Conradi et al.'s (2015) findings are contrary to Craig et al.'s (2013) findings, who found a negative association between both ECR attachment insecurity dimensions and TriPM boldness in a United Kingdom student sample. The later findings by Craig et al. (2013) are more consistent with conceptualisations of boldness as an emotionally resilient construct (Lilienfeld & Andrews, 1996; Patrick et al., 2009), yet the inconsistency between Craig et al. (2013) and Conradi et al.'s (2015) findings do suggest that there is currently some ambiguity in the understanding of the relationship between individual differences in romantic attachment styles and the boldness/fearless dominance component of psychopathy.

Findings regarding the affective and interpersonal features of psychopathy and romantic attachment style have also been less consistent. In a sample of predominantly female university students, Mack et al. (2011) found that the affective/interpersonal features of psychopathy, as measured by the two-factor LSRP, were positive associated with the interaction of higher levels of ECR-R romantic attachment avoidance and romantic attachment anxiety. Using an actor-interdependence model with a community sample of French couples, Sarvard et al. (2015) similarly found that the LSRP affective/interpersonal features of psychopathy in males were positive associated with ECR-R romantic attachment avoidance and attachment anxiety, as well their partners' attachment avoidance. Blanchard and Lyons (2016) found that self-report romantic attachment avoidance was positively related to the affective/interpersonal features of psychopathy for males in a large combined sample of students and community members. They also reported that romantic attachment anxiety

was positively associated with the affective/interpersonal and behavioural features of psychopathy for females in the same sample. These findings are somewhat inconsistent with previous research (Conradi et al. 2015; Sarvard et al. 2015), as well as theories which have suggested that the affective/interpersonal features of psychopathy are lower in anxiety (Cleckley, 1941; Patrick et al., 1993; Verona et al., 2004) and could reflect issues with the construct validity of the affective/interpersonal scale of the LSRP. Blanchard and Lyons' (2016) findings could reflect the quality of the attachment scale used, a version of the Relationships Styles Questionnaire (Creasey & Ladds, 2005), which typically struggles to effectively capture attachment avoidance (Mikulincer & Shaver, 2007). Interestingly, in their study, Conradi et al. (2015) found that the interpersonal features of psychopathy were positively associated with both dimensions of attachment insecurity, while the affective features where positively associated with romantic attachment avoidance and displayed a small negative association with romantic attachment anxiety. This finding may suggest differential associations between the affective and interpersonal components of psychopathy with romantic attachment anxiety, however, given the inconsistency of the results in studies on individual differences in romantic attachment and psychopathy, further research is likely required in this area.

Psychopathy and individual differences in friend attachment styles. Attachments to friends represent another typically central attachment relationship for individuals (Doherty & Feeney, 2004; Trinke & Bartholomew, 1997), yet there has been very limited research regarding the associations between psychopathy and individual differences in attachment to friends. This oversight is perhaps made all the more remarkable by the number of studies linking the influence of peers, specifically friendships, with antisocial and risk taking behaviours (Elliott & Menard, 1996; Haynie, 2002; Matsueda & Heimer, 1987; Menard & Morse, 1984), behaviours typical of psychopathy (Cleckley, 1941; Hare 2003). Of the limited

research available in this area, two studies reported that the Youth Version of the PCL-R was unrelated to a well validated self-report measure of attachment insecurity (Inventory of Parent and Peer Attachment; Armsden & Greenberg, 1987) with friends across two samples of incarcerated male adolescents (Flight & Forth, 2007; Kosson et al., 2002). However, researchers have yet to investigate individual differences in attachment avoidance or attachment anxiety in adult friendships with regards to psychopathy.

Psychopathy and individual differences in parental attachment styles. Similarly, there is limited research regarding the association between psychopathy and parental relationships (i.e., mothers and fathers), despite evidence to suggest their influential nature on a number of aspects of an individual's life (Cassidy, 2008; DeKlyen & Greenberg, 2008; Dozier et al., 2008; K. Grossmann et al., 2002; Volling & Belsky, 1992; Webster et al., 2014). There are several early studies linking separation from caregivers, particularly from fathers, early in life with clinician diagnosed psychopathy (Bowlby, 1944; Oltman & McGarry, 1952; Oltman & Friedman, 1967), but these studies predated validated measures of psychopathy and attachment. In more recent research, Pasalich et al. (2012) found that callous/unemotional traits (often treated as analogous to the affective/interpersonal feature of psychopathy in adults) tended to be highest in children with disorganised attachments to their parents, though it is difficult to generalise these findings across age groups. In incarcerated adolescent males, Kosson et al. (2002) found greater levels of self-report attachment insecurity with parents for those scoring higher on the Youth Version of the PCL-R. Flight and Forth (2007) later found greater self-report attachment insecurity with fathers for those highest on the behavioural features of PCL-R psychopathy reflecting impulsivity and irresponsibility, though neither study investigated the dimensions of attachment security separately. The only study which could be identified to investigate individual differences in attachment to a particular parent, Gordts, Uzieblo, Neumann, Van den Bussche and Rossi

(2015) found that ECR attachment avoidance with mothers was positively associated with the affective features of psychopathy using the Self-Report Psychopathy Scales (Paulhus et al., in press). They also reported that when controlling for malingering (referring to a tendency to endorse atypical and exaggerated symptoms of psychiatric disorder to achieve an end), the association between attachment anxiety with mothers was also positively associated with the affective features of psychopathy, but they reported no other significant associations. However, it should be clear that there is very limited research which has investigated the associations between individual differences in attachment to parents and psychopathy.

Specific attachment relationships: Currently unanswered questions. While there has been varying degrees of investigation into individual differences in specific attachment relationships and psychopathy across a number of studies, there has yet to be any systematic investigation regarding the relationship between these constructs. More specifically, there has yet to have been an investigation which has broadly looked at how psychopathy relates to the most common specific attachment relationships (e.g., mother, father, romantic partner, friends) in the same study. This is an interesting gap in the literature given that each of these specific attachment models tend to overlap with one another (Baldwin et al., 1996; Fraley et al., 2011; Klohnen, et al., 2005; Peirce & Lydon, 2001), suggesting that we currently are unlikely to understand how these models independently relate to psychopathy or whether some models are more important to the relationship with psychopathy than others. Furthermore, researchers have yet to investigate the relationship between psychopathy and specific attachment models in the context of psychopathy's association with general attachment models. Given that researchers have found experiences in specific attachment models tend to update generalised attachment models (Peirce & Lydon, 2001), this raises questions as to whether specific attachment models may account for the relationship between individual differences in general attachment styles and psychopathy. Moreover, it raises the

question as to whether general attachment styles offer something over and above that offered by individual difference in specific attachment models in the relationship between individual differences in attachment and psychopathy.

Psychopathy and the Presence of Attachment Bonds

While there has been some research regarding the individual differences component of attachment theory and psychopathy across several relational contexts, there has yet to be any research conducted regarding the relationship between the actual presence of attachment bonds and psychopathy. This is an important distinction in attachment theory, as there is a difference between the *presence* of a bond and the *quality* of a bond (Ainsworth, 1979). By way of example, one would not confuse the quality of their motor vehicle with actually having a motor vehicle. Within attachment theory, individual differences in the quality of a bond are measured with scales examining attachment styles or internal working models (e.g. Brennan et al., 1998; Feeney et al., 1994; Fraley et al., 2000), while scales aimed at operationalising the presence of a bond in relationships tends to focus on reports of secure base, safe haven, separation distress and proximity seeking behaviours in the context of a relationship (Doherty & Feeney, 2004; Fraley & Davis, 1997; Hazan & Zeifman, 1994; Rowe & Carnelley, 2005; Tancredy & Fraley, 2006; Trinke & Bartholomew, 1997). There is a degree of overlap between the individual differences component of attachment theory and measures examining the presence of an attachment bond which can be difficult to control for (i.e., avoidantly attached individuals reporting less behaviours indicating the presence of a bond; Trinke & Bartholomew, 1997), yet it remains important to make the distinction between presence and quality of attachment bonds.

The lack of research regarding the presence or absence of attachment bonds in psychopathy is an interesting omission in the literature for several reasons. Firstly, psychopathy is a construct that has been defined by the absence of bonding capacity

(Cleckley, 1941) with many theories explicitly linking psychopathy, particularly in the affective/interpersonal component of the construct with bonding deficits (Cooke et al., 2012; Hare, 2003; Lilienfeld & Widows, 2005; Patrick et al., 2009). Secondly, attachment researchers have developed a range of scales to measure the presence and relative importance of attachment bonds amongst one another (Doherty & Feeney, 2004; Fraley & Davis, 1997; Hazan & Zeifman, 1994; Rowe & Carnelley, 2005; Tancredy & Fraley, 2006; Trinke & Bartholomew, 1997). And finally, the entire literature regarding individual differences in attachment styles and psychopathy is predicated on the assumption that researchers are measuring the quality of attachments and therefore that attachment bonds are present. Nevertheless, this is an assumption that is yet to have been empirically tested.

Summary

Overall, in the literature reviewed there are a number of areas in which the associations between attachment and psychopathy are not clear or are yet to be investigated. In the individual differences domain of attachment, results regarding psychopathy and individual differences in either general attachment styles or attachment styles in specific relationships appear to been inconsistent, which could be clarified with use of well validated measures. Furthermore, in some cases the methods employed to study the associations between individual differences in attachment and psychopathy have proved to be so problematic as to make it difficult to evaluate findings. These inconsistences and methodological issues have made it difficult to draw firm conclusions regarding the utility of attachment theory to psychopathy research, such as understanding the interpersonal dynamics of those higher on psychopathy and whether the individual differences component of attachment theory represents a worthwhile etiological pathway to consider with psychopathy. Some specific normative attachment relationships have received very little attention (e.g., fathers, friends, mothers) in psychopathy research and researchers have yet to investigate the

utility of specific attachment relationships together in this field nor their utility in the context of general attachment styles. This research could answer questions regarding the relative importance of specific attachment relationships to psychopathy and the value of general attachment styles beyond specific attachment models. Finally, the association between psychopathy and the actual presence of attachment bonds has yet to have been established, despite the methods available to do so (Rowe & Carnelley, 2005; Tancredy & Fraley, 2006; Trinke & Bartholomew, 1997). This represents a much needed area of research as it speaks not only to attributions regarding the construct of psychopathy (i.e., diminished bonding capacity; Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Lilienfeld & Widows, 2005; Patrick et al., 2009), but also to assumptions regarding research which has investigated the quality of attachment bonds as a function of psychopathy.

Aims of Doctorial Project

Given the current state of the literature regarding the links between psychopathy and attachment, the purpose of this thesis in the broadest sense is to clarify the associations between psychopathy and individual differences in attachment style, and investigate areas of attachment theory that have yet to have been examined in the psychopathy and attachment literature.[12] More specifically, we plan to:

1. Use validated psychometric measures, including improving upon and validating existing measures, as there is a pattern of using non-validated measures of attachment and psychopathy or using measures in an inappropriate fashion, which has led to a lack of clarity in the literature.
2. Clarify the associations between individual differences in general attachment styles and the components of psychopathy, so as to have sound empirical basis from which to understand the relationship between individual differences in attachment and psychopathy.
3. Investigate the associations between psychopathy and individual differences in specific normative attachment relationships (i.e., mother, father, romantic partner, friend), as well as their associations in the context of individual differences in general attachment styles. This will allow us to understand the relationship between specific attachment relationships and psychopathy and the relative importance of each attachment relationship to psychopathy in concert, as well as the utility of general attachment styles to psychopathy beyond specific normative attachment relationships.
4. Examine the relationship between psychopathy and behaviours which indicate the presence, rather than the quality of attachment bonds. Doing so will allow an

[12] When referring to 'attachment' we mean the broader construct of attachment, inclusive of the individual differences component of attachment theory and the behavioural indicators of the presence of an attachment bond.

empirical test of assumptions regarding deficits in bonding capability in psychopathy and underlying assumptions regarding individual differences in attachment quality and psychopathy (i.e., that there must be a bond present in order to have individual differences in the quality of this bond).

In pursuing these aims, we hope to clarify the associations between individual differences in attachment and psychopathy. In doing so, we aim to demonstrate the utility in using attachment theory to understand the interpersonal processes of psychopathy, an interpersonally destructive construct. Furthermore, with sound empirical evidence to support consistent links between attachment and psychopathy, we hope to provide preliminary evidence to support further consideration of attachment theory in the etiology of psychopathy.

Manuscript 1: Development and Validation of an Expanded Version of the Three-Factor Levenson Self Report Psychopathy Scale

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Foreword

In line with the first aim of this thesis (i.e. to use validated psychometric instruments), the first step in our process of investigating psychopathy and attachment theory was to validate our selected measure of psychopathy due to the need to improve its psychometric properties. For the purposes of our investigations we selected the Levenson Self-Report Psychopathy Scale (Levenson et al., 1995), a short self-report scale which can be used in either a 26-item, two factor format, which includes an affective/interpersonal factor and an impulsive/irresponsible behavioural factor, or a 19-item, three-factor format (Brinkley et al., 2008), which includes affective, interpersonal and impulsive/irresponsible behavioural factors. We selected the scale for its relative brevity compared to other psychopathy scales, the evidence for its validity across a number of studies (Brinkley et al., 2008; Levenson, et al., 1995; Lynam et al., 1999; Sellbom, 2011) and its being in the public domain. However, there are some notable concerns regarding low internal reliabilities of several of the subscales, issues regarding the replicability of the latent factor structure, and issues regarding the construct validly of the measure (e.g., positive associations between the affective/interpersonal scale and anxiety; see Sellbom et al., in press, for review of LSRP and its psychometric properties). Consistent with the first aim of this thesis, we opted to attempt to improve the LSRP by including additional items in order to bolster the internal consistency and clarify the latent factor structure before investigating the construct validity of the scale in an independent sample. Therefore, the purpose of the following paper was to develop and

validate an expanded version of the LSRP for use in our investigation into attachment and psychopathy.

Development and Validation of an Expanded Version of the Three-Factor Levenson Self Report Psychopathy Scale

Elliott Christian and Martin Sellbom
The Australian National University

Author Note

Elliott Christian and Martin Sellbom, Research School of Psychology, The Australian National University.

Correspondence concerning this article should be addressed to Martin Sellbom, Research School of Psychology, The Australian National University, Building 39, Canberra, ACT, 2601. Email: martin.sellbom@anu.edu.au

Abstract

The Levenson Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl, & Fitzpatrick, 1995) is a brief self-report questionnaire frequently used in psychopathy research. Although the scale has many desirable properties such as brevity and being available in the public domain, there are also several psychometric concerns associated with it, including low internal consistency, problematic construct validity, and incomplete conceptual coverage of several components of psychopathy. In two studies, we provide evidence that additional items can augment the LSRP to address the aforementioned concerns. In the first study, using a large sample of students and members of the general Australian community (N = 729), we found that an expanded 36-item, 3-factor version of the LSRP was associated with improvements in internal consistency and construct coverage with little degradation in model fit. In the second study, using another Australian community sample (N = 300), we replicated the results of Study 1 and demonstrated improvements in construct validity for the expanded 36-item, 3-factor scale compared to the 19-item, 3- factor scale. Our results indicate that, although slightly longer, the expanded version of the 3-factor LSRP ameliorates many of the concerns associated with its original counterpart.

Keywords: Psychopathy, Levenson Self-Report Psychopathy, LSRP, Self-report, Assessment, Construct Validity, Confirmatory Factor Analysis

Development and Validation of an Expanded Version of the Three-Factor Levenson Self Report Psychopathy Scale

Psychopathy is generally defined by a constellation of traits such as callousness, low empathy, egocentricity, manipulation, impulsivity, and irresponsibility (e.g., Douglas, Nikolova, Kelley, & Edens, 2014). Psychopathy has been associated with a host of undesirable outcomes and behaviors, including but not limited to criminal versatility (Hare, McPherson, & Forth, 1988; Porter, Birt, & Boer, 2001), violent recidivism and aggression (Leistico, Salekin, DeCoster, & Rogers, 2008; Reidy, Shelley-Tremblay, & Lilienfeld, 2011; Vitacco, Neumann, & Pardini, 2014), sexual recidivism (Hawes, Boccaccini, & Murrie, 2013), risky sexual behavior (Kastner & Sellbom, 2012), and substance misuse (see Taylor & Lang, 2006, for review). Given the undesirable outcomes attributed to or associated with psychopathy, there has been substantial impetus to develop reliable and valid measures to operationalize this construct in order to better understand it.

Measurement of Psychopathy

One of the most popular instruments available to measure psychopathy is the Psychopathy Checklist–Revised (PCL–R; Hare, 2003), a clinician rating form that uses a combination of interview and institutional file review to estimate an individual's degree of psychopathy. The PCL–R and its derivatives have been instrumental in progressing the scientific understanding of psychopathy, such as informing latent factor models (Cooke & Michie, 2001; Hare & Neumann, 2008; Harpur, Hare, & Hakstian, 1989), demonstrating the association between psychopathy and violence (e.g., Leistico et al., 2008) and identifying the difficulty in affecting clinical change in psychopathy (Olver & Wong, 2009). However, the PCL–R is lengthy to administer (often > 2.5 hr), requires a file review (often not possible in the general population), and is expensive in terms of costs associated with training, time, and materials. Although a truncated screening version of the PCL–R has been developed to

address some of these drawbacks (PCL: Screening Version; Hart, Cox, & Hare, 1995), even in this condensed form it remains labor intensive.

Several researchers have therefore developed self-report measures of psychopathy as alternatives to the PCL–R, including the Psychopathy Personality Inventory (PPI; Lilienfeld & Andrews, 1996), the Hare Self-Report Psychopathy Scale (SRP; Paulhus, Neumann, & Hare, in press), the Triarchic Psychopathy Measure (TriPM; Patrick, 2010), the Elemental Psychopathy Assessment (Lynam et al., 2011) and the Levenson Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl, & Fitzpatrick, 1995). Self-report measures have become an attractive means by which to measure psychopathy considering the convenience associated with this methodology (i.e., reduction in administration time, supervision not required, lower burden on participants) and because many findings with such measures are consistent with earlier findings with the PCL–R (e.g., Camp, Skeem, Barchard, Lilienfeld, & Poythress, 2013; Lynam, Whiteside, & Jones, 1999; Marcus & Norris, 2014; Seibert, Miller, Few, Zeichner, & Lynam, 2011; Vitacco et al., 2014). Although concerns have been raised as to the validity in measuring a construct defined by deceitfulness and manipulation via self-report (Hart, Hare, & Forth, 1994), a recent meta-analysis found that self-report psychopathy has a weak to negligible negative association with positive impression management and moderate positive association with faking bad (Ray et al. 2013), which should ease concerns about individuals higher on psychopathy presenting themselves in a more socially desirable manner than individuals lower on psychopathy (see Sellbom, Lilienfeld, Fowler, & McCrary, in press, for a more comprehensive discussion of self-report methodology with psychopathy).

Levenson Self-Report Psychopathy Scale.

One self-report questionnaire that has been featured frequently in psychopathy research is the LSRP. This measure was originally designed to index a two-factor model of psychopathy similar to the primary versus secondary psychopathy distinction proposed by

Karpman (1948) and arguably the two-factor model of the PCL–R (Harpur et al., 1989) with the first factor reflecting the affective and interpersonal aspects of psychopathy and the second factor reflecting the impulsive and socially deviant aspects (Levenson et al., 1995). In empirical studies, the LSRP has been used to demonstrate the nontaxonic nature of self-reported psychopathy (Walters, Brinkley, Magaletta, & Diamond, 2008) as well as positive associations with undesirable behaviors such as substance misuse, aggression, sexual coercion, criminal behavior, diminished empathy, and poor response modulation (Brinkley, Diamond, Magaletta, & Heigel, 2008; Brinkley, Schmitt, Smith, & Newman, 2001; Lalumiere & Quinsey, 1996; Lynam et al., 1999; Salekin, Chen, Sellbom, Lester, & MacDougall, 2014; Sellbom, 2011; White, 2014).

Compared to other self-report measures of psychopathy, the LSRP is associated with both undesirable and desirable psychometric properties. The latter include its relative brevity, making the scale comparatively less burdensome on participants; that the scale is in the public domain, making it free to use; and several studies broadly supporting the construct validity of the LSRP scale. Indeed, the latter is supported via positive associations between the LSRP scale and other measures of psychopathy, antisocial behavior, substance use, hostile attribution bias, and sensation seeking; and negative associations between the LSRP scale and response modulation, agreeableness, and conscientiousness (Horan, Brown, Jones, & Aber, 2015; Levenson et al., 1995; Lynam et al., 1999; Poythress et al., 2010; Seibert et al., 2011; Verschuere et al., 2014). However, researchers using the LSRP have consistently reported low internal consistency of the Secondary scale (α approximately .60–.70), problems with the replicability of the two-factor structure (e.g., Brinkley et al., 2008; Sellbom, 2011), and some questionable aspects to its construct validity. Indeed, these latter issues include a failure for the Primary scale to negatively correlate with anxiety and neuroticism (as would be expected in Cleckley's [1941, 1988] and Lykken's [1995] conceptualizations of

psychopathy), at best moderate positive associations between the LSRP scale and other psychopathy scales, higher correlations between the Primary and Secondary scales than between the Primary scale and other measures of affective-interpersonal psychopathy traits, and oversaturation of the Secondary scale with negative emotionality (Lilienfeld & Hess, 2001; Lynam et al., 1999; Poythress et al., 2010; Seibert et al., 2011; Sellbom, 2011; see also Sellbom et al., in press, for review of the LSRP scale).

In terms of internal structure specifically, several studies have now reported that the two-factor model reflecting primary and secondary psychopathy does not meet satisfactory model fit criteria (Brinkley et al., 2008; Salekin et al., 2014; Sellbom, 2011; Somma, Fossati, Patrick, Maffei, & Borroni, 2014). For this reason, Brinkley and colleagues (2008) conducted an exploratory factor analysis on the LSRP scale and found that an alternative three-factor model containing 19 of the original 26 items provided a better fit for the data than the two-factor model. Brinkley and colleagues labeled the subscales within the three-factor model Egocentric ($\alpha = .82$), Callous ($\alpha = .69$), and Antisocial ($\alpha = .63$) with the scales containing 10, 4, and 5 items, respectively. The pattern of factors that emerged could be considered to resemble the conceptualization of psychopathy proposed by Cooke and Michie (2001) in which psychopathy is split into interpersonal (i.e., Egocentric), affective (i.e., Callous), and behavioral (i.e., Antisocial) features. Using confirmatory factor analysis (CFA) across several samples (two college, one correctional), Sellbom (2011) reported that Brinkley and colleagues' (2008) three-factor model displayed better model fit across each sample compared to the two-factor model of the LSRP, a finding that was replicated by Salekin and colleagues (2014) in a large university sample. Somma et al. (2014) also found that a three-factor model of the LSRP displayed superior fit to a two-factor model in a large Italian community sample, although the three-factor model reported in their study is slightly different from that of Brinkley and colleagues (2008). However, a visual inspection of the

item loadings reported by Somma and colleagues indicates a remarkable degree of similarity to those of Brinkley and colleagues.

Investigations regarding the construct validity of the three-factor model have thus far provided mixed support for the LSRP. As expected, the Egocentricity subscale has been found to be associated with variables such as narcissism, Machiavellianism, antagonism, meanness, and diminished perception of social responsibility (Few, Miller, & Lynam, 2013; Salekin et al., 2014; Sellbom, 2011); the Callous subscale has been found to be associated with cold-heartedness, guiltlessness, and diminished empathy (Anderson, Sellbom, Wygant, & Edens, 2013; Salekin et al., 2014; Sellbom, 2011; White, 2014); and the Antisocial subscale has been found to positively correlate with numerous measures of impulse control and antisocial behavior, such as age at first arrest and violence history (Brinkley et al., 2008; Salekin et al., 2014; Sellbom, 2011). However, several studies have found inconsistent correlations between the three subscales and external criterion measures, as well as results that are contrary to theoretical predictions. The Callous subscale has inconsistently correlated with empathy (Salekin et al., 2014; Sellbom, 2011). It has also been found to positively correlate with neuroticism and failed to demonstrate negative associations with fearlessness and stress immunity (Few et al., 2013; Salekin et al., 2014; Sellbom, 2011), a finding inconsistent with more Clecklian conceptualizations of callousness in psychopathy (Cleckley, 1941, 1988; Patrick, 1994). The Antisocial subscale has been positively associated with a number of measures of negative emotionality such as distress, anger, and fearfulness (Brinkley et al., 2008; Salekin et al., 2014; Sellbom, 2011). Although this pattern is not inconsistent with previous psychopathy research and theory (Hare, 2003; Karpman, 1948; Lee, Salekin, & Iselin, 2010; Patrick, Fowles, & Krueger, 2009; Ross, Lutz, & Bailley, 2004; Skeem, Johansson, Andershed, Kerr, & Louden, 2007), the magnitudes of the associations between the Antisocial subscale and negative emotionality measures is so strong as to

indicate oversaturation of this element, leading to stronger associations between the Antisocial subscale and emotional distress than with externalizing behavior (Sellbom, 2011). After identifying several theoretically inconsistent associations between the LSRP three-factor model and external variables, Salekin and colleagues (2014) were led to assert that, relative to the two-factor model, the LSRP three-factor model has problematic construct validity despite superior model fit.

This Study

Although the LSRP three-factor model appears to be the optimal latent factor structure for the scale, there remain a number of psychometric issues concerning the three-factor scales. The internal consistency of the Callous and Antisocial subscales remains quite low (α approximately .60; see Sellbom et al., in press, for a review). Although low estimates of internal consistency might be expected given the number of items on the scale (Cortina, 1993), such low estimates are nonetheless likely to influence the magnitude of validity coefficients possible with the scale (Kaplan & Saccuzzo, 2009) and having such a small number of items also limits the comprehensiveness of construct coverage. The Antisocial subscale, for example, makes little reference to a lack of planfulness while oversampling items related to anger and frustration intolerance (and thus, inflates correlations with negative affectivity measures). Another psychometric issue with the three-factor LSRP is the construct validity of the scales, as associations with the scales are often inconsistent with theoretical models of psychopathy, as just reviewed. Considering the ongoing concerns regarding the quality of the LSRP, the purpose of this study was to determine if additional items could augment the LSRP three-factor scales to improve on their psychometric properties. Specifically, we aimed to include additional items on the Callous and Antisocial scales to improve content representativeness for the underlying constructs, and to determine if such expansion would retain the same internal structure (and thus continue to support the three-

factor model as the optimal latent factor structure), improve internal consistency reliability, and enhance construct validity. We conducted two separate studies for this purpose. Study 1 was designed to demonstrate the feasibility of adding items to the LSRP to improve its psychometric properties. Study 2 was designed to replicate the findings of Study 1 and extend them via the examination of construct validity.

Study 1: Testing the feasibility of additional items within the three-factor LSRP

Method

Participants. Seven hundred and twenty-nine participants were recruited from two different samples as part of a larger group of studies. The first sample included 222 completed responses from participants recruited from an Australian university with either course credit or a ticket in a prize draw as remuneration. Of this sample, one was removed as a non-cooperative response, leaving 221 participants with complete responses. Non-cooperative responses were defined as those with indiscriminate responding (i.e., selection of the same response option for every item on a scale) or providing an unusual response to open response questions (e.g., an impossible age, a random letter string, or a relationship with royalty, such as “the Queen”). The majority of participants in the remaining sample were female (73.3%) and identified as White (69.7%, 19% Asian, 11.3% other) with a mean age of 23.45 (SD D 9.7, range D 18–72).

The second sample included 599 completed responses from Australian community participants recruited via paneling services provided by Qualtrics. Of this sample, six responses were removed as they reported their age as below 18 years, and 85 additional participants were removed as non-cooperative responses using the same criteria as the first sample. The percentage of participants excluded is not uncommon with Internet survey research (e.g., Downs, Holbrook, Sheng, & Cranor, 2010; Shapiro, Chandler, & Mueller,

2013). The majority of participants in this sample were male (54.9%) and identified as White (80.9%), Asian (10%), or other (9.1%), with a mean age of 38.68 years (SD = 11.70, range = 18–69). We decided to merge the two samples, as the optimal latent trait model determined in this sample was invariant across the two groups.[13] The final combined sample contained 729 participants, 53.5% female, with a mean age of 34.06 years (SD = 13.15, range = 18–72). The majority of the sample identified as White (77.5%; 12.8% Asian, 9.7% other).

Measures and Procedure. In addition to the original 26 items of the LSRP, 16 further items were considered to bolster the scale's construct representativeness. Seven of the 16 items were generated as new items by the authors based on identified deficits in construct converge of the LSRP (e.g., lack of planfulness, positively keyed items tapping callousness and cold-heartedness), whereas the remaining nine items were derived from other psychopathy scales (three copied and six closely worded), based primarily on items from the Inventory of Callous/Unemotional Traits (Frick, 2004) and the SRP–III (Paulhus et al., in press) selected to fill the same conceptual gaps.[14] Conceptual coverage limitations in the LSRP were identified by visual inspection of the items, as well as previous theory and research (e.g., Cleckley, 1941, 1988; Hare, 2003). Aspects of psychopathy considered to be underrepresented in the LSRP models included (a) low anxiety (e.g., "I seem to feel less anxious than others"), of which there are no items but theory and research to support the inclusion of low anxiety items (Cleckley, 1941, 1988; Patrick, 1994), (b) charm (e.g., "I can be charming, when I want to be"), of which there are no items although both the PCL–R and PPI include items to assess charm, (c) callousness (e.g., "I tend not to think about other

[13] To test if the factor loadings between the two samples differed, a factor analysis of the LSRP items in both samples was conducted in which the items were allowed to freely load on their respective factors. Then a factor analysis in which the same factor loadings found in the university sample was applied to the community sample. A χ^2 test was used to test the significance of the degradation in model fit when constraining the factor loading between samples. No significant differences between the groups on factor loadings was found, χ^2 (33) = 38.92, p = .22.

[14] To avoid copyright infringements, the items specific to the scale are not shown in this section. Please see Study 2 and Table 3 where items were rewritten, but capture the same phenomena.

people's feelings"), with a subscale that only includes reverse-scored items, (d) impulsivity (e.g., "I like planning things out") with no items directly assessing this aspect of psychopathy, and (e) noncriminal antisociality (e.g., "I know rules are there, but I don't tend to follow them"), which has been suggested to been an important component of psychopathy (Hare & Neumann, 2010), but appears not to be covered by the LSRP. Two to three items were selected for each of these domains. The Likert ratings of the scale were also expanded from the traditional 4-point forced choice (1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree) to a 6-point forced choice (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = somewhat agree, 5 = agree, 6 = strongly agree) in an attempt to increase the variance at the extremities of the distribution.

The LSRP (with the additional items described earlier) was administered online as part of a larger online study. The survey was hosted by Qualtrics. The order in which the LSRP items were presented was randomized for each participant. However, the order in which the measures in the larger study were presented was the same for all participants (i.e., items within each scale were randomized, but the order in which scales were presented was the same for all participants). The LSRP was presented first in the broader study. The total survey took approximately 30 min to complete. The administration procedure was the same for both samples.

Results and Discussion

Measurement Modelling. Based on previous research and the items administered, three item sets were apparent in the data set. The first item set was the 19 items selected by Brinkley and colleagues (2008) for their three-factor model. The second item set was the original 26 items used by Levenson and colleagues (1995) for their two-factor model, and the final item set included all of the 42 items that were administered. To determine the best fitting model and to conduct a comprehensive analysis, one-, two-, and three-factor models

were specified for each of the item sets. One-factor models were specified by regressing all items onto a single latent factor. The three-factor model for the 19-item set was specified using Brinkley and colleagues' three-factor model, whereas the three-factor model for the 26-item set was specified by returning the seven items previously removed in the Brinkley et al. 19-item scale to either the Egocentric, Callous, or Antisocial subscales based on the reported factor loadings. The two and three-factor models for the 42-item set were specified by conceptually assigning each of the additional items to either the Primary or Secondary (for two-factor model), or the Egocentric, Callous, or Antisocial (for three-factor model) subscales. The process of item assignment was conducted independently by the authors. Where disagreements arose, consensus on item placement was reached after discussion. Nine models were specified in total (three levels of factor model by three item sets).

CFA with mean and variance adjusted weighted least squares (WLSMV) estimation was used (in Mplus) for the analyses to account for the ordered categorical nature of the item distributions. As our initial set results indicated that six of the new items failed to meaningfully load ($\lambda < .3$) within any factor model, the decision was made to remove these items from subsequent analyses and continue with the remaining 36-item set rather than the full 42-item set. Interestingly, the excluded items included both the low-anxiety items and the item designed to measure interpersonal charm, indicating that these aspects of psychopathy do not load well within the current LSRP.[15] Descriptive statistics for each of the LSRP scales are presented in Table 1. Visual inspection of the ranges of scores indicates that the sample had several individuals endorse psychopathy items in the *Agree* to *Strongly Agree* range.

[15] We also tested for gender invariance with respect to factor loadings. This analysis revealed a significant difference in factor loadings, χ^2 (33) = 53.87, p = .01, which was no longer significant when the loadings for one item was freely estimated across men and women, χ^2 (32) = 43.50, p = .08. The item "For me, what's right is whatever I can get away with" loaded more strongly on the Egocentricity factor for women (λ = .82) than men (λ = .73). The magnitude of the difference was considered to be small enough that it was theoretically insignificant and analyses proceeded with the men's and women's samples combined. Previous research has also found the LSRP three-factor model to be gender invariant (Sellbom, 2011). Invariance testing for ethnicity, however, was not possible due to an insufficient sample size.

Several fit statistics were calculated to evaluate the models. Chi-square tests are reported but not used, as this statistic is substantially influenced by sample size and thus almost always rejects complex personality models estimated in large samples (Brown, 2015). Instead, the root mean square error of approximation (RMSEA) values of .08 or lower (Kline, 2011), confirmatory fit index (CFI), and Tucker–Lewis Index (TLI) values of .90 or higher (Kline, 2011), and a standardized root mean square residual (SRMR) of.08 or lower were used as indications of adequate model fit (Hu & Bentler, 1999). Nested models were also compared using the Mplus DIFFTEST function, which calculates a chi-square difference test between these models when using robust WLS (i.e., WLSMV) estimation.

The overall results indicated that three-factor models were a statistically better fit to the observed data relative to the other models regardless of the item set; more specifically, the one-factor models tended to produce the worst model fit and two-factor models tended to fall in between the one- and three-factor models (see Table 2). Of the three item sets, the 19-item three factor model was associated with the best absolute fit based on SRMR, CFI, and TLI values. The 36-item three-factor model exhibited CFI and TLI values below the .90 threshold, however, the SRMR was within an acceptable range and the RMSEA was the best of all models calculated, which suggested promise for the new model. Although the 26-item three-factor model did meet the benchmarks selected for RMSEA, SRMR and CFI, the fit indexes were generally weaker compared to the 19-item three-factor model. However, without any meaningful addition to conceptual coverage, it was deemed a redundant model. Based on this, the decision was made to focus on the 19-item three-factor model with the overall best fit and the 36-item, three-factor model, which showed promise in terms of fit statistics and provided the greatest construct coverage of the models.

For the 19-item three-factor model, correlations between subscales were .54 (Egocentric and Callous), .48 (Egocentric and Antisocial), and .27 (Callous and Antisocial).

For the 36- item, three-factor model, correlations subscales were .60 (Egocentric and Callous), .52 (Egocentric and Antisocial), and .40 (Callous and Antisocial). Correlations between corresponding factors for 19-item, three-factor scales and 36-item, three-factor scales were .99 (Egocentric), .82 (Callous), .84 (Antisocial), and .94 (Total). Factor loadings for each item on both the 19-item (Egocentric, median = .64, range = .52–.76; Callous, median = .60, range = .53–.68; Antisocial, median = .60, range = .47– .60) and 36-item (Egocentric, median = .62, range = .49–.79; Callous, median = .57, range =.39–.73; Antisocial, median = .48, range = .38–.76) scales were acceptable for each factor.[16]

Respecification of the 36-Item, Three-Factor Model. Considering that the 36-item, three-factor model failed to reach acceptable benchmarks on the CFI and TLI fit indexes, modification indexes were consulted to see if any meaningful modifications could be made to improve the model fit. Two criteria were used to select modification indexes based on the criteria used by Sellbom (2011); (a) the items had to appear on the same factor; and (b) the items must share a meaningful conceptual relationship beyond that accounted for by variance attributed to the latent factor in the model. Two indexes were first selected based on those previously identified by Sellbom (2011). Then, four additional modification indexes were also selected based on the aforementioned criteria.[17] The fit statistics for this model are presented in Table 2. The modifications resulted in a significant improvement in fit, χ^2 (6) = 575.72, $p < .001$, compared to the model without the modifications, to the point in which these indexes were comparable to the 19- item, three-factor model. The CFI for this respecified model reached an acceptable level of fit, whereas the TLI fell just below this

[16] Loadings with specific items could not be shown to avoid violations of copyright. Standardized loadings are reported.

[17] (a) "When I get frustrated, I often 'let off steam' by blowing my top" with "I have been in a lot of shouting matches with other people"; (b) "For me, what's right is whatever I can get away with" with "In today's world I feel justified in doing anything I can get away with to succeed"; (c) "I don't plan very far in advance" with "I like planning things out"; (d) "My main purpose in life is getting as many goodies as I can" with "Making money is my most important goal"; (e) "Before I do anything, I carefully consider the possible consequences" with "I like planning things out"; and (f) "I often do things before thinking them through" with "Before I do anything, I carefully consider the possible consequences."

cutoff. It should be noted that it is quite unlikely that a model with a greater number of items will produce a better fit than a scale with a smaller and more narrowly worded set of items (Marsh, Hau, & Wen, 2004), making these cutoffs impose unreasonable penalties on longer scales.

Internal Consistency. Cronbach's α, average interitem correlations (AIC) and McDonald's Ω for the 19-item, three-factor scales and the 36-item, three-factor scales were calculated to evaluate internal consistency reliability. For the 19-item, three-factor scales, the reliability estimates for the Total scale (α = .86, AIC = .25, Ω = .92), Egocentric subscale (α = .85, AIC = .36, Ω = .88), Callous (α = .61, AIC = .29, Ω = .70) and Antisocial subscales (α = .65, AIC = .27, Ω = .69) were within acceptable ranges, except Cronbach's α was lower for the Callous and Antisocial subscales. Lower α estimates should be expected for the Callous and Antisocial subscales given the number of items on the scales and approximate estimates found in previous research (see Sellbom et al., in press). For the 36-item, three-factor model estimates for the Total (α = .90, AIC = .21, Ω = .95), Egocentric (α = .85, AIC = .35, Ω = .88), Callous (α = .80, AIC = .26, Ω = .85), and Antisocial (α = .81, AIC = .25, Ω = .83) subscales were all within acceptable ranges. The addition of new items to the Callous and Antisocial subscales has thus raised estimates of internal consistency reliability as well as improved the construct coverage of these scales in terms of content validity, with items related to a lack of planfulness and noncriminal antisociality on the Antisocial subscale and positively keyed items tapping cold-heartedness on the Callous subscale.

Study 2: Replicating factor structure and testing the construct validity of the expanded version of the three-factor LSRP

Based on the results of Study 1, it appeared that the 19-item, three-factor model was the best fitting model overall, although the expanded 36-item, three-factor model showed some promise, particularly after respecification, and is associated with better content validity.

Based on these results, it was demonstrated that it is feasible to expand the number of items within the three-factor model of the LSRP to improve estimates of internal consistency (i.e., Cronbach's α, McDonald's Ω) with little degradation to model fit (and with acceptable absolute model fit). Considering the promise shown by this expanded model, a second study was devised to replicate the findings. We also planned to compare the construct validity of these scales to determine if the expanded 36-item scale could improve on the 19-item scale in this domain.

In examining the construct validity of the three-factor LSRP, several hypotheses were generated about correlations with external variables based on previous research and theories of psychopathy (see Sellbom et al., in press, for a review of LSRP research and nomological network). It was expected that the total LSRP score would be positively associated with other measures of psychopathy. From the perspective of the triarchic psychopathy model (Patrick et al., 2009), the LSRP Egocentricity and Callous subscales were expected to positively correlate with the Meanness scale (Sellbom & Phillips, 2013), as the latter construct accounts for the cold, emotionally shallow, affective, and interpersonally exploitative aspects of psychopathy. The Antisocial subscale was expected to positively correlate with the Disinhibition scale, as both reflect the impulsive, nonplanful, affective dysregulation and antisocial characteristics of psychopathy. The Boldness scale was not expected to strongly correlate with any of the LSRP subscales as it measures the stress immunity aspects of psychopathy that are currently beyond the LSRP's conceptual coverage of psychopathy. These hypotheses are consistent with theory and empirical findings with the original LSRP scale (Drislane, Patrick, & Arsal, 2014; Patrick et al., 2009; Sellbom & Phillips, 2013). The Egocentricity subscale was expected to positivity correlate with measures of narcissism (Few et al., 2013; Miller, Gaughan, & Pryor, 2008; Sellbom, 2011), consistent with the interpersonally selfish and egocentric aspects of psychopathy captured by this subscale. The

Callous subscale was expected to correlate negatively with measures of empathy, particularly affective empathy (Blair, 2005; White 2014) and correlate negatively with measures of distress and fearfulness (Lykken, 1995; Pardini, 2006). Finally, the Antisocial subscale was expected to positively correlate with measures of impulsivity, antisocial behavior, anger proneness, and sensation seeking, consistent with previous research (Brinkley et al., 2008; Hare, 2003; Salekin et al., 2014; Sellbom, 2011). We also hypothesized improved discriminant validity with respect to associations with measures of negative affectivity given the lesser emphasis on anger and frustration intolerance in the longer scale.

Method

Participants. Complete responses from 300 community participants from Australia were collected via an online paneled sample collected by Qualtrics. Forty-eight responses were removed due to endorsement of items from an infrequency scale embedded within the survey (see Measures section) and three were removed for providing non-cooperative responses,[18] leaving a final sample of 249.[19] The mean age of the sample was 37.59 (SD = 12.77, range = 18–60) and the gender distribution of the sample was quite even (50.6% female). The majority of participants identified as White (88%), followed by Asian (6%) and then other (6%).[20]

Measures.

LSRP. The expanded 36-item version of the LSRP was administered as part of the online survey. To avoid copyright violations associated with using items from other psychopathy scales (see Study 1), previously "borrowed" items were reworded to paraphrase the original items. Two independent psychopathy experts reviewed each item and deemed

[18] The same criteria as in Study 1 were used to identify non-cooperative responses.
[19] Exclusion rate consistent with Study 1 and previous research with online samples (Downs et al., 2010; Shapiro et al., 2013).
[20] The sample size was considered too small to attempt to test for measurement invariance between genders or ethnic groups.

each to be representative of the content of the original item used in Study 1. The Likert ratings of the scale were also shifted back to the traditional 4-point forced-choice scale (1 = strongly disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = strongly agree) as visual inspection of the distributions of the expanded 6-point scale in Study 1 did not appear to produce any greater variability in item responses.[21]

Emotionality-Activity-Sociability-Impulsivity Temperament Survey. The Emotionality-Activity-Sociability-Impulsivity Temperament Survey (EASI; Buss & Plomin, 1984) is a 25-item measure of adult temperament with six subscales. The first three subscales, Fearlessness (α = .68, AIC = .35), Anger (α = .57, AIC = .25), and Distress (α = .79, AIC = .48), refer to aspects of negative emotionality. The Activity (α = .53, AIC = .22) subscale refers to an individual's tendency toward being energetic and busy. The Sociability (α = .76, AIC = .44) subscale refers to an individual's preference for and enjoyment of other's company and the Impulsivity (α = .49, AIC = .16) subscale refers to an individual difficulty inhibiting responses. All items were scored on a 5-point Likert scale from 1 (not typical) to 5 (typical). Previous research seeking to investigate the construct validity of the LSRP has used this measure (Sellbom, 2011).

Narcissistic Personality Inventory–16. The Narcissistic Personality Inventory–16 (NPI–16; Ames, Rose, & Anderson, 2006) is a short-form measure of narcissism. It contains 16 items, with each item providing two dichotomous statements to choose from, one believed to be more narcissistic and one believed to be less narcissistic. The scale was developed as a short form of the popular NPI–40 (Raskin & Terry, 1988). Ames et al. (2006) demonstrated

[21] It was noted that the mean scores for the 6-point and 4-point Likert scales were both just below the midpoint of the scales range. Based on the results of Study 2 (see later), it was concluded that there is little difference in use between the 6- point and 4-point Likert scales. This is also consistent with extant literature (e.g., Finn, Ben-Porath, & Tellegen, 2015). However, given the additional scale points associated with the 6-point scale, researchers using this scale in the future might opt for the 6-point scale, as it allows more differentiation of scores across the scale.

similar construct validity between the NPI–16 and the NPI–40. Cronbach's α for the scale was .72 in this study.

Triarchic Psychopathy Measure. The Triarchic Psychopathy Measure (TriPM; Patrick, 2010) is a 58-item self-report inventory designed to measure the Triarchic Model of Psychopathy proposed by Patrick and colleagues (2009). The TriPM items converge on three distinct phenotypic psychopathy domains: Boldness (19 items), Meanness (19 items), and Disinhibition (20 items). All items are scored on a 4-point forced-choice Likert scale (1 = false, 2 = mostly false, 3 = mostly true, 4 = true). Empirical research has provided extensive support for its psychometric properties and construct validity (e.g., Drislane et al., 2014; Sellbom & Phillips, 2013; Stanley, Wygant, & Sellbom, 2013). In this sample, Cronbach's α internal consistency estimates were within acceptable ranges for the Boldness (.85), Meanness (.90), Disinhibition (.87), and Total (.89) scores.

Basic Empathy Scale. The Basic Empathy Scale (BES; Jolliffe & Farrington, 2006) is a 20-item self-report inventory designed to measure the cognitive and affective domains of empathy. Items are measured on a 5-point Likert scale (1 = disagree strongly, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = agree strongly) with 11 items on the Affective subscale and nine items on the Cognitive subscale. Although originally developed in a sample of adolescents, it has since been applied to samples of adults (e.g., Jonason & Krause, 2013). Cronbach's α values for each subscale were lower than found in previous research (approximately .80 in Jonason & Krause, 2013) for both the Cognitive (α =.68, AIC = .21) and Affective subscales (α = .74, AIC = .19; Total = α = .74, AIC = .13).

Antisocial Behaviour Questionnaire. The Antisocial Behaviour Questionnaire (ABQ; Sellbom & Verona, 2007; Wall, Sellbom, & Goodwin, 2013) is a 16-item self-report checklist of criminal conduct using a 3-point scale (no, yes, but only once, and yes, more than once). The scale includes items concerning varying degrees of theft, violence, fraud, and

property damage and has been previously used in research examining psychopathy (Kastner & Sellbom, 2012; Sellbom et al., 2012; Wall et al., 2013). The Cronbach's α of the ABQ total score was .84 in this sample.

Sensation Seeking Scale–V. The Sensation Seeking Scale–V (SSS–V; Zuckerman, 1979) is a 40-item self-report questionnaire, widely used in the literature, designed to measure an individual's propensity to endorse sensation-seeking behaviors. The scale has four subscales: Disinhibition (α = .75, AIC = .24), Boredom Susceptibility (α = .49, AIC = .09), Thrill and Adventure Seeking (α = .84, AIC D .34), and Experience Seeking (α = .50, AIC = .09). These can be combined to create a total score (α = .84, AIC = .12). All items use a dichotomous forced-choice response format choosing between two statements, one scored as a high sensation seeking statement and the other being scored as a low sensation-seeking statement.

Infrequency Validity Scale. Six items were created to form an infrequency validity scale. Items were developed as statements that were either impossible or improbable enough that individuals would not be able to endorse if they were making a genuine attempt to take the survey. These items were "I enjoy stealing from graves" (base rate = 5.30%), "I am close personal friends with the prime minister of Zanzibar" (base rate = 7.00%), "I make a point of only being friends with people born in August" (base rate = 3.30%), "I am allergic to water" (base rate = 2.70%), "When I see the color orange, I taste mustard" (base rate = 4.00%), and "I wrote three best-selling novels last year" (base rate = 7.00%). Items were placed within different scales throughout the survey. In terms of scoring, any response in which the individual chose an affirmative endorsement of an item was recorded as an infrequency hit. Approximately 16.00% of the sample affirmatively endorsed at least one item, with subsequent decrements in frequency with increasing endorsements (7.33% endorsed 2 items,

4.00% endorsed 3 items, 1.33% endorsed 4 items, and less than .01% endorsed 5 or 6 items). Cronbach's α for the scale in the total sample was .69 (AIC = .27).

Procedure. The survey was administered online via Qualtrics. The questionnaires were placed in one randomized order and administered to all participants. However, the items within each questionnaire were randomized for each participant on all scales (i.e., participants received the same order of questionnaires, but the order of items within each questionnaire was randomized between participants). The survey took approximately 30 min to complete.

Results and Discussion

Descriptive statistics for the LSRP scales are presented in the lower panel of Table 1.

Measurement Modelling. CFA with WLSMV estimation was used to estimate model parameters for the 19- and 36-item sets for one-, two-, and three-factor models. One-, two-, and three-factor models were specified the same way as for Study 1, but only for the 19- and 36-item sets. It was noted that one item on the Antisocial subscale, "I don't plan anything very far in advance," unexpectedly loaded below the .30 threshold. The decision was made to retain the item to ensure consistency between Study 1 and 2. CFI and TLI values are not reported for the 36-item model, as the RMSEA of the null (or baseline) model on which these values are based was .115, meaning that CFI and TLI would not be able to reach .90 even at an RMSEA value of .05 (i.e., acceptable fit), making them unreasonable for this comparison (see Kenny, 2014). Chi-square is again reported, but not interpreted. The results of the analyses are similar to those found in Study 1 and are presented at the end of Table 2. Three-factor models were associated with the best fit to observed data regardless of item set. To compare the three-factor models based on the 19- and 36-item sets, RMSEA indicated a better absolute fit for the 36-item, three-factor model, whereas SRMR suggested better fit for the 19-item, three-factor model, providing inconclusive results as to which is the better fitting model. The items and their respective factor loadings for the expanded 36-item scale are

presented in Table 3. The 36-item model was again respecified using the modification indexes used in Study 1 and was again a significantly better fit than the 36-item scale without the modification indexes, χ^2 (6) = 179.92, p < .001.

Correlations between the latent factors were mostly high for both the 19-item, three-factor model (Egocentric and Callous, r = .53; Egocentric and Antisocial, r = .42; Callous and Antisocial, r = .16) and the 36-item, three-factor model (Egocentric and Callous, r = .54; Egocentric and Antisocial, r = .54; Callous and Antisocial, r = .35). Correlations between the 19-item and 36-item scales were high for the total scale (r = .93) and each of the subscales (Egocentric, r = .99; Callous, r = .85; Antisocial, r = .80), suggesting that virtually the same construct is being measured in each of the scales.

Internal Consistency. Cronbach's α, AIC, and McDonald's Ω were again used to evaluate internal consistency. For the 19-item, three-factor model, the reliability estimates for the Total scale (α = .83, AIC = .21, Ω = .92), Egocentric subscale (α = .82, AIC = .31, Ω = .88), Callous subscale (α = .61, AIC = .28, Ω = .72), and Antisocial subscale (α = .56, AIC = .20, Ω = .64) were within acceptable ranges, except Cronbach's α was again lower for the Callous and Antisocial subscales. For the 36-item, three-factor model, estimates for the Total (α = .88, AIC = .18, Ω = .94), Egocentric (α = .82, AIC = .30, Ω = .87), Callous (α = .79, AIC = .24, Ω = .85), and Antisocial (α = .76, AIC = .20, Ω = .91) subscales were again all within acceptable ranges. Consistent with Study 1, the addition of new items to the Callous and Antisocial subscales appears to have raised estimates of internal consistency reliability.

Construct Validity. Associations between the 19-item and 36-item LSRP scales and the external criterion variables were examined using two methods. First, we calculated zero-order correlations between both the 19-item and 36-item LSRP scales (and their subscales) and the criterion variables to look for theoretically consistent and inconsistent associations across the two scales. Steiger's (1980) *t* test for dependent correlations was also used to test

for significant differences in the magnitude of correlations between each of the 19 and 36-item LSRP scales and the external criterion variables. The results of these analyses are presented in Table 4. Second, we conducted a series of path analyses using maximum likelihood estimation with robust scaling in which each of the external variables was regressed onto subscales (i.e., Egocentric, Callous, Antisocial) while controlling for the shared variance between the LSRP subscales. These path analyses allowed us to examine the association between each external variable and its association with the unique variance of each LSRP subscale independent of the other LSRP subscales. The results of this analysis are present in Table 5.

In terms of the zero-order associations, correlations between the expanded 36-item scale and the external criteria were found to be closer to theoretical expectations than those derived from the 19-item scale. Consistent with hypotheses, the Total scale scores for both LSRP scales correlated positively and significantly with the TriPM Total, Meanness, and Disinhibition scales, but not with the Boldness scale. The expanded 36-item Total scale was, however, significantly more strongly correlated with the TriPM Total scale, the Meanness scale, and the Boldness scale, suggesting that the 36-item LSRP might be more closely related to psychopathy as indexed by the TriPM than the 19-item LSRP. The Egocentricity subscale for both the 19- item and 36-item subscales correlated significantly with narcissism, as expected. The 19-item Egocentricity subscale did positively correlate more strongly with measures of distress and antisocial behavior compared to the 36-item scale ($p > .05$), indicating worse discriminant validity for the 19-item version compared to the 36-item version. The Callous subscales both demonstrated significant associations with a number of variables, including negative correlations with measures of fearfulness, distress, and empathy (particularly affective empathy), and positive correlations with TriPM Total and Meanness scores; however, the Callous subscale from the 36-item scale was associated with a larger

effect size magnitude than its counterpart from the 19-item form. The Antisocial subscales from both LSRP versions were positively correlated with measures of disinhibition, antisocial behavior, and negative emotionality. However, the Antisocial subscale from the 36-item scale was not only significantly more strongly associated with measures of impulsivity, sensation seeking, disinhibition, and antisocial behavior than its counterpart from the 19-item form, but it also had significantly weaker associations with measures of negative emotionality (i.e., fearfulness, distress, and anger). These results indicate improvement in both construct and discriminant validity for the 36-item LSRP.

In the path analyses, standardized regression coefficients associated with the Egocentricity scale for both the 19-item and 36-item item scale showed a similar pattern of association with external variables after controlling for shared variance with the other subscales.[22] However, the 19-item Egocentricity subscale tended to display worse discriminant validity; for example, the 19-item Egocentricity subscale was significantly correlated with disinhibition and boredom proneness, variance that would be expected to be mainly accounted for by the Antisocial subscale. The Callous subscale from both the 19-item and 36-item scales was significantly negatively associated with measures of empathy (particularly affective empathy) and positively associated with psychopathy scores (particularly Meanness). However, the pattern of associations for the Callous subscale from the 36- item form appeared to be closer to those theoretically expected than the Callous subscale from the 19-item form, in that the former subscale was significantly negatively correlated with measures of distress and fearfulness, whereas the latter version was not.

[22] We examined whether gender moderated any of these regression-based associations. Regression paths were freely estimated for each gender and then we constrained the female group to the same regression estimates as the male groups and tested for a significant degradation in model fit using a χ^2 diff-test in Mplus. The results of these analyses revealed only one significant gender difference, χ^2 (3) = 8.76, p = 033. In the-36 item LSRP scale, the Egocentricity subscale was significantly associated with TriPM Boldness for women (b = .29, p = .002), but not men (b = .07, p = .53). In general, given the large number of analyses run with null findings, we concluded that gender was not a meaningful moderator in this context, although future research should follow up on this one difference to determine the possibility of Type I error versus meaningful difference.

Significant associations between the Callous subscale from the 36-item form and Boldness were also found, suggesting perhaps some small drift in the Callous subscale toward this Boldness aspect of psychopathy, likely as a result of greater inclusion of unemotionality in item content. The Antisocial subscale of both versions was predictive of antisocial behavior and TriPM Disinhibition. However, the 36-item version also correlated positively with most subscales of the SSS–V, whereas the 19-item version did not, suggesting better construct validity for the expanded version of the scale. Overall, the pattern of correlations between the external variables and each of the LSRP subscales, when accounting for shared variance between the subscales, indicates stronger construct and discriminant validity for the 36-item scale compared to the 19-item scale.

General Discussion

Previous research investigating the optimal latent factor structure of the LSRP has consistently supported a three-factor model (Brinkley et al., 2008; Salekin et al., 2014; Sellbom, 2011; Somma et al., 2014). However, the psychometric properties of the three-factor model, in particular the Callous and Antisocial subscales, have been questioned with regard to construct coverage, internal consistency, and construct validity (Brinkley et al., 2008; Few et al., 2013; Salekin et al., 2014; Sellbom et al., in press). In two separate studies, it was demonstrated that additional items could augment the LSRP three-factor model by improving on the psychometric properties of the scale with minimal degradation in model fit. In our second study we also demonstrated that this expanded 36-item, three-factor version of the LSRP was associated with significant improvements in construct validity compared to the original 19-item, three-factor scale.

As expected, the psychometric properties of the three-factor LSRP were substantially improved with the additional items placed in the scale. The additional items within the expanded scale raised estimates of internal consistency for the Callous and Antisocial

subscales to the point to which they could be considered within acceptable ranges for psychological research. In addition, the Callous subscale within the expanded scale is no longer composed entirely of reverse-scored items, indicating the presence of an actual latent construct rather than a potential method factor. Improvements in the expanded three-factor LSRP were also strongly evident in the examination of the construct and discriminant validity. The expanded three-factor scales consistently correlated with external measures in a way that was theoretically expected and did so more strongly than the original three-factor scales; these improvements were particularly noted for the Callous and Antisocial subscales where most of the additional items had been placed.

Notable differences between the original and expanded Callous subscales include the stronger association between the expanded Callous subscale and increased meanness and diminished affective empathy than shown on the original Callous subscale. Affective empathy and meanness have both been identified as important components within many conceptualizations of psychopathy (Kreis, Cooke, Michie, Hoff, & Logan, 2012; Hare, 2003; Patrick et al., 2009), indicating that the expanded Callous subscale might be more closely capturing these aspects of psychopathy than its counterpart in the original scale. The expanded Callous subscale also negatively correlated with measures of distress and fearfulness, whereas these correlations failed to reach statistical significance for the original Callous subscale, indicating the callousness captured by the expanded scales might be more closely linked to theories of psychopathy that ascribe a level of distress tolerance to psychopathy (e.g., Cleckley, 1941, 1988; Lykken, 1995; Patrick, 1994; Patrick et al., 2009). Curiously, the expanded Callous subscale was positively associated with Boldness, whereas the original Callous subscale was not, suggesting some drift toward Boldness in the expanded Callous subscale, which could be reflecting blunted emotional response to the suffering of others rather than the prototypical stress immunity reflective of Boldness.

Correlations between the expanded Antisocial subscale and measures of impulsivity, sensation seeking, disinhibition, and antisocial behavior were all significantly stronger than with the original Antisocial subscale, indicating that the expanded Antisocial scale might more closely conform to the measurement of social deviance traits of psychopathy relative to the original Antisocial subscale (Hare, 2003; Lee et al., 2010). When controlling for the shared variance between the subscales, both the expanded and original Antisocial subscales displayed significant positive correlations with antisocial behavior and impulsivity. However, the original Antisocial subscale did not significantly correlate with sensation seeking, whereas the expanded Antisocial subscale did, the latter finding being consistent with theoretical predictions and previous research (Levenson et al., 1995; Sellbom, 2011). The expanded Antisocial subscale was more weakly correlated with measures of negative emotionality than the original Antisocial subscale. As mentioned previously, a degree of negative emotionality within the Antisocial subscale is consistent with previous findings and theory (Karpman, 1948; Ross et al., 2004; Sellbom, 2011), although additional items on this subscale have likely reduced the saturation of negative emotionality in this scale, and by doing so, improved the scale's construct validity.

Consistent with previous research, the three-factor models consistently produced the optimal fit to the data compared to one and two-factor models, regardless of the item set (Brinkley et al., 2008; Salekin et al., 2014; Sellbom, 2011; Somma et al., 2014). Samples to identify three-factor structures in the LSRP have included U.S. (Salekin et al., 2014; Sellbom, 2011), Italian (Somma et al., 2014), and now Australian samples, indicating that a three-factor latent model in the LSRP is generalizable across several cultures. Given the size of this sample, gender proportions, sampling technique, and replication across samples, the findings from these studies seem likely to be generalizable to the general community. Previous research has tended to support the generalizability of findings with the LSRP from

community samples to correctional settings (e.g., Book, Quinsey, & Langford, 2007; Lynam et al., 1999; Sellbom, 2011; Sellbom & Phillips, 2013). However, generalization of these findings toward the higher or "clinical" spectrum of psychopathy, often associated with correctional settings, might be at best tentative with the current samples given that we did not recruit from a correctional population.

Given the findings supporting the three-factor latent structure of the LSRP in this study and others (Brinkley et al., 2008; Salekin et al., 2014; Sellbom, 2011; Somma et al., 2014), it is clear that the conceptualization of psychopathy measured by the LSRP has drifted from that originally intended by Levenson and colleagues (1995). Although the Antisocial subscale still appears to measure a construct akin to PCL–R Factor 2 or the disinhibited antisociality present in many conceptualizations of psychopathy (Cooke & Michie, 2001; Hare, 2003; Lilienfeld & Andrews, 1996; Patrick et al., 2009), the measurement of affective-interpersonal psychopathy traits is parsed into factors consistent with Cooke and Michie's (2001) three-factor model of psychopathy.

There are several limitations to consider in interpreting the findings of these studies. First, online questionnaires were used, lowering the control of potential confounds. However, there is research to suggest that online samples tend to produce data equivalent to data collected in person (e.g., Buhrmester, Kwang, & Gosling, 2011; Germine et al., 2012) and Qualtrics's panel sampling is of high quality. Second, all measures of external criteria used in Study 2 were self-report questionaries, raising the possibility for shared method variance artificially inflating correlations among scale scores. An important consideration in future research might be to use behavioral experiments (e.g., Lynam et al., 1999) or prospective research (Vitacco et al., 2014) to validate the findings from this study. Finally, as previously noted, the samples collected in this study were derived from community populations, which

likely have lower levels of psychopathy relative to correctional and forensic populations, making our findings restricted with respect to generalizability to such settings.

To conclude, the findings of this research indicate that the inclusion of additional items within the three-factor LSRP scale is not only feasible, but is also associated with meaningful improvements in the measure's psychometric properties without substantially transforming the scale. Although longer than the 19-item version of the LSRP, the expanded version of the scale presented in this article addresses several issues with the 19-item scale, including construct representativeness, low reliability in the Callous and Antisocial subscales, and limitations with respect to construct validity. Furthermore, the expanded scale remains shorter than most commonly used self-report measures of psychopathy and remains in the public domain. We believe that the expanded version of the LSRP now represents an attractive choice for researchers requiring a valid and reliable short form measure of psychopathy, particularly those interested in measuring psychopathy from a perspective more in line with the PCL–R three-factor model of psychopathy (e.g., Cooke & Michie, 2001).

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Table 1.1

Descriptive Statistics for the Different LSRP Scales

	LSRP	Scale	Mean	SD	Range (Min – Max)
Study 1.	26 item	Total	2.68	.61	4.19 (1.08 - 5.27)
		Primary	2.51	.69	4.38 (1.00 – 5.38)
		Secondary	2.94	.68	4.50 (1.10 – 5.60)
	19 item	Total	2.62	.66	4.53 (1.05 – 5.58)
		Egocentric	2.54	.80	4.50 (1.00 – 5.50)
		Callous	2.24	.76	5.00 (1.00 – 6.00)
		Antisocial	3.08	.85	4.80 (1.00 – 5.80)
	36 item	Total	2.65	.58	4.17 (1.11 – 5.28)
		Egocentric	2.60	.78	4.55 (1.00 – 5.55)
		Callous	2.45	.66	4.17 (1.00 – 5.17)
		Antisocial	2.87	.69	4.23 (1.08 – 5.31)
Study 2.	19 item	Total	1.90	.40	2.05 (1.11 – 3.16)
		Egocentric	1.85	.48	2.40 (1.00 – 3.40)
		Callous	1.70	.55	2.75 (1.00 – 3.75)
		Antisocial	2.17	.51	3.00 (1.00 -4.00)
	36 item	Total	1.94	.36	1.97 (1.08 – 3.06)
		Egocentric	1.89	.48	2.36 (1.00 – 3.36)
		Callous	1.88	.44	2.25 (1.00 – 3.25)
		Antisocial	2.05	.41	2.23 (1.00 – 3.23)

Note. In study 1, scales were scored on a 6 point Likert scale. In study 2, scales were scored on a 4 point Likert scale. Higher scores indicate greater endorsement of psychopathy related items.

Table 1.2
Model Fit Statistics for Different LSRP Models With WLSMV Without Mean Structure

	LSRP	Factor	χ^2	RMSEA	SRMR	CFI	TLI	DIFFTEST
Study 1.	26 item	1	2348.41*	.097 (.093-.101)	.078	.81	.79	-
		2	1803.31*	.083 (.080-.087)	.069	.86	.85	191.70*
		3	1381.82*	.071 (.067-.075)	.060	.90	.89	184.23*
	19 item	1	1328.76*	.103 (.098-.108)	.069	.85	.83	-
		2	924.06*	.084 (.079-.089)	.059	.90	.89	192.92*
		3	789.31*	.077 (.072-.082)	.054	.92	.91	80.24*
	36 item	1	4244.71*	.092 (.089-.094)	.085	.76	.75	-
		2	3060.20*	.076 (.073-.078)	.072	.84	.83	280.65*
		3	2606.41*	.068 (.066-.071)	.066	.87	.86	180.47*
	36 item (m)	1	3586.66*	.084 (.081-.086)	.079	.80	.79	-
		2	2602.71*	.069 (.066-.071)	.067	.87	.86	245.98*
		3	2156.26*	.061 (.058-.063)	.060	.90	.89	174.66*
Study 2.	19 item	1	430.39*	.086 (.076-.095)	.087	.89	.88	-
		2	365.66*	.076 (.066-.085)	.080	.91	.90	29.35*
		3	324.19*	.069 (.059-.079)	.074	.93	.92	31.85*
	36 item	1	1427.99*	.075 (.070-.080)	.100	NR	NR	-
		2	1284.51*	.068 (.063-.074)	.095	NR	NR	84.16*
		3	1165.45*	.062 (.057-.068)	.089	NR	NR	82.75*
	36 item (m)	1	1264.24*	.068 (.063-.073)	.094	NR	NR	-
		2	1166.62*	.063 (.058-.068)	.090	NR	NR	64.01*
		3	1051.17*	.057 (.051-.062)	.084	NR	NR	80.14*

Note. * > .001, NR = Not reported, m = with modification indices, LSRP = Levenson Self Report Psychopathy, WLSMV = Weighted Least Squared Means and Variance Adjusted, RMSEA = *Root Mean Square Error of Approximation,* SRMR = Standardized Root Mean Square Residual, CFI = *Comparative Fit Index, TLI* = Tucker-Lewis index, DIFFTEST = χ^2 difference test for nested models.

Table 1.3
Items and Factor Loadings for the Expanded 36 Item LSRP

	λ	SE	*p*
Egocentric			
Success is based on survival of the fittest; I am not concerned about the losers.	.696	.044	<.001
People who are stupid enough to get ripped off usually deserve it.	.541	.050	<.001
I tell other people what they want to hear so that they will do what I want them to do.	.599	.046	<.001
I often admire a really clever scam.	.628	.048	<.001
In today's world, I feel justified in doing anything I can get away with to succeed.	.804	.036	<.001
Making a lot of money is my most important goal.	.498	.054	<.001
My main purpose in life is getting as many goodies as I can.	.674	.041	<.001
For me, what's right is whatever I can get away with.	.816	.035	<.001
I enjoy manipulating other people's feelings.	.654	.051	<.001
I let others worry about higher values; my main concern is with the bottom line.	.444	.061	<.001
Looking out for myself is my top priority.*	.454	.053	<.001
Callous			
I make a point of trying not to hurt others in pursuit of my goals.	.755	.047	<.001
Cheating is not justifiable because it is unfair to others.	.679	.046	<.001
Even if I were trying very hard to sell something, I wouldn't lie about it.	.567	.051	<.001
I feel bad if my words or actions causes someone else to feel emotional pain.	.591	.049	<.001
I tend not to think about other people's feelings.*	.606	.055	<.001
People are too emotional at funerals.*	.538	.057	<.001
When people are sad around me, I feel sad myself.*	.442	.061	<.001
I'm not a very emotional person.*	.399	.061	<.001
I tend to cry in sad movies.*	.336	.066	<.001
I feel bad when I do something wrong.*	.628	.053	<.001
My friends consider me a warm person.*	.455	.054	<.001
I would be upset if my success came at someone else's expense.*	.664	.046	<.001
Antisocial			
I have been in a lot of shouting matches with other people.	.409	.072	<.001
I find myself in the same kinds of trouble, time after time.	.417	.061	<.001
When I get frustrated, I often "let off steam" by blowing my top.	.312	.065	<.001
I am often bored.	.378	.063	<.001
I quickly lose interest in tasks I start.	.399	.059	<.001
I am a bit of a rebel.*	.504	.058	<.001
I like planning things out.*	.326	.066	<.001
I usually can't keep out of trouble for too long.*	.756	.045	<.001
Before I do anything, I carefully consider the possible consequences.*	.496	.060	<.001
I know rules are there, but I don't tend to follow them.*	.705	.045	<.001
I often do things before thinking them through.*	.393	.059	<.001
I don't plan anything very far in advance.*	.282	.061	<.001
Getting into trouble doesn't bother me.*	.706	.047	<.001

Note. LSRP = Levenson Self Report Psychopathy, λ = factor loading, SE = Standard error, Parameters calculated using Weighted Least Squared Means and Variance Adjusted confirmatory factor analysis. * = additional items.

Table 1.4

Zero Order Correlations Between External Criterion Variables and 19 and 36 Item LSRP Scales

	Total			Egocentric			Callous			Antisocial		
	19item	36item	*S-t p*	19item	36item	*S-t p*	19item	36item	*S-t p*	19item	36item	*S-t p*
EASI												
Social	-.02	-.07	<.05	.08	.07	>.05	-.06	-.01	>.05	-.15*	-.13*	>.05
Activity	.08	.05	>.05	.13*	.13*	>.05	-.01	.01	>.05	-.01	-.01	>.05
Impulse	.41**	.47**	<.01	.30**	.29**	>.05	.25**	.22**	>.05	.45**	.62**	<.01
Fearful	.09	-.02	<.01	-.00	-.01	>.05	-.10	-.25**	<.01	.37**	.21**	<.01
Distress	.18**	.08	<.01	.06	.04	<.05	-.07	-.18**	<.01	.48**	.32**	<.01
Anger	.39**	.35**	>.05	.26**	.27**	>.05	.10	.13*	>.05	.59**	.44**	<.01
NPI 16	.22**	.22**	>.05	.26**	.26**	>.05	.16*	.20**	>.05	.04	.08	>.05
TriPM												
Total	.57**	.66**	<.01	.54**	.54**	>.05	.46**	.56**	<.01	.29**	.49**	<.01
Bold	-.00	.07	<.01	.08	.09	>.05	.14*	.22**	<.05	-.27**	-.13*	<.01
Mean	.65**	.72**	<.01	.58**	.57**	>.05	.56**	.67**	<.01	.35**	.50**	<.01
Dis	.53**	.56**	>.05	.45**	.45**	>.05	.25**	.26**	>.05	.52**	.64**	<.01
BES												
Total	-.37**	-.48**	<.01	-.34**	-.33**	>.05	-.49**	-.62**	<.01	-.06	-.22**	<.01
Affect	-.28**	-.41**	<.01	-.27**	-.27**	>.05	-.43**	-.61**	<.01	.06	-.11	<.01
Cog	-.31**	-.34**	>.05	-.24**	-.24**	>.05	-.30**	-.30**	>.05	-.20**	-.27**	>.05
ABQ	.23**	.30**	<.01	.18**	.16*	<.05	.12	.19**	<.05	.25**	.38**	<.01
SSSV												
Total	.25**	.34**	<.01	.23**	.22**	>.05	.23**	.30**	<.05	.10	.31**	<.01
Thrill	.06	.13*	<.01	.08	.07	>.05	.11	.17**	>.05	-.06	.06	<.01
Xp	.03	.11	<.01	-.01	-.03	<.05	.09	.09	>.05	.03	.19**	<.01
Dis	.33**	.40**	<.01	.32**	.31**	>.05	.25**	.31**	>.05	.18**	.36**	<.01
Bore	.34**	.42**	<.01	.32**	.32**	>.05	.25**	.32**	<.05	.20**	.37**	<.01

Note. Correlations calculated with Pearson's *r*, * = $p < .05$, ** = $p <$. 01. LSRP = Levenson Self Report Psychopathy, S-t = Steiger's *t*-test, EASI = Emotionality-Activity-Sociability-Impulsivity Temperament Survey, NPI 16 = Narcissistic Personality Inventory – 16, TriPM = Triarchic Psychopathy Measure, Bold = Boldness, Mean = Meanness, Dis = Disinhibition, BES = Basic Empathy Scales, Affect = Affective, Cog = Cognitive, ABQ = Antisocial Behaviours Questionnaire, SSSV = Sensation Seeking Scale-V, Thrill = Thrill seeking, Xp = Experience seeking, Bore = Boredom Proneness.

Table 1.5

Path Analyses of LSRP Scales With External Variables Using MLR

	Egocentric		Callous		Antisocial	
	19item	36item	19item	36item	19item	36item
EASI						
Social	.26***	.29***	-.16*	-.18*	-.23**	-.22**
Activity	.24**	.24**	-.12	-.08	-.10	-.11
Impulse	.05	-.08	.16*	.05	.40***	.65***
Fearful	-.14	.01	-.10	-.37***	.44***	.33***
Distress	-.12	-.03	-.09	-.33***	.55***	.45***
Anger	.01	.07	.00	-.05	.59***	.42***
NPI 16	.28***	.27**	.02	.09	-.08	-.10
TriPM						
Total	.36***	.21**	.25***	.36***	.10	.25***
Bold	.19*	.09	.10	.27***	-.37***	-.27***
Mean	.31***	.19**	.37***	.49***	.16**	.22***
Dis	.25**	.15*	.05	-.01	.41***	.57***
BES						
Total	-.14	.00	-.42***	-.62***	.06	-.00
Affect	-.14*	.02	-.38***	-.66***	.18**	.12
Cog	-.05	-.02	-.25***	-.23**	-.14	-.18*
ABQ	.06	-.13	.05	.12	.22**	.41***
SSSV						
Total	.15	-.04	.15	.23**	.01	.25**
Thrill	.08	-.03	.08	-.18*	-.11	.01
Xp	-.10	-.25**	.13	.12	.05	.29***
Dis	.23**	.07	.11	.18**	.06	.25***
Bore	.22**	.08	.12	.19*	.09	.27***

Note. * = $p < 0.5$, ** = $p < .01$, *** = $p < .001$. LSRP = Levenson Self Report Psychopathy, MLR = Maximum Likelihood modelling with Robust Scaling, EASI = Emotionality-Activity-Sociability-Impulsivity Temperament Survey, NPI 16 = Narcissistic Personality Inventory – 16, TriPM = Triarchic Psychopathy Measure, Bold = Boldness, Mean = Meanness, Dis = Disinhibition, BES = Basic Empathy Scales, Affect = Affective, Cog = Cognitive, ABQ = Antisocial Behaviours Questionnaire, SSSV = Sensation Seeking Scale-V, Thrill = Thrill seeking, Xp = Experience seeking, Bore = Boredom Proneness.

Manuscript 2: Clarifying the Associations between Individual Differences in General Attachment Styles and Psychopathy.

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Foreword

Having established the validity of an expanded version of the LSRP, we began examination of the associations between psychopathy and attachment theory. To begin our investigation we decided to focus on the associations between psychopathy and general attachment styles, as general attachment styles reflect behaviours which are broadly considered to reflect stable behaviours which occur across a variety of circumstances (Mikulincer & Shaver, 2007), similar to personality traits. While there has been some previous research regarding the associations between general attachment styles and psychopathy, the literature has been limited. In particular, there are concerns regarding the quality of methods employed in some studies, as well as inconsistencies in findings, which has made it difficult to draw firm conclusions regarding the relationship between attachment and psychopathy. Therefore, the purpose of the following manuscript was to identify valid and reliable associations between psychopathy and general attachment styles. In doing so, we hope to provide a foundation of valid and reliable associations from which to understand the associations between attachment and psychopathy.

Clarifying the Associations between Individual Differences in General Attachment Styles and Psychopathy

Elliott Christian and Martin Sellbom

The Australian National University

Ross B. Wilkinson

University of Newcastle

Author Note

Elliott Christian and Martin Sellbom, Research School of Psychology, The Australian National University. Ross B. Wilkinson, School of Psychology, University of Newcastle.

Correspondence concerning this article should be addressed to Elliott Christian, Research School of Psychology, The Australian National University, Building 39 Science Road, Canberra, ACT, 2601, Australia. Email: elliott.christian@anu.edu.au

Abstract

The association between individual differences in general attachment styles and psychopathy is currently unclear, despite the potential utility attachment theory could provide regarding the interpersonal characteristics of psychopathy and the etiology of this construct. The purpose of the current investigation was to clarify these associations. For this purpose, we analyzed responses from an Australian community sample (N = 249) and a U.S. community sample (N = 292) containing validated measures of psychopathy (Triarchic Psychopathy Measure and Expanded–Levenson Self-Report Psychopathy Scales [Australian sample only]) and general attachment styles (Experiences in Close Relationships–Revised– General Short Form and Attachment Styles Questionnaire) to replicate our findings across measures and samples. The psychopathy domain of boldness was consistently negatively associated with insecure attachment styles. Psychopathy's affective domain (meanness, callousness) was consistently associated with avoidant attachment, whereas its behavioral domain (disinhibition, antisocial) was consistently associated with insecure attachment styles, particularly anxious attachment. Our findings suggest that there are consistent associations between individual differences in general attachment styles and psychopathy in adult samples and provides preliminary support for further consideration of attachment theory in psychopathy research.

Keywords: psychopathy, triarchic, Levenson, attachment, general attachment styles

Clarifying the Associations between Individual Differences in General Attachment Styles and Psychopathy

Psychopathy is a construct notorious for its association with antisocial interpersonal behaviors (Hawes, Boccaccini, & Murrie, 2013; Leistico, Salekin, DeCoster, & Rogers, 2008), yet the mechanisms underlying the construct and its disruptive interpersonal tendencies are not well understood. One theory that may be useful to further understand the nature of psychopathy, but has yet to receive notable consideration, is attachment theory (Bowlby, 1973, 1980, 1982). Attachment theory is a theory of interpersonal and emotional behavior, definitive features of psychopathy. As such, it could useful for understanding the problematic interpersonal and emotional behavior seen in psychopathy. However, despite several investigations into the link between psychopathy and attachment styles (Conradi, Boertien, Cavus, & Verschuere, 2015; Craig, Gray, & Snowden, 2013; Frodi, Dernevik, Sepa, Philipson, & Bragesjö, 2001; Mack, Hackney, & Pyle, 2011; Pasalich, Dadds, Hawes, & Brennan, 2012), these associations have not been clearly delineated cross-sectionally, making it difficult to evaluate the utility of attachment theory in psychopathy research.

Psychopathy

Psychopathy refers to a cluster of individual differences personality traits such as callousness, diminished empathy, egocentricity, manipulativeness, fearlessness, irresponsibility and impulsivity (Cleckley, 1941; Hare, 2003; Lykken, 1995). Using a combination of empirical research and conceptual descriptions, researchers have proposed a variety of models to group and categorize these traits (e.g., Cooke, Hart, Logan, & Michie, 2012; Hare, 2003; Lilienfeld & Andrews, 1996; Lynam & Miller, 2015; Patrick, Fowles, & Krueger, 2009). Several models of psychopathy have been based on the Psychopathy Checklist—Revised (PCL-R; Hare, 2003), which can be divided into affective (e.g., callousness, low empathy), interpersonal (e.g., manipulative, grandiose), lifestyle (e.g.,

impulsive, irresponsible), and antisocial features (e.g., delinquency, recidivism), though some have dropped the final factor to save from criterion contamination (Cooke & Michie, 2001). Other models have also proposed additional components to psychopathy beyond that provided in the PCL-R, such as boldness in the triarchic model of psychopathy (Patrick et al., 2009), which refers to a tendency to be socially dominant and emotionally resilient. However, there is typically substantial overlap between the different models of psychopathy, depending on how models combine and subdivide features (e.g., the PCL-R affective and interpersonal features roughly translate to meanness in the triarchic model of psychopathy).

It is important to note that differentiating between the various components of psychopathy reflects an important consideration when investigating psychopathy. Researchers have consistently found that different components of psychopathy are differentially associated with other variables. The affective/interpersonal features of psychopathy (e.g., callousness, diminished empathy, shallow emotions) are associated with lower fear responses and instrumental violence (Patrick, Bradley, & Lang, 1993; Reidy, Shelley-Tremblay, & Lilienfeld, 2011), the behavioral features (PCL-R lifestyle and antisocial features) are more associated with externalizing psychopathology and criminal behavior (Hawes et al., 2013; Leistico et al., 2008; Patrick, Hicks, Krueger, & Lang, 2005), while boldness is typically associated with more adaptive features such as emotional stability and low personal distress (Sellbom & Phillips, 2013).

Currently, the mechanisms underlying psychopathy are not well understood. Although there are several promising bio-cognitive theories of psychopathy (e.g., Blair, 2006; Moul, Killcross, & Dadds, 2012; Zeier, Maxwell, & Newman, 2009), there has been less consideration of environmental experiences. This could be problematic, as development of a comprehensive understanding of psychopathy seems unlikely without some consideration of experience in addition to biological predisposition. Relational experiences may be

particularly important to consider in psychopathy as it is in part, defined by interpersonal problems (e.g., empathy, manipulativeness, bonding; Hare, 2003). Blackburn (1998) suggested a cognitive-interpersonal theory of psychopathy, where psychopathy is underpinned by self-fulfilling cognitive schemata based on relational experiences (e.g., hostility eliciting hostility). There is some research to suggest that psychopathy may be characterized by interpersonal hostility and dominance on the interpersonal circumplex (Salekin, Leistico, Trobst, Schrum, & Lochman, 2005). However, there has otherwise been limited investigation of relational experiences shaping psychopathy.

Attachment Theory

One theory that has yet to receive notable attention in psychopathy research is attachment theory (Bowlby, 1973, 1982; Mikulincer & Shaver, 2007). Attachment theory is itself grounded in biological theory (i.e., evolutionary, systems theories), but draws heavily on the role of relational experience in shaping behavior. Attachment theory suggests that infants are born with an innate need to bond with and maintain proximity to others, typically to their parents, which protects them from potential threats (Bowlby, 1982). It also proposes that the quality of attachments may differ depending on experiences in these relationships (Bowlby, 1973, 1982). Research has generally been supportive of the role of relational experience in shaping attachment security with consistent moderate associations between parental sensitivity and attachment security (De Wolff & van IJzendoorn, 1997). Interventions which promote parental sensitivity have also been found to increase attachment security, suggesting a causative relationship between sensitivity and security (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). However, the biological contribution to attachment security is uncertain with Vaughn, Bost and van IJzendoorn (2008) concluding that “attachment security and temperament domains are at best only partially, and rarely

consistently, overlapping" (p. 199). This does not rule out a biological contribution to attachment security, but does suggest that the state of this literature is unresolved.[23]

A key attachment theory concept is that individuals are considered to represent their attachment experiences cognitively. Bowlby (1982) proposed that through manifold proximity seeking attempts during attachment relationships, individuals develop "internal working models" of the self and others in these relationships. Typically, these models are first developed with parents and are then generalized to guide behavior in future attachment relationships (Bowlby, 1982), such as with friends and romantic partners who become targets for attachment in adolescence and early adulthood (Hazan & Zeifman, 1994). Although individuals may develop different styles of working models across their relationships (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996), there is often a degree of commonality which reflects an individual's general attachment style or most chronically accessible models of attachment (Mikulincer & Shaver, 2007). As may be surmised from the above, attachment theory suggests that an adult's current general working models are a reflection of their attachment history and, therefore, there should be some stability to these models. While there has been found to be a moderate degree of stability in attachment models from early childhood through to early adulthood (Fraley, 2002), these models have also been found to be revised and influenced by significant life events (Waters, Merrick, Treboux, Crowell, & Albersheim, 2000) and more recent experiences in relationships (Pierce & Lydon, 2001). These findings suggest that general attachment models in adults are not only related to

[23] Behavioural genetics studies have tended to suggest a smaller role for genetics compared to environmental contributions, at least in children (Bokhorst, et al., 2003; O'Connor & Croft, 2001). Studies with adults have tended to find a larger role for genes, but as monozygotic twins are more likely to form attachments to their twin than dizygotic twins (Fraley & Tancredy, 2012), these studies fail to meet the equal environments assumption. Studies investigating the links between specific genes and attachment security have identified several specific genes which may contribute to attachment security, but replication has been inconsistent at this stage (Raby, Roisman, & Booth-LaForce, 2015).

earlier experiences, but are also shaped by new experiences which are integrated to make the attachment models more consistent with their current environment (Bowlby, 1982).

Individual differences in adult attachment styles can be conceptualized along two dimensions: attachment anxiety and attachment avoidance (analogous to the categories seen with children; Ainsworth, 1979; Brennan, Clark, & Shaver, 1998). Attachment anxiety is characterized by a preoccupation with the availability of others, fear of abandonment, doubts over self-worth, and excessive reassurance seeking, thought to reflect a history of inconsistent responses to attachment bids (Ainsworth, 1979; Brennan et al., 1998). Attachment avoidance is characterized by avoidance of emotions, dependency, and intimacy; defensive self-inflation and cynicism regarding relationships and is thought to reflect a history of insensitive; and nonresponsive caregiving (Bartholomew & Horowitz, 1991; Brennan et al., 1998). Mikulincer and Shaver (2007) describe attachment avoidance as a "deactivation" strategy where attachment needs are dismissed because support is not expected and distressing to acknowledge, while they describe anxious attachment as a "hyperactivation" strategy where support seeking is amplified to ensure care from an inconsistent caregiver. A low level of both anxious and avoidant attachment is considered to reflect a secure attachment style, characterized by trust and appropriate support seeking and reflective of a history of receiving sensitive and supportive care (Brennan et al., 1998). High levels on both dimensions, by contrast, reflect a "fearful," or at extreme levels "disorganized" attachment, characterized by haphazard and sometimes bizarre expressions of attachment behavior (e.g., freezing, hiding), which is prevalent in impoverished backgrounds (e.g., abuse and trauma; Bakermans-Kranenburg & van IJzendoorn, 2009).

Individual Differences in Attachment and Psychopathy

Psychopathy is characterized, in part, by consistent problematic patterns of affective and interpersonal behavior (e.g., Hare, 2003; Patrick et al., 2009; Reidy et al., 2011), domains

of relevance to attachment theory (Bowlby, 1982). As general attachment styles reflect persistent patterns of interpersonal relations (Mikulincer & Shaver, 2007), they may be particularly relevant to understanding psychopathy. To support this idea, previous research has found that variables impacting on the quality of attachment relationships are related to psychopathy (e.g., inadequate parenting, abuse, maternal depression, low socioeconomic status; Farrington, 2006; Gao, Raine, Chan, Venables, & Mednick, 2010; Lang, af Klinteberg, & Alm, 2002; Marshall & Cooke, 1999). Psychopathy also displays a pattern of relating to others consistent with insecure attachment styles, particularly avoidant attachment (e.g., low commitment, low empathy, interpersonal cynicism; De Ganck & Vanheule, 2015; Jonason & Buss, 2012; Verona, Patrick, Curtin, Bradley, & Lang, 2004). Likewise, insecure attachment styles are associated with variables important to psychopathy (e.g., low empathy, lower compassion, lower willingness to help, increased aggression; Britton & Fuendeling, 2005; Mikulincer et al., 2001; Mikulincer, Shaver, Gillath, & Nitzberg, 2005; Riggs & Kaminski, 2010). Although these associations occur with both attachment dimensions, attachment avoidance is associated with values indicating limited concern for others (Mikulincer et al., 2003), suggesting that motivations reflective of the affective/interpersonal components of psychopathy are more consistent with attachment avoidance. On the other hand, boldness appears to share properties with attachment security such as emotional resilience and social competence (Patrick et al., 2009; see Mikulincer & Shaver, 2007).

However, findings regarding the direct association between psychopathy and general attachment styles have been mixed. Some studies have found no relationship, but owing to a small sample size (i.e., $N = 14$; Frodi et al., 2001) or use of a non-validated measure of psychopathy (Brennan & Shaver, 1998), it is difficult to generalize from these studies. Schimmenti et al. (2014) reported that psychopathy was associated with disorganized attachment in a forensic sample, but their attachment measure consisted of two PCL-R

items[24] and they failed to include a comparison group when describing those highest on psychopathy. At the factor or domain level, boldness, has displayed positive and negative associations with attachment avoidance, and null and negative associations with attachment anxiety in undergraduate samples (Conradi et al., 2015; Craig et al., 2013). These findings are not only inconsistent, but given that boldness is defined by emotional resilience (Patrick et al., 2009), particularly fearlessness, we may expect it to be associated with lower attachment insecurity, specifically attachment anxiety. The affective/interpersonal features of psychopathy have shown consistent small to moderate zero-order positive associations with attachment avoidance across several undergraduate samples (Conradi et al., 2015; Craig et al., 2013). However, Mack, Hackney, and Pyle (2011) found that this association was only present for those also higher on attachment anxiety, consistent with Pasalich, Dadds, Hawes, and Brennan (2012) who reported that high callous/unemotional traits in children were associated with disorganized attachment styles. However, Pasalich et al. (2012) reported some truncation of range in their sample,[25] and these findings are inconsistent with the conceptualization of this component of psychopathy being low in anxiety (Cleckley, 1941; Patrick et al., 1993), indicating that replication is necessary. Conradi, Boertien, Cavus, and Verschuere (2015) reported that interpersonal psychopathy was positively correlated with attachment anxiety, while affective psychopathy was negatively correlated, which may account for the interaction terms reported by Mack et al. (2011). However, the bivariate (Conradi et al., 2015) versus multivariate analyses (Mack et al., 2011) used across studies makes comparison difficult. Thus far, the behavioral or disinhibited component of psychopathy is the only component to display consistent links to attachment with small to

[24] (a) Promiscuous sexual behaviour and (b) Many short-term martial relationships (i.e. items expected to correlate with PCL-R total scores). They also attempted to code attachment styles based on the PCL-R interview, but this interview is unlikely to be sufficient to code attachment variables accurately.
[25] That is, using a categorical system their sample of 55 children included only seven avoidantly attached children and none with anxious attachment.

moderate positive associations with both dimensions of attachment insecurity across several undergraduate samples (Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011).

Current Study

To date, the associations between the domains of psychopathy, particularly the affective/interpersonal factor, and individual differences in general attachment styles have not been clearly established. This represents an important field of inquiry as attachment theory may be a useful framework to understand interpersonal relations in psychopathy, an area of consistent concern in psychopathy research (Hawes et al., 2013; Reidy et al., 2011). The first step in this process is determining whether consistent cross-sectional associations exist between the constructs. Therefore, the purpose of the current study was to clarify the associations between individual differences in general attachment styles and psychopathy. We aimed to do this using multiple measures of individual differences in attachment and psychopathy within two independent community samples in order to identify convergent and replicable associations between these constructs within and across samples.

We first hypothesized that boldness would be negatively associated with attachment insecurity, particularly attachment anxiety, as boldness is, in part, defined by emotional resilience and fearlessness (Patrick et al., 2009), which tend to be the inverse of that seen in attachment insecurity (Bowlby, 1982; Mikulincer & Shaver, 2007). Second, we hypothesized that the affective/interpersonal features of psychopathy would be positively associated with attachment avoidance, consistent with the shared interpersonal styles between the constructs. Third, we hypothesized that attachment anxiety would be negatively related to the affective/ interpersonal features of psychopathy (despite previous findings; Mack et al., 2011), as this aspect of psychopathy has been proposed (Cleckley, 1941; Lykken, 1995) and empirically demonstrated (e.g., Neumann, Johansson, & Hare, 2013 for PCL-R psychopathy) to be low on anxiety/fear. Finally, we hypothesized that the behavioral features of psychopathy would

be positivity associated with attachment avoidance and attachment anxiety, consistent with previous research and the shared negative emotionality between the constructs (Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011).

Method

Participants

Sample 1. Three-hundred complete responses were collected from an Australian community sample via online paneling conducted by Qualtrics. Fifty-one responses were removed as the responses were deemed either non-cooperative (n = 3)[26] or showed endorsement of extremely improbably items (see Measures section). This procedure left a final sample of 249. The mean age was 37.59 (SD = 12.77, range = 18 – 60) and most identified as White (88%, 6% Asian, 6% Other) with an approximately equal gender distribution (50.6% female). This sample was previously used in an article by Christian and Sellbom (2016), but the ideas and analyses presented here have not been previously reported.

Sample 2. A further 320 completed responses were collected from a community sample recruited from the U.S. via Mechanical Turk. A final sample of 292 was reached after 24 responses were removed due to endorsement of items from our infrequency scale and four were identified as non-cooperative responses.[27] The mean age was 39.63 (SD = 11.89, range = 18 – 68). Most participants identified as White (80.5%, 6.50% African American, 5.5% Hispanic/Latino, 7.5% Other) and gender was again evenly distributed (55.1% female).

Measures

Triarchic Measure of Psychopathy (TriPM; Patrick, 2010). The TriPM is a 58-item self-report inventory designed to measure the triarchic theory of psychopathy (Patrick et

[26] Noncooperative responses were defined as indiscriminate response patterns (i.e. endorsement of the same response for every question on the scale or providing implausible responses to open ended questions (e.g., claiming to be 10,000-years-old).

[27] Noncooperative responses were defined in the same manner as the first sample with the inclusion of < 12 min responses as the cut off for noncooperative responses. Responses of this speed were not collected in the first sample.

al., 2009). It contains three scales: boldness (k = 19), meanness (k = 19), and disinhibition (k = 20) with items measured on a 4-point Likert scale (*mostly false, false, mostly true, true*). The TriPM's psychometric properties have been established across different samples (Blagov, Patrick, Oost, Goodman, & Pugh, 2016; Stanley, Wygant, & Sellbom, 2013).

Expanded-Levenson Self-Report Psychopathy Scales (LSRP; Christian & Sellbom, 2016; Levenson, Kiehl, & Fitzpatrick, 1995). The second psychopathy scale used was the expanded 36 item version of the LSRP (E-LSRP; Christian & Sellbom, 2016). This scale is based on the 19-item, three-factor LSRP scale proposed by Brinkley, Diamond, Magaletta, and Heigel (2008) with additional items to address concerns regarding low internal consistency and construct validity (e.g., Salekin, Chen, Sellbom, Lester, & MacDougall, 2014). Initial validation has suggested that the expanded scale has appropriate levels of model fit and displays improvements in internal consistency and validity over the 19-item version of the scale (Christian & Sellbom, 2016). The expanded scale has three subscales: egocentricity (k = 11), callousness (k = 12), and antisocial (k = 13) and is scored on a 4-point Likert scale (*strongly disagree, somewhat disagree, somewhat agree, strongly agree*). The E-LSRP was only used with the first sample due to constraints on survey length in sample two.

Experiences in Close Relationships—Revised – General Short Form (ECR-R-GSF; Wilkinson, 2011). The ECR-RGSF is a 20-item inventory based on the Experiences in Close Relationships—Revised (ECR-R; Fraley, Waller, & Brennan, 2000) designed to measure current individual differences in attachment avoidance (k = 10) and attachment anxiety (k = 10). Unlike the ECR-R, which focuses on romantic attachment styles, the ECR-R-GSF was designed to measure individual differences in general attachment styles. Wilkinson (2011) has previously demonstrated the construct validity of the scale and its

psychometric properties. Responses on the scale are recorded on a 5-point Likert scale (*strongly disagree, disagree, neutral/mixed, agree, strongly agree*).

Attachment Style Questionnaire (ASQ; Feeney, Noller, & Hanrahan, 1994). The ASQ is a 40-item self-report questionnaire designed to measure current individual differences in general attachment styles. For the purposes of our investigation we opted to use the two factor structure, which measures attachment avoidance (k = 16) and attachment anxiety (k = 13), as well as the five factor structure, which measures confidence (k = 8), discomfort with closeness (k = 10), relationships as secondary (k = 7), need for approval (k = 7) and preoccupation (k = 8). The discomfort with closeness and relationships as secondary scales can be considered subdivisions of attachment avoidance, while need for approval and preoccupation can be considered subdivisions of attachment anxiety. Confidence can be considered as akin to secure attachment. Both latent models have been empirically supported and validated (Fossati et al., 2003). The benefit of using both factor structures is the ability to look at the broad dimensions of attachment, but also investigate more specific aspects of these dimensions. Responses on the ASQ are recorded on a 6-point Likert scale (*totally disagree, strongly disagree, slightly disagree, slightly agree, strongly agree, totally agree*).

Infrequency Validity Scale. A short Infrequency Scale (six items) was used to detect non-cooperative responses based on endorsement of either impossible or improbable statements (e.g., "I make a point of only being friends with people born in August"). The items were embedded randomly throughout the survey, taking on the scale of the questionnaire they were embedded in. Hits were scored when the participants indicated affirmative endorsement of any item, from which point participants data was removed from the sample. Base rates for the items ranged from 2.7%–7% (Cronbach's alpha .69; see Christian & Sellbom, 2016, for items and more details regarding base rate endorsement).

Procedure

For both samples, the surveys were administered online via the respective service noted above as part of a broader series of studies on attachment and psychopathy. Scales were presented in a single randomized order, though the order of items within each scale was randomized for each participant. Demographic information was collected at the start of survey for the Australian sample and at the end of the survey for the U.S. sample. Both surveys took approximately 30 min to complete.

Data Analysis Plan

For the purposes of our study, two analyses were conducted. The first was to examine the association between attachment styles and psychopathy traits at the bivariate level. To do this we calculated Pearson correlation coefficients between each of the psychopathy components for all of the attachment style measures for both samples. In the second set of analyses we conducted a series of multiple hierarchical regression analyses to determine the multivariate associations between attachment and psychopathy when controlling for gender[28] and the shared variance between attachment dimensions. In this analysis, we first entered a dummy-coded gender variable,[29] followed by attachment avoidance and attachment anxiety scale scores in the second step, and finally the interaction term between attachment avoidance and anxiety. This analysis was conducted separately for each attachment scale. For the sake of brevity and to conserve statistical power we opted not to use the full ASQ five-factor model. All variables were standardized (for centering) before conducting these analyses and the interaction terms were calculated using these standardized variables. Significant interaction terms were investigated using simple slope analysis in the SPSS add-on PROCESS (Hayes, 2013). For the purposes of deciding the presence or absence of replication

[28] Consistent with the analyses conducted by Mack et al. (2011) and Conradi et al. (2015).
[29] The results were similar to when gender was not included.

between samples, we considered a finding replicated when there was a significant association between in the same direction in both samples.

Results

Descriptive statistics are presented in Table 1. All scales preformed acceptability in terms of internal consistency, though the relationships as secondary subscale's was lower than the other scales, but this is consistent with previous findings (Feeney et al., 1994). The means for most scales were close to the center of the scale, consistent with other community and undergraduate samples (Craig et al., 2013; Feeney et al., 1994; Wilkinson, 2011), and there was no notable truncation in the scales. Correlations between the attachment scales were high for attachment avoidance (.76, $p < .01$; .88, $p < .01$) and attachment anxiety (.80, $p < .01$; .89, $p < .01$). However, as there were minor differences in findings across that attachment scales, our use of multiple scales was supported.[30]

The results for bivariate analyses are presented Table 2. Across both samples, TriPM Boldness was found to negatively correlate with measures of attachment avoidance and attachment anxiety, regardless of the attachment measure used, and correlate positively with the ASQ confidence subscale. TriPM meanness was positively correlated with avoidance across both attachment measures, particularly ASQ relationships as secondary subscale, and was negatively correlated with the ASQ confidence subscale. These findings were again consistent across samples. However, ECR-RGSF anxiety was positively associated with TriPM meanness in the second sample, but meanness was unrelated to all other measures of attachment anxiety across both samples. Also, the ASQ discomfort with closeness subscale was positively associated with meanness in the second sample, while in the first sample there was only a positive trend ($p = .06$). Disinhibition was positively correlated with measures of

[30] See Christian and Sellbom (2016) for correlations between psychopathy scales.

attachment avoidance and anxiety regardless of attachment measure or sample, and was negatively correlated with the ASQ confidence subscale for both samples.

For correlations between the E-LSRP and attachment variables, the egocentric subscale was positively correlated with ASQ avoidance, particularly the relationships as secondary subscale, but this finding did not replicate with the ECR-R-GSF. The egocentric subscale was also positively correlated with the ASQ need for approval subscale, but displayed no relationship with the broader dimension of attachment anxiety across both attachment measures. Consistent with TriPM Meanness, the E-LSRP Callous subscale was positively correlated with attachment avoidance for both attachment measures, particularly the ASQ relationships as secondary subscale. However, unlike meanness, the E-LSRP callous subscale was also negatively associated with the ASQ need for approval subscale and was not significantly associated with the confidence subscale. Finally, the E-LSRP antisocial subscale, consistent with TriPM disinhibition, was positively correlated with avoidance and anxiety regardless of attachment measure, and negatively correlated with the ASQ confidence subscale. Importantly, the total scores of both psychopathy measures appeared to be uninformative given that the constituent parts that make up these scores displayed differential associations with attachment variables.

The results of the multiple regression analyses are presented in Table 3 as standardized beta weights. TriPM boldness was again negatively associated with avoidance and anxiety regardless of measure or sample, with the exclusion of ASQ Avoidance in the second sample where there was no relationship.[31] TriPM meanness was positively associated with avoidance for both measures across both samples. This finding was qualified by a significant interaction in the first sample where the association between avoidance and

[31] In a post hoc analysis, ASQ Avoidance became significant when removing Anxiety from the regression equation, $\beta = -.40$, $p < .01$.

meanness became stronger as anxiety decreased for both the ASQ (-1 *SD*, β = .43, p < .01, +1 *SD*, β = .15, p = .12) and ECR-R-GSF (-1 *SD*, β = .35, p < .01, 1 +*SD*, β = .02, p = .87). This interaction term was not significant in the second sample, but there was a significant positive association between meanness and ASQ anxiety, which was not present in the first sample. TriPM disinhibition was positively related to anxiety, but not avoidance across both attachment measures and samples. This finding is qualified in the first sample where the association between ASQ anxiety and disinhibition became stronger as ASQ avoidance decreased (-1 *SD*, β = .41, p < .01, +1 *SD*, β = .18, p = .02).[32]

For the E-LSRP, the egocentricity subscale was positively associated with ECR-GSF anxiety, but had no other main effect associations with either attachment measure. However, it was associated with an interaction term where the association between attachment anxiety and egocentricity became stronger attachment avoidance decreased (ECR-RGSF; -1 *SD*, β = .32, p < .01, 1 +*SD*, β = .04, p = .65; ASQ; -1 SD, β = .25, p < .01, +1 *SD*, β = .05, p = .55). The callous subscale was positively associated with attachment avoidance on both attachment measures and negatively associated with ASQ anxiety. Consistent with meanness, these findings were qualified by a significant interaction term where the association between avoidance and callousness became stronger as anxiety levels decrease for both the ECR-GSF (-1 *SD*, β = .30, p < .01, +1 *SD*, β = .02, p = .78) and the ASQ (-1 *SD*, β = .39, p < .01, +1 *SD*, β = .10, p = .30). Finally, the antisocial subscale was positively associated with anxiety, but not avoidance for both attachment measures. On the ASQ, this finding was qualified by a significant interaction effect where the association between anxiety and the antisocial

[32] The association between TriPM disinhibition and attachment anxiety remained significant until 1.18 *SD* above the mean for attachment avoidance.

subscale became stronger as avoidance decreased (-1 *SD*, $\beta = .51$, $p < .01$, +1 *SD*, $\beta = .15$, $p < .05$).[33] This interaction effect was not significant for the ECR-GSF.

Discussion

The purpose of the current study was to investigate the association between individual differences in general attachment styles and psychopathic personality traits. Using multiple measures of both constructs and two independent community samples, we demonstrated several consistent and differential associations between the components of psychopathy and dimensions of general attachment styles. Our findings are broadly consistent with our hypotheses, with a few exceptions, and provide preliminary support for further consideration of attachment theory in psychopathy research.

Consistent with our first hypothesis, boldness displayed consistent small to large negative associations with attachment insecurity at both bivariate and multivariate levels. These findings indicate that interpersonal interactions with individuals higher on boldness would likely be characterized by self-confidence, trust and emotional stability (Mikulincer & Shaver, 2007). Attachment anxiety tended to display a particularly strong correlation with boldness, suggesting that individuals higher on boldness are unlikely to be preoccupied with abandonment and partner availability in relationships, and consistent with boldness being a stress immune construct (Patrick et al., 2009). These findings are also consistent with those reported by Craig, Gray, and Snowden (2013), but inconsistent with Conradi et al.'s (2015). This may be due to differences in measurement, as we and Craig et al.'s (2013) used the well validated TriPM (Blagov et al., 2016; Stanley et al., 2013), whereas Conradi et al. (2015) measured boldness via Youth Psychopathic Traits Inventory (YPI; Andershed, Kerr, Stattin, & Levander, 2001) which cross loads with meanness and disinhibition more so than the

[33] At greater than 1 *SD* above the mean of attachment avoidance, the association between attachment anxiety and the E-LSRP antisocial subscale become nonsignificant.

TriPM (Drislane et al., 2015). As both boldness and attachment security are in part defined by emotional resilience (Patrick et al., 2009; see Mikulincer & Shaver, 2007), it seems plausible to consider that emotional resilience may underlie this association, which could be an avenue for future research.

Our findings regarding the affective/interpersonal components of psychopathy were partially consistent with our hypotheses. TriPM meanness and E-LSRP callousness displayed replicable small to large positive associations with attachment avoidance, in line with our predictions and previous research (Conradi et al., 2015; Craig et al., 2013). However, E-LSRP egocentricity displayed inconsistent associations, and while it is difficult to draw firm conclusions, the trend of our results suggest a positive association with attachment anxiety. Given that TriPM meanness tends to have a stronger association with E-LSRP callousness than E-LSRP egocentricity (Christian & Sellbom, 2016), our results suggest that individuals higher on affective, rather than interpersonal, psychopathy are likely to be characterized by emotional dismissiveness, cynicism in relationships, and discomfort with intimacy (see Mikulincer & Shaver, 2007). The ASQ relationships as secondary scale displayed a particularly strong relationship with the affective domain of psychopathy, suggesting a tendency to deprioritized relationships (Feeney et al., 1994). Our findings regarding attachment anxiety were also partially consistent with our predictions and previous theory (Cleckley, 1941; Lykken, 1995; Patrick et al., 1993), as attachment anxiety was found to negatively interact with attachment avoidance to predict affective psychopathy. This suggests individuals higher on affective psychopathy are likely to become increasingly attachment avoidant as attachment anxiety decreases. Attachment anxiety could also be considered a protective factor given this interaction. This interaction term is inconsistent with Mack et al.'s (2011) findings, who reported that a positive interaction between the dimensions of attachment insecurity (i.e., disorganized attachment) predicted affective/interpersonal

psychopathy. This inconsistency could be due to divergent associations between attachment anxiety and the affective (-) and interpersonal (+) components of psychopathy, as Mack et al. (2011) used the primary scale of the LSRP, which does not separate the affective and interpersonal facets of psychopathy, whereas the E-LSRP used in our study does. However, given that these effect sizes are small and interaction terms were not replicated between studies, these interpretations should be considered cautiously.

Consistent with our hypotheses and previous research (Conradi et al., 2015; Craig et al., 2013), the behavioral components of psychopathy displayed consistent moderate positive associations with attachment insecurity at the bivariate level. However, only attachment anxiety had an independent association with this component of psychopathy. Mack et al. (2011) reported independent associations between behavioral psychopathy and both dimensions of attachment insecurity. The reason for this inconsistency is unclear, but differences in sampling across the studies may account for the discrepancy. Nevertheless, the association between attachment anxiety and behavioral psychopathy is unsurprising given that both are prone to negative emotionality (Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010; Hicks & Patrick, 2006), particularly anger (Bowlby, 1973; Hare, 2003). Our results suggest that individuals higher on behavioral psychopathy traits are characterized by attachment "hyperactivation" strategies (e.g., fear of rejection, demanding and frustrated in relationships, difficulty with boundaries). Some have suggested that conduct problems in anxious attachment may act as a way to engage proximity seeking from caregivers (Allen, Moore, Kuperminc, & Bell, 1998), though further research is required to validate this idea in psychopathy.

From a theoretical standpoint, our results have several implications for psychopathy research. First, from a clinical perspective, our results suggest that individual differences in general attachment styles could be used to understand interpersonal relations in psychopathy

(Conradi et al., 2015). Based on the individual's composition of psychopathic traits, we may be able to consider how individuals high on psychopathy are likely to think about and behave in relationships, and how this style of relating to others may limit secure attachment formation which buffers against antisociality (Buist, Dekovic, Meeus, & van Aken, 2004). However, ´ there are necessary caveats to this interpretation. In particular, the participants selected for the current study were from community samples and this limits our ability to generalize to forensic populations where the highest levels of psychopathy are often encountered. Further research is also required to understand how divergent associations between attachment styles and psychopathy domains would present clinically (e.g., how individuals high on boldness and meanness would present given the divergent associations between these constructs with attachment insecurity).

Second, as we found consistent cross-sectional associations between general attachment styles and psychopathy, our results may be considered to provide preliminary support for further consideration of general attachment styles in the etiology of psychopathy. As a largely underdeveloped literature, attachment theory may be a useful framework from which to expand on the potential role of environmental experience in psychopathy. However, it is important to stress the preliminary nature of these results and the caveats associated with our study design. Due to the cross-sectional nature of our design, our results are unable to support causal links between attachment styles and psychopathy: it is possible that higher levels of psychopathy lead to relational experiences that promote attachment insecurity, vice versa, or even a bidirectional relationship. Some researchers have suggested that biological deficits can lead to problems forming early attachments (Dadds, Jambrak, Pasalich, Hawes, & Brennan, 2011), while others have suggested that parental warmth mitigates risks associated with conscience development in children with fearless temperaments (Kochanska, 1997). Regardless, longitudinal studies will be necessary to evaluate the directional associations

between these constructs. Also, while there is substantial evidence to suggest that attachment styles develop from an individual's accumulated attachment history (Fraley, 2002), our results are based on the current attachment perceptions of adults and should not been seen as solely a childhood developmental process. As previously noted, attachment styles are open to a degree of revision across the life span based on more recent relational experiences (Bowlby, 1982; Pierce & Lydon, 2001) and in adults, attachment with peers (i.e., romantic, friend) has a strong relationship with general attachment styles (Klohnen, Weller, Luo, & Choe, 2005). Given that Pasalich et al. (2012) found that callous/unemotional traits were related to disorganized attachment in young boys, it also appears to be worth considering whether the association between attachment and psychopathy changes across the life span (i.e., from disorganized to organized insecurity). Finally, it is important to consider that an attachment perspective on psychopathy would likely share properties with the cognitive-interpersonal theory of psychopathy (Blackburn, 1998), as both have an interpersonal focus based on the development of cognitive schemata via interpersonal experiences. However, as attempts to integrate and subsume attachment theory within interpersonal theory have only found low to moderate correlations between attachment and broader interpersonal theory (e.g., Florsheim, Henry, & Benjamin, 1996; Pincus, Dickinson, Schut, Castonguay, & Bedics, 1999), they may be best considered distinct, but overlapping theories at this stage.

There are several other limitations of this study to note. First, shared method variance due to the exclusive use of self-report measures may have artificially inflated associations between constructs. Future research could focus on experimental inductions to replicate our results (e.g., Mikulincer et al., 2001, 2003, 2005). And second, there are conceptualizations of psychopathy and attachment that were not included in the current study, but could provide potentially provided meaningful information regarding this relationship and should be also

considered in future research (e.g., the adult attachment interview, George, Kaplan, & Main, 1985; the four-factor model antisocial scale, Hare, 2003).

Overall, notwithstanding the limitations associated with this study, we found consistent differential associations between general attachment styles and the components of psychopathy across different measures and samples. Our findings provide preliminary support for further considering this aspect of attachment theory in psychopathy research, particularly for understanding the interpersonal relations of psychopathy. These results also provide tentative support for further consideration of relational and environmental experience in shaping psychopathy which, noting methodological limitations, could compliment current bio-cognitive explanations of the construct. However, longitudinal research is clearly necessary to begin to untangle nature of the association between attachment and psychopathy.

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Table 2.1
Descriptive Statistics for the Attachment and Psychopathy Measures

	Sample 1				Sample 2			
Scale	Mean	SD	Min – Max	α	Mean	SD	Min – Max	α
TriPM								
Total	1.98	.32	1.28 – 3.16	.89	1.92	.30	1.25 – 3.03	.88
Bold	2.46	.47	1.16 – 3.63	.85	2.44	.54	1.00 – 3.68	.89
Mean	1.69	.46	1.00 – 3.63	.90	1.63	.46	1.00 – 3.32	.90
Dis	1.79	.46	1.00 – 3.70	.87	1.70	.42	1.00 – 3.10	.86
E-LSRP								
Total	1.94	.36	1.08 – 3.06	.88	-	-	-	-
Ego	1.89	.48	1.00 – 3.36	.82	-	-	-	-
Cal	1.88	.44	1.00 – 3.25	.79	-	-	-	-
Anti	2.05	.41	1.00 – 3.23	.76	-	-	-	-
ECR-R-GSF								
Avoidant	3.03	.62	1.00 – 5.00	.81	3.01	.89	1.00 – 5.00	.92
Anxiety	2.81	.81	1.00 – 5.00	.91	2.39	.99	1.00 – 4.80	.95
ASQ								
Avoidant	3.54	.64	1.50 – 5.50	.81	3.50	.93	1.00 – 5.88	.92
Anxiety	3.33	.91	1.00 – 5.77	.89	2.88	1.06	1.00 – 6.00	.92
Confidence	3.74	.79	1.25 – 6.00	.78	3.77	1.01	1.00 – 6.00	.88
Discomfort	3.82	.77	1.60 – 6.00	.82	3.73	1.09	1.00 – 6.00	.91
RAS	2.79	.72	1.00 – 4.86	.67	2.76	.86	1.00 – 6.00	.76
Need	3.31	.98	1.00 – 6.00	.82	2.85	1.04	1.00 – 6.00	.85
Preoccupation	3.52	.84	1.00 – 6.00	.78	3.09	.99	1.25 – 5.75	.83

Note. In study 1, E-LSRP scales were scored on a 6 point Likert scale. In study 2, E-LSRP scales were scored on a 4 point Likert scale. TriPM = Triarchic Psychopathy Measure, Bold = Boldness, Mean = Meanness, Dis = Disinhibition, E-LSRP = Expanded - Levenson Self Report Psychopathy, Ego = Egocentric, Cal = Callous, Anti = Antisocial, ECR-GSF = Experiences in Close Relationships – Revised – General Short Form, ASQ = Attachment Style Questionnaire, Discomfort = Discomfort with Closeness, RAS = Relationships As Secondary, Need = Need for Approval.

Table 2.2
Zero-Order Correlations Between Attachment and Psychopathy Variables

	Psychopathy							
	TriPM				E-LSRP			
Attachment	Tot	Bold	Mean	Dis	Tot	Ego	Cal	Anti
Sample 1								
ECR-GSF								
Avoidance	.04	-.35**	.21**	.22**	.17**	.06	.13*	.21**
Anxiety	-.10	-.58**	.05	.32**	.16*	.12	-.07	.32**
ASQ								
Avoidance	.09	-.36**	.28**	.26**	.24**	.17**	.17**	.24**
Anxiety	-.13*	-.63**	.04	.32**	.13*	.11	-.12	.33**
Confidence	.09	.57**	-.17**	-.22**	-.11	-.01	-.03	-.22**
Discomfort	-.03	-.39**	.12	.21**	.11	.04	.02	.20**
Secondary	.28**	-.23**	.46**	.34**	.49**	.48**	.39**	.32**
Need	-.09	-.58**	.04	.35**	.14*	.14*	-.13*	.32**
Preoccupation	-.10	-.47**	.02	.24**	.13*	.12	-.11	.30**
Sample 2								
ECR-GSF								
Avoidance	.07	-.40**	.37**	.25**	-	-	-	-
Anxiety	.03	-.51**	.22**	.47**	-	-	-	-
ASQ								
Avoidance	.14*	-.39**	.45**	.31**	-	-	-	-
Anxiety	-.16**	-.68**	.10	.40**	-	-	-	-
Confidence	.07	.61**	-.28**	-.32**	-	-	-	-
Discomfort	.07	-.42**	.35**	.30**	-	-	-	-
RAS	.29**	-.15*	.50**	.25**	-	-	-	-
Need	-.21**	-.67**	.06	.35**	-	-	-	-
Preoccupation	-.08	-.50**	.08	.40**	-	-	-	-

Note. Correlations calculated with Pearson's *r*, * = $p < .05$, ** = $p <. 01$. E-LSRP = Expanded - Levenson Self Report Psychopathy, Tot = Total, Ego = Egocentric, Cal = Callous, Anti = Antisocial, TriPM = Triarchic Psychopathy Measure, Bold = Boldness, Mean = Meanness, Dis = Disinhibition, ECR-GSF = Experiences in Close Relationships – Revised – General Short Form, ASQ = Attachment Style Questionnaire, Discomfort = Discomfort with Closeness, RAS = Relationships As Secondary, Need = Need for Approval.

Table 2.3.
Regression of Attachment Dimensions on Psychopathy Factors

	Psychopathy							
	TriPM				E-LSRP			
Attachment	Tot	Bold	Mean	Dis	Tot	Ego	Cal	Anti
Sample 1								
ECR-GSF								
Gender	-.29**	-.20**	-.27**	-.14*	-.24**	-.14*	-.37**	-.08
Avoidance	.04	-.16**	.17*	.08	.08	-.03	.14*	.08
Anxiety	-.08	-.49**	.01	.30**	.15*	.14*	-.08	.30**
Int	-.17**	-.07	-.18**	-.09	-.17**	-.18**	-.16**	-.07
ASQ								
Gender	-.28**	-.18**	-.26**	-.14*	-.23**	-.13*	-.35**	-.08
Avoidance	.13	-.12*	.29**	.11	.16*	.10	.24**	.06
Anxiety	-.13	-.54**	-.04	.30**	.11	.10	-.16*	.33**
Int	-.16**	-.08	-.14**	-.12*	-.19**	-.15**	-.15**	-.18**
Sample 2								
ECR-GSF								
Gender	-.57**	-.29**	-.52**	-.27**	-	-	-	-
Avoidance	.07	-.20**	.35**	.03	-	-	-	-
Anxiety	.01	-.41**	.08	.47**	-	-	-	-
Int	-.02	.00	-.04	-.01	-	-	-	-
ASQ								
Gender	-.48**	-.25**	-.40**	-.27**	-	-	-	-
Avoidance	.29**	-.08	.51**	.11	-	-	-	-
Anxiety	-.29**	-.64**	-.13*	.36**	-	-	-	-
Int	-.05	-.00	-.09	-.00	-	-	-	-

Note. Displaying standardized Beta's calculated with Ordinary Least Squares Regression. * = $p < .05$, ** = $p <. 01$. E-LSRP = Expanded - Levenson Self Report Psychopathy, Tot = Total, Ego = Egocentric, Cal = Callous, Anti = Antisocial, TriPM = Triarchic Psychopathy Measure, Bold = Boldness, Mean = Meanness, Dis = Disinhibition, ECR-GSF = Experiences in Close Relationships – Revised – General Short Form, ASQ = Attachment Style Questionnaire, Int = Interaction term (i.e. Attachment Avoidance X Attachment Anxiety). The negative association between psychopathy and gender indicates that males were higher on psychopathy than females for all psychopathy variables, with the exception of E-LSRP Antisocial.

Manuscript 3: Evaluating the Association between Psychopathy and Specific Attachment Models in Adults

Christian, E., Sellbom, M., & Wilkinson, R. B. (Resubmitted, December 2016). *Journal of Personality Disorders.*

Foreword

Having demonstrated the presence of valid and reliable associations between psychopathy and general attachment styles, we turned our attention to the associations between psychopathy and individual differences in attachment styles in specific relationships in order to expand on our findings. While there has been some investigation into psychopathy and individual differences in attachment styles in specific relationships, mostly with romantic partners, the literature is nonetheless scant. Therefore, the purpose of the following study was to expand on our previous findings by investigating associations between psychopathy and individual differences in attachment styles in specific normative relationships (i.e. mother, father, romantic partner, friend). In addition to their zero-order effects, we planned to examine these relationships in the same sample, giving us the opportunity to investigate their independent effects on psychopathy. Furthermore, given that individual differences in general attachment styles are known to be composed of individual differences in attachment styles from specific relationships (Pierce & Lydon, 2001), we also aimed to evaluate the utility of individual differences in general attachment style to psychopathy beyond individual differences in attachment style in specific normative attachment relationships.

Evaluating the Association between Psychopathy and Specific Attachment Models in Adults

Elliott Christian[1], Martin Sellbom[1, 2] & Ross B. Wilkinson[3]

[1]The Australian National University

[2]University of Otago

[3]University of Newcastle

Author Note

Elliott Christian, Research School of Psychology, The Australian National University. Martin Sellbom, Department of Psychology, University of Otago and Research School of Psychology, The Australian National University. Ross Wilkinson, School of Psychology, University of Newcastle.

Correspondence concerning this article should be addressed to Elliott Christian, Research School of Psychology, The Australian National University, Building 39, Canberra, ACT, 2601. Email: elliott.christian@anu.edu.au

Abstract

In the current investigation, we examined the association between psychopathy and attachment styles in several specific attachment relationships (i.e. Romantic, Mother, Father, Friend). Data were collected online from a combination of Australian university and general community samples (N = 729, 53.50% female) using the Expanded - Levenson Self Report Psychopathy scale (Christian & Sellbom, 2016) and a modified version of the Experiences in Close Relationships Structures (Fraley, Heffernan, Vicary, & Brumbaugh, 2011). Our results revealed that specific attachment models tend to have small to moderate associations with the components of psychopathy, but that the strength and direction of these associations tends to differ between figures, components of psychopathy and dimension of attachment considered. Interestingly, it appeared that peer relationships (i.e. Romantic, Friend) tended to account for the majority of the variance in the relationship between psychopathy and general attachment styles, which may be an important avenue for future research.

Keywords: Psychopathy, Attachment, Specific Attachment, E-LSRP, ECR-RS

Evaluating the Association between Psychopathy and Specific Attachment Models in Adults

Psychopathy is a construct which has been empirically associated with a wide array of interpersonally problematic behaviours, such as, violence and aggression, sexual misconduct and counterproductive workplace behavior (Babiak, Neumann, & Hare, 2010; Boddy, 2014; Hare, 2003; Hawes, Boccaccini, & Murrie, 2013; Lalumiere & Quinsey, 1996; Leistico, Salekin, DeCoster, & Rogers, 2008; Reidy, Shelley-Tremblay, & Lilienfeld, 2011). One theory that could provide a useful framework for understanding the interpersonal relations characteristic of psychopathy is the individual differences component of attachment theory (Bowlby, 1982). While previous research has found that *general* attachment styles are associated with psychopathy (Christian, Sellbom, & Wilkinson, 2016; Conradi, Boertien, Cavus, & Verschuere, 2015; Craig, Gray, & Snowden, 2013; Mack, Hackney, & Pyle, 2011; Miller et al., 2010; Miller, Maples-Keller, & Lynam, 2016),[34] researchers have yet to investigate the role of *specific* attachment relationships. As specific attachment models inform the nature of an individual's general attachment style (Pierce & Lydon, 2001), it may be important to discern whether specific attachment relationships are related to psychopathy or contribute disproportionately to psychopathy's association with general attachment styles.

Psychopathy

Psychopathy is often defined by features including, but not limited to, diminished empathy, manipulativeness, shallow affect, callousness, impulsivity and irresponsibility (Cleckley, 1941; Hare, 2003). Using the Psychopathy Checklist Revised (PCL-R; Hare, 2003), these features can be grouped into various factors, including an affective factor (e.g. callous, lack of empathy), an interpersonal factor (e.g. lying, manipulativeness), a lifestyle

[34] Individual differences in attachment, attachment styles and attachment models are labels that can be used interchangeably.

factor (e.g. impulsive, parasitic) and an antisociality factor (e.g. recidivism). However, defining psychopathy via measurement has been a contentious issue (e.g. Cooke, Michie, & Hart, 2006; Hare & Neumann, 2006) and a variety of different methods for grouping the features of psychopathy which may depend on the measure used. For example, a recent study using a representative sample of Canadian offenders found better model fit for a three-factor hierarchal model of the PCL-R, with affective, interpersonal and lifestyle factors (Storey, Hart, Cooke, & Michie, 2015), than for the four factor model. Despite debates regarding how psychopathy should be best defined and organized, there have been some demonstrated consistencies in the nomothetic network of psychopathy. Typically, the affective/interpersonal features tend to be more associated with instrumental violence, antagonism and narcissism (Derefinko & Lynam, 2006; Reidy et al., 2011; Woodworth & Porter, 2002), while the behavioral factors (i.e. lifestyle/antisocial) are more strongly associated with externalizing and criminal behavior (Hawes et al., 2013; Leistico et al., 2008 Patrick, Hicks, Krueger, & Lang, 2005)[35], suggesting that different psychological mechanisms may underlie different components of psychopathy.

Attachment Theory

One theory that may provide a useful framework to understand some of the problematic interpersonal behavior attributed to psychopathy is attachment theory (Bowlby, 1982). According to attachment theory, individuals are born with a need to bond with and maintain proximity to others who provide protection and care (Zeifman & Hazan, 2008). Through repeated bids for proximity, individuals develop internalized representations (working models) of their attachment figures that guide behavior in future relationships and differ depending on their relationship history (Ainsworth, 1979; Bowlby, 1982). These

[35] Criminal behavior tends to have a strong relationship with the Antisocial factor of the four-factor PCL-R, which is likely inflated due to criterion contamination (Skeem & Cooke, 2010).

working models are thought to be manifested as 'attachment styles' that are predominantly conceptualized using two dimensions: attachment avoidance and attachment anxiety (Brennan, Clark, & Shaver, 1998). Attachment avoidance is characterized by emotional dismissiveness, self-reliance, fear of intimacy and defensive self-inflation, reflective of cold and insensitive caregiving (Brennan et al., 1998; Bartholomew & Horowitz, 1991). Attachment anxiety is characterized by a fear of rejection or abandonment, need for reassurance and preoccupation with caregiver availability, reflective of a history of inconsistent caregiving (Brennan et al., 1998; Bartholomew & Horowitz, 1991). Individuals scoring low on both attachment dimensions are thought to have secure attachment styles, reflective of appropriate and sensitive caregiving (Mikulincer & Shaver, 2007). High scores on both dimensions indicate a fearful or potentially disorganized attachment style characterized by a conflicting combination of attachment anxiety and attachment avoidance, often studied via the interaction effect between these dimensions in order to understand their exacerbated effects on one another (Mikulincer & Shaver, 2007). Individuals with this style of attachment may display a haphazard oscillation between attachment avoidance and anxiety (e.g. seeking comfort, only to withdraw), or display bizarre attachment behavior (e.g. a 'freeze' response),[36] as they attempt to cope with the conflicting motivations to approach and withdraw from attachment figures. This style of attachment is often reflective of abusive or impoverished care (Bakermans-Kranenburg & van Ijzendoorn, 2009), and is typically associated with poorer outcomes for the individual (e.g. psychopathology, relationship difficulties), some of which are relevant to a construct like psychopathy (e.g. externalizing, lowered empathy; Mikulincer & Shaver, 2007).

[36] Referring to the 'fight, flight, or freeze' response in which the individual is so immediately overwhelmed that they cease all locomotive activity, typically to avoid being noticed and/or attacked.

While general attachment styles remain an important part of how humans interact in relationships, individuals are also known to develop working models of specific attachment relationships (Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996; Cozzarelli, Hoekstra, & Bylsma, 2000; Klohnen, Weller, Luo, & Choe, 2005). Interestingly, it has been found that experiences in specific models tend to update general models more so than general models update specific models (Pierce & Lydon, 2001), suggesting an important role for experiences in close relationships in the development of general attachment models. However, specific working models do more than simply update more generalized models, they also predictive of relationship specific as well as broader outcomes (e.g. self-esteem; Cozzarelli et al., 2000; Klohnen et al., 2005). In adulthood, an individual's peer attachment models (i.e. romantic and friends) are usually closely related to their general attachment models and central to their own networks of attachment figures (Doherty & Feeney, 2004; Klohnen et al., 2005; Trinke & Bartholomew, 1997).

Attachment and Psychopathy

To date, there have been a number of studies conducted on the relationship between general attachment styles and psychopathy (Christian et al., 2016; Conradi et al., 2015; Craig et al., 2013; Frodi, Dernevik, Sepa, Philipson, & Bragesjö, 2001; Mack et al., 2011; Miller et al., 2010; Miller et al., 2016). However, it should be noted that there are several studies which have used the Experiences in Close Relationships (ECR; Brennan et al., 1998) or the Experiences in Close Relationships-Revised to measure attachment styles (ECR-R; Fraley, Waller, & Brennan, 2000). These are measures worded towards individual differences in attachment with intimate relationships and/or romantic partners, suggesting that there is likely to be a systematic bias towards romantic attachment models in the attachment and psychopathy literature. Nevertheless, there is a remarkable similarity in findings between studies using explicit measures of general attachment style (e.g. Christian et al., 2016) and

studies using the ECR or ECR-R, likely due to the strong association between general attachment models and romantic attachment models in adults (Klohnen et al., 2005). While some studies have found no significant association between individual differences in attachment and psychopathy (e.g. Brennan & Shaver, 1998; Frodi et al., 2001), likely due to small sample sizes or use of non-validated measures, most tend to report small-to-moderate positive associations between general attachment dimensions and psychopathy components, with some exceptions.

Firstly, boldness, a factor of psychopathy characterized by stress immunity, thrill-seeking, and social dominance (Patrick, Fowles, & Krueger, 2009), tends to correlate negatively with attachment insecurity (Christian et al., 2016; Craig et al. 2013; Miller et al., 2016). Although Conradi et al. (2015) reported a positive association between boldness and attachment avoidance, this likely reflects the psychopathy measure used by Conradi et al. (Youth Psychopathy Inventory; Andershed, Kerr, Stattin, & Levander, 2001), as the boldness measure for this scale tends to share greater than expected variance with other psychopathy scales (Drislane et al., 2015). Secondly, attachment anxiety tends to have a small, typically negative or null, association with the affective component of psychopathy (Christian et al., 2016; Conradi et al., 2015; Craig et al., 2013; Miller et al., 2010; Miller et al., 2016). However, a study of 221 US university students found attachment anxiety and avoidance positively interacted to predict higher affective/interpersonal psychopathy (Mack et al., 2011). In a recent study, which included adult community samples from Australia (n = 249) and the US (n = 292), Christian et al. (2016) were unable to replicate this interaction term across multiple measures of individual differences in attachment and psychopathy and instead found negative interaction effects between attachment dimensions when psychopathy was regressed on them. This inconsistency could reflect differences in the way psychopathy was measured between the studies. Mack et al., (2011) used a scale which combined the affective

and interpersonal features of psychopathy in a single scale (also known as Factor 1 psychopathy), while Christian et al. (2016) used scales which partitioned affective and interpersonal psychopathy. Christian et al. (2016) subsequently found differential associations between attachment anxiety and affective psychopathy (i.e. negative and null) compared to attachment anxiety and interpersonal psychopathy (i.e. positive).

Although there is some research into the relationship between general attachment styles and psychopathy, researchers have yet to systematically consider the role of specific normative attachment relationships (e.g. mother, fathers, friends, romantic partners) in psychopathy. This is an important gap in the literature given that specific working models are known to influence general models overtime (Pierce & Lydon, 2001) and that some relationships contribute disproportionately to general attachment styles (e.g. peers in adulthood; Klohnen et al., 2005). Currently, there is no published research on parental attachment styles and psychopathy in adults. However, some researchers have reported that parental neglect, coldness, separation, abuse and neglect are associated with higher psychopathy in adults (Farrington, 2006; Gao, Raine, Chan, Venables, & Mednick, 2010; Marshall & Cooke, 1999), though these studies do not measure attachment insecurity. In a study of 55 Australian boys (4-9 years of age), Pasalich, Dadds, Hawes and Brennan, (2012), found that callous/unemotional traits were associated with disorganized attachment, which may suggest positive associations between individual differences in parental attachment and psychopathy, although generalization from children to adults is problematic. With regards to the relationship between specific parental attachment figures and psychopathy, previous research has found that in adults, reports of early paternal separation, paternal overprotection, and diminished maternal care is associated with higher psychopathy (Gao et al., 2010; Oltman & Friedman, 1967), indicating that specific attachment relationships are likely to be associated with psychopathy in adulthood. Furthermore, paternal attachment insecurity in

adolescence has also been found to predict higher psychopathy (Flight & Forth, 2007), but again, generalizing from such a sample to adults is questionable.

To date, there has been limited research on individual differences in peer attachment and psychopathy in adults, with no research on friend attachment and psychopathy. However, studies conducted with adolescents have reported no significant association between individual differences in friend attachment and psychopathy (Flight & Forth, 2007; Kosson, Cyterski, Steuerwald, Neumann, & Walker-Matthews, 2002), suggesting that individual differences in friend attachment is unlikely to be influential. In contrast, Savard, Brassard, Lussier and Sabourin, (2015) reported that romantic attachment insecurity (i.e. avoidance and anxiety) was associated with higher behavioral and affective/interpersonal psychopathy in French adult couples, though only males displayed the association with affective/interpersonal psychopathy.[37] This finding is partially consistent with the aforementioned study by Mack et al. (2011), who reported that a positive interaction between attachment anxiety and avoidance predicted higher interpersonal affective psychopathy. Given that Mack et al. used a measure worded towards romantic relationships (i.e. the ECR-R; Fraley et al., 2000), these findings may suggest that higher attachment anxiety in affective/interpersonal psychopathy could be specific to romantic relationships. In addition, this explanation could offer an alternative explanation for the inconsistency between others studies which have used measures of general attachment style have found a negative or null association between affective/interpersonal psychopathy and attachment anxiety (Christian et al., 2016; Craig et al., 2013). Nevertheless, a positive association with attachment anxiety remains inconsistent with the low-anxiety conceptualization of this factor (Patrick, Bradley, & Lang, 1993).

[37] The authors used an actor-partner interdependence model with male and female partners. Partner effects are not discussed here as they are beyond the scope of this paper, though interested readers are referred to the original paper by Savard et al. (2015).

Current Study

In light of the literature just reviewed, the purpose of the current study was twofold; first, to investigate the association between specific attachment relationships and psychopathy; and second, to evaluate the utility of general attachment models in psychopathy, given the role of specific attachment models. For this purpose, we combined data from two adult Australian samples, which included measures of psychopathy and individual differences in attachment in several relational contexts. Based on previous research, we chose several normatively important attachment models to measure (i.e. mothers, fathers, romantic partners, friends; Doherty & Feeney, 2004; Trinke & Bartholomew, 1997). In light of the literature reviewed, we hypothesized that individual differences in mother, father and romantic attachment models would be positively related to psychopathy (Farrington, 2006; Gao et al., 2010; Mack et al., 2011; Savard et al., 2015), but that individual differences in friend attachment models would be unrelated (Flight & Forth, 2007; Kosson et al., 2002). We hypothesized that individual differences in maternal and romantic attachment models would be most strongly associated with psychopathy, as these are considered pivotal attachment relationships (Bowlby, 1982; Mikulincer & Shaver, 2007). With regards to associations between specific attachment dimensions and components of psychopathy, we hypothesized that most associations would be small to moderate and positive, consistent with previous research (Christian et al., 2016; Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011; Miller et al., 2010; Miller et al., 2016). However, we also hypothesized that affective psychopathy would negatively correlate with attachment anxiety across relationships (due to the conceptualization of this component of psychopathy as a low anxiety construct and previous findings; Patrick et al., 1993; Christian et al., 2016; Cleckley, 1941; Conradi et al., 2015), but positively correlate with romantic attachment anxiety (Mack et al., 2011; Savard et al., 2015). Finally, given the focus of previous research on general

models of attachment in psychopathy, we decided to test the utility of this association when accounting for specific attachment models. We hypothesized that general attachment models would continue to be predictive of psychopathy, even after accounting for specific attachment relationships, consistent with previous research which has investigated the utility of general attachment models over and above specific attachment models (Klohnen et al., 2005).

Method

Participants

Data were collected from a combination of Australian university and general community populations. In the university sample, responses from 222 participants were collected.[38] Of these responses, one was removed as a non-cooperative response[39], leaving 221 participants. The mean age of this sample was 23.45 years (SD = 9.70, range = 18-72). Most of the sample was female (73.30%) and identified as Caucasian (70.00%), followed by Asian (19.10%) then "Other" (10.90%). Due to the smaller than desired sample size and disproportional number of women, we collected a second sample from the general Australian community, which consisted of 599 participants who provided complete data. Six underage participants (< 18 years) were removed, along with 85 additional participants who provided non-cooperative responses using the same criteria as the university sample; this resulted in a final sample of 508 participants. The mean age of the community sample was 38.68 years (SD = 11.70, range = 18-69, 54.90% male). Most participants identified as Caucasian (80.30%), followed by Asian (10.00%) then "Other" (9.70%), displaying a similar pattern to the university sample. The combined samples contained 729 participants, a slight majority were female (53.50% female) with a mean age of 34.06 years (SD = 13.15, range = 18-72)

[38] Some participants did not complete all measures of attachment in specific relationships, producing discrepancies in the final number used in each analysis.
[39] Non-cooperative responses were those that displayed an inappropriate lack of variability on a scale and inappropriate responses such as claiming fictitious royal lineage, highly improbable age or a seemingly random assortment of letters, numeral and symbols.

and most individuals identifying as White (77.50%, 12.80% Asian, 9.70% Other).[40] This sample was previously used by Christian and Sellbom (2016), however, the analyses conducted here are novel.

Materials

Expanded-Levenson-Self Report Psychopathy Scales (E-LSRP; Christian & Sellbom, 2016; Levenson, Kiehl, & Fitzpatrick, 1995). The E-LSRP is a modified version of the three-factor model of the Levenson Self-Report Psychopathy scale (Brinkley, Diamond, Magaletta, & Heigel, 2008), which was based on the original two factor version of the scale (Levenson et al., 1995). Christian and Sellbom (2016) successfully expanded the scale by adding additional items to improve reliability and construct coverage. The E-LSRP is composed of three subscales, Egocentricity (k = 11; α = .85), Callousness (k = 12; α = .80), and Antisocial (k = 13; α = .81) as well as a Total Score (α = .90). The three subscales generally conform to Cooke and Michie's (2001) three-factor conceptualization of the PCL-R, measuring affective, interpersonal and behavioral components of psychopathy. In the current study, a six-point Likert-type scale was used (*Strongly Disagree, Disagree, Somewhat Disagree, Somewhat Agree, Agree, Strongly Agree*). The scale has previously demonstrated promising psychometric properties and construct validity (see Christian & Sellbom, 2016).

Experiences in Close Relationships – Revised – Structures (ECR-RS; Fraley, Heffernan, Vicary, & Brumbaugh, 2011). To measure specific and general attachment styles we used a modified version of the ECR-RS (see online supplementary material). The original ECR-RS (Fraley et al., 2011) is a short scale used to measure attachment avoidance (k = 6) and attachment anxiety (k = 3) in specific attachment relationships. The scales use the same item pool for each relational context to maintain consistency across relationships, with

[40] Tests of invariance across samples were conducted and are reported in the results section.

mother, father, romantic and friend attachment contexts typically included[41]. All items were scored on a 7-point Likert scale (*Strongly Disagree*, *Disagree*, *Slightly Disagree*, *Neither Agree Nor Disagree*, *Slightly Agr*ee, *Agree*, *Strongly Agree*). In the modified version of the scales, we included three additional items on the attachment anxiety scales to broaden the construct coverage (e.g. attachment frustration and desire to merge), and also replaced an item that Fraley et al. (2011) reported cross-loaded between the scales. Information regarding the measurement modelling and construct validity of the scale is included in the supplementary materials (this includes intercorrelations among the attachment scales). Briefly, we found that the scales tended to reach acceptable levels of model fit following respecification with modification indices, though there was some cross-loading with several of the avoidance items and the attachment frustration item loading was lower than expected for parents (≈ .30). Internal consistency reached acceptable levels for all attachment avoidance (General α = .85, Mother α = .90, Father α = .87, Romantic α = .87, Friend α = .86) and attachment anxiety scales (General α = .89, Mother α = .83, Father α = .85, Romantic α = .88, Friend α = .87) and we found evidence to support the construct validity of the modified scales.

Procedure

The questionnaire was administered online and hosted via Qualtrics as part of a broader series of studies. Participants from the university sample were directed to the survey via posters displayed on campus, whereas responses from participants in the community sample were collected by Qualtrics' panelling services. Each of the measures was presented

[41] As some participants may not have had some of these relationships, there is some inconsistency with the number of responses across relationships (Romantic *n* = 689, Mother *n* = 683, Father *n* = 662, Friend *n* = 689, General *n* = 694). For romantic, participants were asked to rate their romantic relationship or previous relationships were they did not have a current partner. For the parental figures they were asked to rate their relationship or a parental like figure (e.g. mother or mother like figure). For friend, they were asked to rate their best friendships.

in a single randomized order, with the items within each measure randomized between participants. The survey took approximately 30 minutes to complete.

Results

Descriptive statistics for the E-LSRP and ECR-RS are presented in Table 1. Initially, Pearson's correlation coefficients were calculated to ascertain the strength of the associations between the attachment and psychopathy variables (see Table 2). Most of the associations between the components of psychopathy and attachment variables were positive and small to moderate in size with remarkably limited differentiation between the components of psychopathy and their associations with the attachment scales in any of the relational contexts. The exception to this pattern was the association between callousness and attachment anxiety in general and romantic relationships which was non-significant.

Next, multiple hierarchical linear regression analyses were conducted for each relational context where each of the psychopathy factors were regressed on attachment anxiety, attachment avoidance, followed by their mean-centered interaction term in the next step (see Table 2).[42] Interaction terms were used in the analyses in order to examine the exacerbating effect sometimes reported for individuals higher on both individual differences dimensions of attachment (Mikulincer & Shaver, 2007), whilst also allowing comparison between previous studies which have found significant interaction between attachment dimensions in their association with psychopathy (e.g. Christian et al., 2016; Mack et al., 2011). For the Egocentricity scale, both dimensions of general attachment style displayed small positive main effects, qualified by a negative interaction term. In other words, the association between egocentricity and either attachment dimension was inflated as the other

[42] Variance Inflation Factor (VIF) and Tolerance statistics were used to test for multicollinearity. These statistics ranged from 1.01-1.38 and .73-.99 respectively, suggesting that multicollinearity is unlikely to be impacting on the results (Menard, 1995). Due to differential associations between the attachment dimensions and psychopathy, the total psychopathy scores are likely to be uninformative in this context and therefore, we restrict our discussion to the associations between the dimensions of attachment and psychopathy factors.

attachment dimension decreased and suppressed as the other attachment dimension increased (see Figure 1 for example). For specific attachment figures, parental attachment anxiety was found to positively predict egocentricity, with the slope becoming flatter as parental attachment avoidance increased (mothers -1SD β = .36, p < .01, +1SD β = .17, p < .01; fathers, -1SD β = .44, p < .01, +1SD β = .06, p = .18). Notably, for those that reported no father (n = 193), egocentricity displayed a stronger positive association with attachment anxiety (β =.48, p <.01) and a stronger and significant negative association with attachment avoidance (β = -.17, p =.03), as well as stronger negative interaction effect (β = -.39, p <.01) compared to those who reported having a father (n = 563; attachment anxiety β =.19, p <.01; attachment avoidance β = .09, p =.09; interaction β = -.14, p <.01,).[43] For peer attachments, attachment avoidance was found to positively predict egocentricity, with the slope for romantic attachment avoidance moderated by attachment anxiety in which the association between egocentricity became stronger with decreases in attachment anxiety (-1SD β = .41, p < .01) and weaker with increases in attachment anxiety (+1SD β = .17, p < .01). However, the interaction term between attachment avoidance and anxiety was not significant for friend attachment avoidance with egocentricity. Friend attachment anxiety was also significantly positively predictive of egocentricity, but only in the community sample (β = .25, p <.01; β = .04, p = .57 for the university sample).[44]

In the prediction of callousness, general attachment styles displayed differential associations across the attachment dimensions. Attachment avoidance evinced a moderate

[43] To test for differences in groups of interest (i.e. gender, sample, presence of relationship), we examined degradation in model fit using χ^2 significance testing by allowing slopes to freely vary across groups and comparing this to a constrained model. These analyses were conducted using Maximum Likelihood estimation with robust scaling in M*plus* 7. No significant gender differences were found. Differences in presence (versus absence) of relationship and between samples are noted in text.

[44] Slopes were also significantly different for the association between total psychopathy and friend attachment anxiety (χ^2 = 17.62, df = 3, p < .01) with the association being significantly positive for the community sample (β = .25, p <.01) and non-significant for the university sample (β = .01, p =.86).

positive association and attachment anxiety displayed a small negative association. These effects were qualified by a significant negative interaction term. Here, the slope for the association between callousness and attachment avoidance became more positive with decreases in attachment anxiety and the slope for the association between callousness and attachment anxiety became more negative with decreases in attachment anxiety. A similar association was also observed between attachment styles and callousness in both peer attachment relationships (see Figure 1 for romantic attachment context), with the exception of friend attachment anxiety which displayed a non-significant main effect. However, friend attachment anxiety did have a small significant negative association (β = -.16, p =.02), when considered separately to the community sample (β = .06, p = .19). Small positive associations were found for both parental attachment relationships and their associations with callousness for both attachment dimensions. These effects interacted with each other to display a stronger positive association with callousness as the other attachment dimension decreased, and a weaker association with increases in the other attachment dimension.

For the Antisocial scale, a similar pattern of associations with attachment styles was noted across all relational contexts. With general attachment styles, attachment avoidance and attachment anxiety both displayed small positive slopes which interacted to become more positive as the other attachment dimensions decreased, and weaker as the other attachment dimension increased (i.e. mutual inhibition). A similar association between general attachment style and the Antisocial scale was observed with each of the specific attachment relationships with two exceptions. For mother attachment style, the interaction between attachment dimensions was not significantly associated with the Antisocial scale and for friend attachment anxiety, the slopes between the university sample (β = .12, p = .05) and community sample (β = .29, p <.01) differed significantly (χ^2 = 12.34, df = 3, p = .01) in their association with the Antisocial scale.

To evaluate the degree of independent contribution from the attachment style with each specific attachment figure and the association with psychopathy, each component of psychopathy was separately regressed on all specific attachment relationship variables at once (see Table 3).[45] In these analyses, working models of specific attachment relationships accounted for 19-27% of the variance in psychopathy, depending on the component of psychopathy. For parental attachment styles, attachment anxiety displayed several small independent associations with each of the components of psychopathy, which tended to differ between mother and father. Several interaction terms were also significant for parent attachment styles, but these were also small. For peer attachment styles, attachment avoidance displayed several small to moderate associations with components of psychopathy. Romantic attachment anxiety displayed a negative association with callousness, but this relationship was not found for the friend attachment context. Friend attachment anxiety also displayed several small positive slopes across the components of psychopathy and two significant interaction terms.

Finally, to evaluate utility of general attachment models in psychopathy, accounting for specific working models of attachment, hierarchical multiple regression analyses were conducted with each component of psychopathy. In the first step we entered all parental attachment variables, as these models should act as a foundation for peer models (Bowlby, 1982), followed by all peer attachment variables, with general models entered in the final step (see Table 4). Using this procedure, parental models initially accounted for between 11-14% of the variance across the components of psychopathy and peer attachment models contributed an additional 7-15% of the variance. With the final step, general attachment variables were found to still provide a significant contribution to the model, but the size was

[45] VIF and Tolerance statistics ranged from 1.13-2.08 and .48-.89 respectively, which are within recommended guidelines and suggests that multicollinearity is unlikely to be impacting on the results (Menard, 1995).

small (ΔR^2 = 1-3%). Given that the strongest associations between individual differences attachment and psychopathy had been in the peer domain, we decided to re-run the analysis with peer attachment variables entered in the first step, following by parent attachment variables, to see the contribution of parental attachment models to psychopathy beyond peer attachment models. The results indicated that parent attachment models maintains a significant contribution to the relationship between individual differences in attachment and psychopathy, but that relationship tends to be small (ΔR^2 = 3-4%) when taking peer attachment models into account first.

Discussion

In this study we investigated the association between specific attachment models and psychopathy, as well as the utility of the association between general attachment models and psychopathy after accounting for specific attachment models. With regards to our first aim, we hypothesized that specific attachment models, particularly romantic and maternal, would generally have small to moderate positive associations with the components of psychopathy, but that friend attachment models would be unrelated. We also hypothesized that attachment anxiety would have a negative association with the affective component of psychopathy across relationships, except for romantic partners where we hypothesized a positive relationship between attachment anxiety and affective psychopathy. Our results were partially consistent with these hypotheses. Most specific attachment models, *including* friend attachment models, had small to moderate positive associations with most components of psychopathy, and most associations were qualified by significant negative interaction terms. Based on our results, it appears that peer attachment models tended to display stronger and more numerous associations with psychopathy, rather than maternal or parental attachment models. We also found that attachment anxiety tended to have a null to small negative association with the affective component of psychopathy with peers and a small positive

association with parents. With regards to our second aim, we found that after accounting for specific attachment models, general attachment models continue to have a significant, albeit small, association with psychopathy.

For peer attachment models, we found a number of significant associations with psychopathy. Unlike previous research (Flight & Forth, 2007; Kosson et al., 2002), psychopathy was found to be significantly associated with friend attachment models. This is perhaps unsurprising with an adult sample where attachments to friends often occupy primary positions in an individual's network of attachment figures (Doherty & Feeney, 2004; Trinke & Bartholomew, 1997); whereas previous studies reported on attachment in adolescence, where the transfer of attachment behaviors to peers may still be in progress (Hazan & Zeifman, 1994). Of the associations between psychopathy and peer attachment models, it appears that attachment avoidance may have a particularly important relationship relative to attachment anxiety. Peer attachment avoidance displayed consistent positive associations across the components of psychopathy, most of which were independent of parental attachment models. This finding is consistent with the interpersonally emotionally detached style of psychopathy (Jones & Paulhus, 2010), particularly as callousness tended to have the strongest association, and suggests that psychopathic individuals are likely to have peer attachments characterized by emotional avoidance, discomfort with intimacy and dismissiveness. Consistent with this interpretation, higher psychopathy is associated with poorer relationship quality and perceived conflict in peer relationships (Love & Holder, 2016; Muñoz, Kerr, & Besic, 2008).

In contrast, peer attachment anxiety displayed a more complex association with psychopathy, which differed across attachment figure, component of psychopathy and sample. Previous research has reported that factor 1 psychopathy (i.e. affective/interpersonal) is positively associated with romantic attachment anxiety using the LSRP Primary scale

(Mack et al., 2011; Savard et al., 2015). However, given that peer attachment anxiety had a differential relationship across egocentricity (null/+), and callousness (null/-), our results are more supportive of considering the affective and interpersonal components of psychopathy separately, consistent with findings at the level of general attachment models (Christian et al., 2016), rather than romantic attachment anxiety being positively related to affective psychopathy. Moreover, these findings appear to be consistent with the idea that individuals higher on psychopathy are low in anxiety (Cleckley, 1941; Patrick et al., 1993). Interestingly, friend attachment anxiety in the community sample was found to have steeper positive slopes associated with the components of psychopathy compared to the university sample. Reasons for this difference are not entirely clear, though differences here could be due to stage of life differences in relationships between the two samples.[46]

In the parent domain, a similar pattern of small positive associations between attachment models and psychopathy, qualified by negative interaction terms, was found for both parental figures. Our findings are somewhat consistent with previous research which has found parental attachment insecurity in children and adolescents is associated with higher psychopathy (Kosson et al., 2002; Pasalich et al., 2012). However, we also found that the individual differences dimensions of parental attachment tended to negatively interact, which is a novel finding and may suggest some interesting parental attachment model configurations for those higher on psychopathy.[47] Contrary to our predictions and results with peers, parental attachment anxiety was positively associated with egocentricity and callousness and also had associations with psychopathy independent of peer attachment models, suggesting that parental attachment anxiety may be important in the relationship between attachment and

[46] Age alone did not appear to explain these results as the differences in slopes between the university and community samples remained significant even when age was controlled for in the analyses.
[47]Given the small main effects and negative interaction term for most of the associations, it is possible that high/low combinations on the attachment dimensions could be more common with those highest on psychopathy.

psychopathy. Further research will be required to understand these positive associations, particularly with callousness, given the low anxiety conceptualization of affective psychopathy (Cleckley, 1941), though they could reflect the turbulent family histories of those higher on psychopathy (Farrington, 2006; Marshall & Cooke, 1999). Finally, the slopes for the association between father attachment models and egocentricity were significantly steeper for participants without fathers, compared to participants that reported having fathers. In previous research, early father absence has been associated with higher psychopathy (Gregory, 1958; Jenkins, 1966; Oltman & Friedman, 1967), though these studies occurred prior to reliable measurement of psychopathy and the reason for this effect does not appear to be understood.

With regards to general attachment models and psychopathy, our results are largely consistent with previous findings (Christian et al., 2016; Conradi et al., 2015; Craig et al. 2013; Mack et al., 2011). Attachment avoidance and attachment anxiety displayed small to moderate positive associations with each of the E-LSRP psychopathy scales, except the Callousness subscale, where attachment anxiety showed a null or weak negative association. However, in the current study, attachment avoidance had more significant associations with the egocentricity and antisocial scales when accounting for shared variance between the attachment scales compared to Christian et al. (2016), which could reflect differences in statistical power across the studies. It is also important to note that we were again unable to replicate the positive interaction term between attachment scales predicting affective or interpersonal psychopathy factors reported by Mack et al. (2011). Instead, we again found negative interaction terms. The reasons for this inconsistency remain unclear to us, but could reflect differences in sampling or a cultural idiosyncrasy. Interestingly, general attachment models appeared to only have a small relationship with psychopathy after accounting for specific relationships. Peer attachment models appeared to be the strongest predictor,

suggesting that peer attachment models, over parental attachment models, may be particularly important in the association between individual differences in attachment and psychopathy in adults. Our research seems to be consistent with the idea that attachment relationships which are currently influential to the individual are the most important attachment relationships for psychopathy, as in adulthood, peer attachments tend to occupy central positions in an individual's attachment network and become the strongest predictors of general attachment models (Doherty & Feeney, 2004; Klohnen et al., 2005; Trinke & Bartholomew, 1997). With regards to the utility of general attachment models in psychopathy research, given the small amount of variance accounted for by general attachment models, researchers may be interested in directing their inquires towards the specific attachment models we found to be influential. However, as general attachment models represent an individual's most chronically accessible models of attachment, may still retain some utility, as they may be relied upon in certain situations over specific attachment models (e.g. ambiguous situations; Collins & Read, 1994).

From the results of the current research there are also several broader implications. Like previous research (Christian et al., 2016; Conradi et al., 2015; Craig et al. 2013; Mack et al., 2011), our results demonstrate a relationship between attachment and psychopathy, indicating that there may be utility in the application of attachment theory to psychopathy. Our results also provide preliminary evidence to suggest that attachment theory may be useful in the discussion of the etiology of psychopathy, though further research in this area is clearly required, particularly regarding causality and integration with other etiological theories (e.g. Blackburn, 1998; Blair, 2006; Lykken, 1995; Moul, Killcross, & Dadds, 2012; Patrick et al., 2009; Zeier, Maxwell, & Newman, 2009). In terms of clinical implications, the current results suggest that adults higher on psychopathy are likely to present with attachment insecurity across their attachment relationships; peer attachment models are likely to be

particularly important, perhaps as a point of intervention, and characterized by emotionally dismissiveness, independence, minimization and discomfort with intimacy.

There are limitations to the current study which should be considered. Firstly, our study relied on self-report measurement which may have inflated our correlations due to shared method variance artefacts. Future research using interview based measures such as the PCL-R (Hare, 2003) and/or Adult Attachment Interview (George, Kaplan, & Main, 1985) may be useful to ameliorate this issue and provide alternative perspectives on psychopathy and attachment. Secondly, the current study measured only four specific attachment relationships, despite adults being known to form attachments with a range of figures (e.g. other family, pets, deities; Doherty & Feeney, 2004; Kirkpatrick & Shaver, 1992; Kurdek, 2009; Trinke & Bartholomew, 1997). However, as there is currently no research on the nature of attachment networks in psychopathy, the selection of several normatively investigated figures appears defensible (e.g. Fraley et al., 2011; Klohnen et al., 2005). Thirdly, participants for the current study were collected from a combination of university and general community samples, suggesting that findings may generalize well to other university and community samples, but limits our ability to generalize to forensic and other clinical samples. Finally, causality in the relationship between individual differences in attachment and psychopathy cannot be determined in the current study. Longitudinal research is needed to begin addressing this research question.

Overall, this study extends on previous research on the association between individual differences in general attachment models and psychopathy in adults by investigating the role of specific attachment models. The findings of this study suggest that individuals higher on psychopathy are likely to have specific attachment models characterized by attachment insecurity, the nature of which differs depending on the component of psychopathy, dimension of attachment insecurity and particular figure considered. Furthermore, although

still significant, our findings indicate that the majority of variance in the relationship between general attachment models and the components of psychopathy is accounted for by specific attachment models (i.e. maternal, paternal, romantic and friend), particularly romantic and friend attachment models. While the utility of individual differences in general attachment models to psychopathy research is debatable, based on the current findings, our research suggests that romantic and friend attachment models may be important to consider in future research.

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Table 3.1
Descriptive Statistics for Psychopathy and Attachment Variables

Scale	N	Mean	SD	Range (Min – Max)	Skew (SE)	Kurtosis (SE)
E-LSRP						
Total	729	2.65	.58	4.17 (1.11-5.28)	.393 (.091)	.285 (.181)
Egocentricity	729	2.60	.78	4.55 (1.00-5.55)	.486 (.091)	.258 (.181)
Callousness	729	2.45	.66	4.17 (1.00-5.17)	.522 (.091)	.213 (.181)
Antisocial	729	2.87	.69	4.23 (1.08-5.31)	.274 (.091)	.063 (.181)
ECR-RS						
General						
Avoidance	695	3.61	1.26	6.00 (1.00-7.00)	.251 (.093)	-.005 (.185)
Anxiety	694	3.57	1.41	6.00 (1.00-7.00)	.147 (.093)	-.699 (.185)
Mother						
Avoidance	683	3.21	1.53	6.00 (1.00-7.00)	.437 (.094)	-.579 (.187)
Anxiety	683	2.44	1.22	6.00 (1.00-7.00)	1.041 (.094)	.800 (.187)
Father						
Avoidance	662	3.73	1.52	6.00 (1.00-7.00)	.267(.095)	-.674 (.190)
Anxiety	663	2.54	1.27	5.67 (1.00-6.67)	.789 (.095)	.028 (.190)
Romantic						
Avoidance	689	2.70	1.24	5.67 (1.00-6.67)	.670 (.093)	-.119 (.186)
Anxiety	690	3.44	1.48	6.00 (1.00-7.00)	.364 (.093)	-.661 (.186)
Friend						
Avoidance	689	3.04	1.22	6.00 (1.00-7.00)	.402 (.093)	-.125 (.186)
Anxiety	698	3.13	1.34	6.00 (1.00-7.00)	.469 (.093)	-.353 (.186)

Note. E-LSRP = Expanded – Levenson Self-Report Psychopathy scales, ECR-RS = Experiences in Close Relationships – Revised – Structures.

Table 3.2
Correlations and Beta Weights for the Associations Between Attachment and Psychopathy Variables

	E-LSRP							
	Total		Egocentricity		Callousness		Antisocial	
Attachment	r/ΔR^2	*β*	r/ΔR^2	*β*	r/ΔR^2	*β*	r/ΔR^2	*β*
General								
Avoidance	.36***	.28***	.26***	.18***	.35***	.33***	.27***	.19***
Anxiety	.17***	.11***	.15***	.11***	-.01	-.08*	.26***	.21***
Interaction	.03***	-.16***	.04***	-.16***	.02***	-.12***	.02**	-.11***
r^2	-	.17***	-	.11***	-	.15***	-	.13***
Mother								
Avoidance	.26***	.16***	.17***	.07	.23***	.17***	.24***	.14***
Anxiety	.28***	.27***	.25***	.26***	.13***	.13**	.28***	.25***
Interaction	.02***	-.13***	.01*	-.09*	.03***	-.16***	.00	-.07
r^2	-	.12***	-	.08***	-	.08***	-	.10***
Father								
Avoidance	.23***	.09*	.14***	.02	.22***	.12***	.20***	.09*
Anxiety	.26***	.28***	.22***	.25***	.17***	.18***	.23***	.24***
Interaction	.05***	-.23***	.03***	-.19***	.04***	-.20***	.02***	-.17***
r^2	-	.13***	-	.09***	-	.09***	-	.09***
Romantic								
Avoidance	.39***	.39***	.29***	.29***	.35***	.44***	.32***	.25***
Anxiety	.16***	-.00	.14***	.02	-.03	-.21***	.26***	.15***
Interaction	.02***	-.14***	.01**	-.12**	.01***	-.12***	.01*	-.09*
r^2	-	.17***	-	.10***	-	.17***	-	.13***
Friend								
Avoidance	.39***	.33***	.33***	.26***	.40***	.39***	.25***	.17***
Anxiety	.25***	.16***	.25***	.17***	.09*	-.02	.27***	.22***
Interaction	.01**	-.09**	.00	-.06	.01*	-.07*	.01**	-.10***
r^2	-	.19***	-	.14***	-	.17***	-	.12***

Note. * = $p < .05$, ** = $p <. 01$., *** = $p <. 001$. Correlations calculated with Pearson's r, standardised *β* weights displayed calculated using regression with Ordinary Least Squares Estimation. For the interaction terms, ΔR^2 is displayed in lieu of r. E-LSRP = Expanded - Levenson Self Report Psychopathy scales, N = 662-729. Significant differences in slopes were found for those reporting the absence of a father compared to those reporting a father and between the community and university samples. These differences are reported in text and only the aggregated results are presented in the table.

Table 3.3
Simultaneous Regression of Specific Attachment Figure Dimensions on Psychopathy Factors

	E-LSRP			
Attachment	Total	Egocentricity	Callousness	Antisocial
Mother				
Avoidance	.05	.00	.05	.08
Anxiety	.12*	.13*	.03	.13*
Interaction	-.06	-.04	-.11**	.00
Father				
Avoidance	-.00	-.04	.01	.02
Anxiety	.10*	.08	.12*	.06
Interaction	-.11***	-.11**	-.08*	-.08
Romantic				
Avoidance	.25***	.16***	.29***	.16***
Anxiety	-.09*	-.05	-.23***	.04
Interaction	-.07	-.06	-.06	-.04
Friend				
Avoidance	.16***	.17***	.20***	.02
Anxiety	.12**	.11*	.03	.14**
Interaction	-.11**	-.07	-.09*	-.12**
Interaction effects ΔR^2	.04***	.03***	.04***	.03***
Total R^2	.29***	.19***	.27***	.21***

Note. * = $p < .05$, ** = $p <$. 01., *** = $p <$. 001. Displaying standardized Beta's calculated with Ordinary Least Squares Regression, E-LSRP = Expanded - Levenson Self Report Psychopathy scales. Listwise deletion was used for participants with missing data. $N = 611$.

Table 3.4

Hierarchical Regression on the Association Between General Attachment Models and the Components of Psychopathy After Accounting for Specific Attachment Models

	E-LSRP							
	Total		Egocentricity		Callousness		Antisocial	
Model	R^2	ΔR^2	R^2	ΔR^2	R^2	ΔR^2	R^2	ΔR^2
Parents Entered First								
Step 1 - Parents	.17***	-	.11***	-	.11***	-	.14***	-
Step 2 - Peers	.28***	.11***	.17***	.08***	.26***	.15***	.21***	.07***
Step 3 - General	.30***	.02***	.20***	.03***	.28***	.02***	.22***	.01*
Peers Entered First								
Step 1 - Peers	.24***	-	.16***	-	.23***	-	.17***	-
Step 2 - Parents	.28***	.04***	.19**	.03***	.26***	.03***	.21***	.04***
Step 3 - General	.30***	.02***	.22***	.03***	.28***	.02***	.22***	.01*

Note. * = $p < .05$, ** = $p <. 01.$, *** = $p <. 001$. E-LSRP = Expanded - Levenson Self Report Psychopathy. “Parents” refers to both dimensions of attachment insecurity and their interactions terms for mothers and fathers. “Peers” refers to both dimensions of attachment insecurity and their interactions terms for romantic partners and friends. $N = 601$.

Figure 3.1
Interaction between Dimensions of Romantic Attachment on Their Association with E-LSRP Callousness

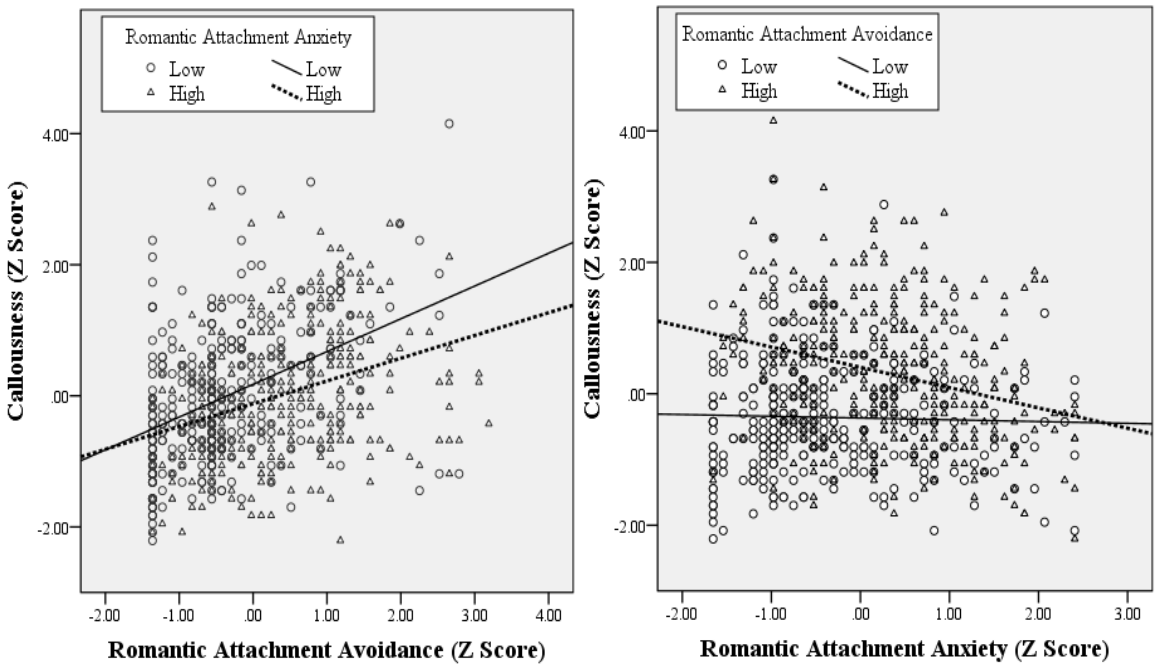

Figure 1. Scatter diagrams plotting the association between E-LSRP callousness and ECR-RS romantic attachment. On the left, the association between E-LSRP callousness and ECR-RS Romantic attachment avoidance is plotted separately for participants low (β = .35, p < .001, r^2 = .12) and high (β = .50, p < .001, r^2 = .18) on romantic attachment anxiety (via a median split) to demonstrate the moderating effect of romantic attachment anxiety on this relationship. On the right, the association between E-LSRP callousness and ECR-RS Romantic attachment anxiety is plotted separately for participants low (β = -.03, p = .59, r^2 = .00) and high (β = -.31, p < .001, r^2 = .07) on romantic attachment avoidance (via a median split) to demonstrate the moderating effect of romantic attachment anxiety on this relationship.

Manuscript 4: Is Psychopathy Associated with Deficits in Bonding in an Adult Non-Institutionalised Sample? The Association Between Intimate Social Network Size, Composition, Attachment Behaviour and Psychopathy

Christian, E., Sellbom, M., & Wilkinson, R. B. (Submitted). *Journal of Social and Personal Relationships.*

Foreword

Having investigated the associations between psychopathy and individual differences in attachment style in general and specific relationships, we shifted our focus to an area of attachment theory which has yet to be investigated in relation to psychopathy, the actual presence of attachment bonds. While individual differences in attachment style reflect the *quality* of a bond, they do not reflect to *presence* of a bond (Ainsworth, 1979). This is an interesting gap in the literature as the research conducted regarding psychopathy and individual differences in attachment style is based on the assumption that the individuals within their sample have attachment bonds. In addition, psychopathy is a construct which is often defined by the absence of bonds and attachments, particularly for the affective component of the construct (Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Lilienfeld & Widows, 2005; Patrick et al., 2009), yet there has been limited research to validate this attribution. Therefore, the purpose of the following study was to investigate the associations between psychopathy and behaviour which indicate the presence, rather than the quality, of attachment relationships.

Is Psychopathy Associated with Deficits in Bonding in an Adult Non-Institutionalised Sample? The Association Between Intimate Social Network Size, Composition, Attachment Behaviour and Psychopathy

Elliott Christian[1], Martin Sellbom[1, 2] and Ross B. Wilkinson[3]

[1]The Australian National University

[2]University of Otago

[3]University of Newcastle

Author Note

Elliott Christian, Research School of Psychology, The Australian National University. Martin Sellbom, Department of Psychology, University of Otago and Research School of Psychology, The Australian National University. Ross B. Wilkinson, School of Psychology, University of Newcastle.

Correspondence concerning this article should be addressed to Elliott Christian, Research School of Psychology, The Australian National University, Building 39, Canberra, ACT, 2601. Email: elliott.christian@anu.edu.au

Abstract

The diminished capacity to form bonds is an attribute that has been widely ascribed to psychopathy, particularly the affective domain of the construct. The purpose of the current study was to investigate this hypothesis by examining the association between psychopathy, intimate social network size and composition, and attachment bonds, using self-report measures in a large mixed Australian sample of university students and members of the general community. Our results indicated that psychopathy is associated with some deficits in bonding. Psychopathy was associated with fewer peer relationships, particularly female friendships, and less attachment behaviour towards familial relationships. The results also tended to differ across psychopathy factors, with the affective domain consistently displaying diminished attachment behaviour with both peers and family. However, the effect sizes were generally small and raise some question as to the centrality of bonding deficits to psychopathy, at least in adult non-institutionalised samples.

Is Psychopathy Associated with Deficits in Bonding in an Adult Non-Institutionalised Sample? The Association Between Intimate Social Network Size, Composition, Attachment Behaviour and Psychopathy

Psychopathy can be defined by a constellation of affective (e.g., diminished empathy, shallow affect), interpersonal (e.g., manipulativeness, lying) and behavioural features (e.g., impulsivity, irresponsibility; Cooke & Michie, 2001; for alternative theoretical models see Cooke, Hart, Logan, & Michie, 2012; Hare, 2003; Lynam & Miller, 2015; Patrick, Fowles, & Krueger, 2009). It has consistently been associated with a range of disruptive and destructive interpersonal behaviours, often accompanied by diminished guilt, sympathy or remorse regarding the consequences of these behaviours for others (Blais, Solodukhin, & Forth, 2014; Boddy, 2014; Cleckley, 1941; Hare, 2003; Hawes, Boccaccini, & Murrie, 2013; Leistico, Salekin, DeCoster, & Rogers, 2008). An attribute which has been ascribed to psychopathy, perhaps in part due to the remorseless behaviour noted above, is that individuals higher on this construct have a diminished capacity to form close emotional bonds to others (Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Patrick et al., 2009). Despite the apparent popularity of this view, there appears to have been limited empirical testing of this hypothesis.

The idea that psychopathy includes difficulties in bonding is present in a range of conceptualisations. For example, in Cleckley's early observational research, he reported that "an incapacity for object-love" (p. 241, 1941) was one of the characteristics of psychopathy, which is consistent with the observations of contemporary clinicians who have consistently rated social bonding difficulties as relevant to the construct (Kreis & Cooke, 2011; Kreis, Cooke, Michie, Hoff, & Logan, 2012). Modern conceptualisation of psychopathy, such as the four factor model of the Psychopathy Checklist – Revised (PCL-R; Hare, 2003), the triarchic theory of psychopathy (Patrick et al., 2009), and the Comprehensive Assessment of Psychopathy (Cooke et al., 2012), also include references to bonding and 'attachment'.

Interestingly, these references tend to be placed in the affective factors of psychopathy, for example, 'meanness' in the triarchic theory of psychopathy (Patrick et al., 2009), suggesting that this component may be particularly important when considering intimate social bonds.

Despite the idea that psychopathy is associated with deficits in bonding, there appears to be limited empirical evidence to support this hypothesis.[48] Several studies using undergraduate and online samples have suggested that the intimate relationships of those higher on psychopathy are characterised by lowered commitment in romantic relationships (Jonason & Buss, 2012), higher rates of infidelity (Brewer, Hunt, James, & Abell, 2015; Jones & Weiser, 2014), and a game playing style of love (Jonason & Kavanagh, 2010), though these are not direct measures of bonding and findings here have not been entirely replicated (e.g., Ali & Chamorro-Premuzic, 2010). Some studies have found that separation from parents at a young age is associated with psychopathic features, which could suggest atypicalities in early bonding could be related to psychopathy (Gao et al., 2010; Oltman & Friedman, 1967). Studies with male adolescents have found psychopathy was negatively associated with feelings of closeness with parents, but not with peers (Kosson et al., 2002), while callous/unemotional traits (analogous to the affective features of psychopathy) have been positively associated with the subjective perception of conflict in peer relationships (Muñoz, Kerr, & Besic, 2008), which could indicate some difficulty in interpersonal relations and the affective component of psychopathy. However, there appears to be limited direct testing of the connection between bonding and the nature of intimate social networks for those higher in psychopathy.

One type of bond which may be important to consider with psychopathy is attachment (Bowlby, 1982). These are bonds that have been found to be influential in emotional

[48] There are studies on the association between psychopathy and the Parental Bonding Instrument (PBI; Blanchard & Lyons, 2016; Blanchard, Lyons, & Centifanti, 2016; Craig, Gray, & Snowden, 2013; Gao, Raine, Chan, Venables, & Mednick, 2010), however, the name of this scale is a misnomer as it measures retrospective reports of parenting styles during childhood rather than bonding.

processing and interpersonal behaviour (see Mikulincer & Shaver, 2007 for review), areas of direct relevance to psychopathy. Indeed, one of Bowlby's early observations was that disruption of attachment bonding with parents in the first few years of life was associated with "affectionless" characteristics in children (1944), an observation which arguably drove the development of attachment theory. Attachment bonds refer to close emotional bonds to others, whether positive or negative, who are called on for support and security in times of need (Ainsworth, 1979; Bowlby, 1982). Generally, attachment bonds are first formed early in life between an infant and parents, but individuals tend to form attachment relationships with friends and romantic partners as they move into late adolescence and early adulthood (Ainsworth, 1989; Hazan & Zeifman, 1994). In middle and late adulthood, attachment bonds with siblings and children also become more frequent, though bonds with a range of other figures throughout the lifespan are not uncommon (e.g., Doherty & Feeney, 2004; Trinke & Bartholomew, 1997) and relate to the age and sex of the individual (Doherty & Feeney, 2004). Previous research on the association between psychopathy and attachment has suggested that psychopathy is positively associated with insecure attachment expectancies across a variety of relational contexts with respect to both relationships in general and specific classes of relationships (e.g., romantic partners, friends, parents), suggesting that psychopathy is characterised by poor attachment quality (Christian, Sellbom, & Wilkinson, 2016a, 2016b; Conradi, Boertien, Cavus, & Verschuere, 2015; Craig, Gray, & Snowden, 2013; Mack, Hackney, & Pyle 2011; Miller et al., 2010; Pasalich, Dadds, Hawes, & Brennan, 2012; Savard, Brassard, Lussier, & Sabourin, 2015). Poorer quality peer attachment has been found to be a relatively strong predictor in this area (Christian et al., 2016b), and by peer attachment we are referring to a broader categorisation of attachments which includes romantic partners and friends.

However, previous research regarding psychopathy and attachment has focused on the *quality* of an attachment bond rather than behaviours that would indicate the *presence* of a bond. Although there is frequently a positive association between the two (Fraley & Davis, 1997; Trinke & Bartholomew, 1997), it is important not to conflate the existence of a relationship with the quality of that relationship. In studies with adults, attachments to others are typically indicated by the presence of four behaviours directed towards a figure: proximity seeking (i.e., physical and/or emotional closeness), separation distress (i.e., distress when a figure is unavailable), safe haven (i.e., seeking the figure for support and comfort when threatened or distressed) and secure base (i.e., using the figure as a trusted base from which to explore; Bowlby, 1982; Hazan & Zeifman, 1994).[49] While attachment bonds are often discussed as present or absent in nature (Cassidy, 2008), some researchers have used continuous measures to quantify the degree to which a relationship to a specific figure represents an attachment bond (Tancredy & Fraley, 2006). To the best of our knowledge, the association between psychopathy and these attachment behaviours, behaviours which indicate the presence of an attachment, have yet to be studied.

Current Study

The purpose of the current study was to investigate the association between psychopathy and attachment bonding. More specifically, we planned to investigate whether the size and composition of an individual's intimate social network differed as a function of psychopathy and whether the degree of attachment behaviour displayed towards figures in these intimate social networks differed as a function of psychopathy. We investigated these aims by examining the associations between self-report psychopathy, self-nominated intimate social networks and self-report attachment behaviour with a large sample composed of

[49] There are minor differences between studies with Fraley and Davis (1997) not including the separation distress component and Trinke and Bartholomew (1997) including loss and mourning items, but these four features appear consistently across the attachment literature (e.g. Doherty & Feeney, 2004; Hazan & Zeifman, 1994; Tancredy & Fraley, 2006).

university students and members of the general community. We developed three hypotheses which we believed to be consistent with the conceptualisations of psychopathy as a construct that entails deficits in bonding (Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Patrick et al., 2009). First, we hypothesised that psychopathy would be negatively associated with intimate social network size (i.e., higher psychopathy, fewer figures nominated). Second, we hypothesised that psychopathy would be negatively associated with the likelihood of nominating any specific type of relationship as an emotionally significant relationship (e.g., romantic partner, friend, mother), consistent with nominating fewer figures overall. Finally, we hypothesised that psychopathy would be negatively associated with behaviours indicating attachment to others overall and across relationships (i.e., higher psychopathy, less attachment behaviour displayed). As an extension of this latter hypothesis, we anticipated that the affective component of psychopathy would have the strongest association with reports of attachment behaviour, given that bonding deficits is a feature that has appeared in the affective factor of psychopathy of various conceptualisations of the construct.

Method

Participants

Participants were recruited from two Australian samples, which were then combined to create a larger sample. The first sample contained 217 participants from university students recruited via flyers placed around campus, of which 18 participants were removed as they were identified as non-cooperative.[50] This left 199 participants (76.50% female) with a mean age of 23.07 years (SD = 8.79, range = 18-70), most of whom identified as White (71.50%,

[50] The criteria for non-cooperative responses were sub 12 minutes responses for the survey (approximately < 2 seconds response per question throughout), failure to complete the attachment measure correctly (nominating groups of figures, not completing parts of the measure [e.g. their relationship to a figure], unrealistic responses [e.g. age of figures > 10 000 years]), provided impossible or improbable responses to open ended questions (e.g. nominating the Queen or a television series as an attachment figure) or provided a response with 0 variance on the psychopathy measure or attachment styles measure (i.e. providing the same response to every question). The same criterion for identifying non-cooperative responses was used in both samples.

17.50% Asian, 11.00% Other). The second sample was 498 participants from an Australian general community sample recruited via the Qualtrics panelling service. Of this sample, 132 participants were removed as they were identified as non-cooperative and seven participants were excluded as they were less than 18 years of age. This left a sample of 359 participants (46.00% female) with a mean age of 39.20 years (SD = 11.28, range = 18-60) who predominately identified as White (85.00%, 8.90% Asian, 6.20 % Other). The final combined sample was 558 participants (56.89% female) with a mean age of 33.43 years (SD = 13.00, range = 18-70), most of whom identified as White (80.14%, 12.00% Asian, 7.87% Other). It should be noted that these samples were previously used by Christian and Sellbom (2016) and Christian et al. (2016b), but the research questions and statistical analyses presented here are novel and have not been published elsewhere.

Measures

Intimate Social Network and Measurement of Attachment Behaviour. In order to measure the size and composition of intimate social networks, participants were requested to nominate the people in their life to whom they have close emotional attachments with the following statement:

> *Throughout our lives we form a number of close emotional attachments to others. These attachments can be positive, negative or mixed. These are people we seek or wish to seek emotional support from, we miss during prolonged separations and hope to count on in times of need. Please nominate individuals in your life that you have a close emotional attachment to.*

This method is similar to that used in previous studies, which typically requested participants to list people in their lives to whom they "feel a strong emotional tie, regardless of whether that tie is positive, negative or mixed'' (p. 475, Doherty & Feeney, 2004; e.g., Fraley & Davis, 1997; Hazan & Zeifman, 1994; Tancredy & Fraley, 2006; Trinke & Bartholomew,

1997). However, we also included reference to attachment behaviours in the description so as to elicit participants' more intimate social networks and attachment relationships from the onset rather than more tangential relationships. Participants were able to nominate up to 20 figures along with basic details of the relationship such as, the nature of the relationship, length of relationship and figure's sex.

Participants were subsequently asked eight questions regarding their displays of attachment behaviour towards each figure they nominated. This included two items to measure proximity seeking (e.g., "It is important that I see or talk to *[figure name]* regularly"), separation distress (e.g., "I miss *[figure name]* if I know I won't be able to contact them for a while"), safe haven (e.g., "I would contact *[figure name]* first in an emergency") and secure base (e.g., "*[figure name]* will always be there for me"). Items were either selected from or based on items used in previous measures depending on how readily they could be adapted to a continuous format. Each item was scored on a 7-point Likert scale (*"Strongly disagree"*, *"Disagree"*, *"Slightly disagree"*, *"Neither agree nor disagree"*, *"Slightly agr*ee", *"Agree"*, *"Strongly agree"*). These questions were based on those used by Tancredy and Fraley (2006) and provide a measure of the degree to which attachment behaviours are present in a particular relationship. However, to reduce the burden on participants, the current measure is half the size of Tancredy and Fraley's (2006) scale.

Expanded - Levenson Self Report Psychopathy Scales (E-LSRP; Christian & Sellbom, 2016; Levenson, Kiehl, & Fitzpatrick, 1995). An expanded 36 item version of the LSRP, the E-LSRP, was used to measure psychopathy (Christian & Sellbom, 2016). The scale is a short self-report measure with three subscales; Egocentricity (k = 11, α = .79), Callousness (k = 12, α = .73), and Antisocial (k = 13, α = .75; Total scale α = .90), which roughly correspond to Cooke and Michie's (2001) three factor model of psychopathy (i.e. interpersonal, affective, and behavioural domains, respectively). Items were scored on a 6-

point forced choice Likert scale (*Strongly Disagree, Disagree, Somewhat Disagree, Somewhat Agree, Agree, Strongly Agree*), with higher scores indicating greater psychopathy. Compared to the original LSRP three-factor subscales proposed by Brinkley, Diamond, Magaletta and Heigel (2008), the E-LSRP has displayed improvements in internal consistency and construct validity while retaining acceptable levels of structural integrity (Christian & Sellbom, 2016).

Procedure

The survey was conducted online as part of a broader series of studies on attachment and psychopathy using the Qualtrics platform. Measures were presented in a single randomised order, but items within the measures were randomised across participants. The only exception to this procedure was that participants from the university sample were asked their age and sex at the end of the survey, whereas participants from the community sample were asked these questions at the start of the survey. The overall survey took approximately 30 minutes to complete.

Data Analyses

Size and Composition of Intimate Social Network. Given the nature of the data collected, the first step in our data analysis involved determining the size and composition of participants' intimate social networks, to inform the nature of our analyses with respect to the types of relationships we could focus on. Based on previous research, we expected that there would be certain types of relationships nominated at a sufficient frequency in order to examine the association between attachment and psychopathy across individuals, such as parents, romantic partners, friends, siblings and children (Doherty & Feeney, 2004; Trinke & Bartholomew, 1997). However, given that we would not know the types and frequency of relationships to be nominated a priori, this step represents an important aspect of the analysis.

Once the size and composition of participants' social networks were determined, we planned to conduct two types of analyses to examine psychopathy's association with the types of relationships nominated and frequency of nominated figures overall and within relationship categories. First, we aimed to determine whether psychopathy was associated with the nomination/non-nomination of different types of relationships or relational categories. These are binary variables on which participants were either coded for the nomination of a relationship (e.g. a mother; including at least one figure in a relational category, such as at least one parental figure), or coded as not nominating a relationship. For this purpose, we conducted logistic regression analyses in which the nomination (versus absence) of a particular relationship type was used as the dependent variable and psychopathy scales used as the predictor variables. Each model was estimated separately for each psychopathy scale (i.e., Total, Egocentricity, Callousness and Antisocial). Second, we aimed to examine whether psychopathy was associated with the frequency of figures nominated overall and in specific relationship categories. For this purpose, we regressed the number of figures nominated for a type/grouping of relationship category on each of the psychopathy scales. We specified each model according to a Poisson distribution for these analyses given the count nature of the dependent variable. We also included age and sex (dummy-coded) as covariates, as previous research has found that the size and composition of intimate social networks tends to vary depending on these variables (Doherty & Feeney, 2004). SPSS was used for these analyses.

Attachment Measure: Scale Properties and Associations with Psychopathy. To examine the association between psychopathy and self-reported attachment behaviour, we conducted two sets of analyses. Given the novel nature of the attachment measure, we first conducted Exploratory Factor Analyses (EFA) with individual items as indicators, as this would impact upon our subsequent analyses (i.e., depending on the number of factors present

in the scale). Given that Tancredy and Fraley's (2006) measure adhered to a one factor structure, we expected that a one factor structure would also underlie our scale. As previously mentioned, the nature of our analyses would be informed by the types and frequencies of relationships nominated by participants. For these analyses, we expected that $n \approx 300$ participants would need to nominate a specific type or grouping of relationship for EFA to be conducted for that relationship (Tabachnick & Fidell, 2007), as the analyses would need to be conducted on comparable relationship units between participants (e.g. romantic partners, friends, mothers). Therefore, only relationships nominated frequently enough would be used in these analyses. For our EFAs, we used Maximum Likelihood Estimation with robust scaling via Mplus, specifying oblique rotation (geomin), and extracting 1-4 factors.

Finally, we examined the association between psychopathy and attachment behaviour towards those figures nominated by participants. In this analysis we regressed attachment behaviours overall and for different types of relationship on the psychopathy variables with age and sex included as covariates. We anticipated $n \approx 100$ participants would need to nominate a type of relationship in order for the sample size to be appropriate for that relationship to be included in the analysis.[51] These analyses were conducted using SPSS.

Results

Size and Composition of Intimate Social Network

The first step in our data analysis was to identify the types and frequency of relationships which participants nominated (see Table 1).[52] Consistent with previous attachment research and research on attachment and psychopathy (Christian et al., 2016b; Klohnen, Weller, Luo, & Choe, 2005), different types of specific relationships were

[51] Tabachnick and Fidell (2007) reported that $N \geq 50 + 8m$ (where m is the number of predictors) is an appropriate rule of thumb in most cases, which would suggest a sample size of $n = 74$. Given that we expected a degree of negative skew in the attachment variable, we aimed for a more conservative sample size.

[52] An initial inspection of the data revealed one univariate outlier that was removed from these analyses as they nominated a substantially greater number of significant figures than other participants (i.e. $n = 19$; $z = 4.75$),[52] which left 558 participants.

identified and these were also grouped into higher/broad domains of relationship (e.g., family, which included relationships related to one's family [excluding romantic partners], and peer domains, which included peer relationships such as romantic partners and friends). On average, participants nominated 5.08 figures (*SD* = 2.87, range = 1-15), with more female figures typically being nominated (*M* = 2.93, *SD* = 1.93), *t*(557) = 8.64, *p* < .01, *r* = .21, than males (*M* = 2.14, *SD* = 1.65), and females typically nominating more figures (*M* = 5.51, *SD* = 2.85), *t*(556) = 4.13, *p* < .01, *r* = .17, than males (*M* = 4.51, *SD* = 2.80). The majority of participants nominated a family member (82.40%) or peer relationship (91.80%), with a smaller number nominating relationships outside of these domains (5.40%; e.g., deities, healthcare workers, pets, deceased individuals).

In the family domain, the majority of participants nominated at least one parent (i.e. a mother and/or father; 64.90%), with the most common types of family relationships nominated across participants being mothers (61.60%), siblings (46.20%,)[53] and fathers (44.40%). No participant nominated two parents of the same sex. A smaller number of participants nominated children (18.50%, *n* = 103),[54] extended family members (15.20%; e.g. grandparent, aunt, uncle, cousin) or other forms of non-biological family (8.60%; e.g. step-parent, in-law, foster family). In the peer domain, the most common types of relationships nominated were friendships (70.30%) and romantic partners (60.60%), with a small number nominating ex-partners (5.40%,) or other types of peers (0.90%; e.g. ex-friends, "crushes", "friends with benefits"). The majority of participants who reported being in a romantic

[53] Sisters typically appeared in networks (31.50%, *n* = 176, *M* = .32, SD = .47, range = 0-4) more often than brothers (24.60%, *n* = 137, *M* = .25, SD = .43, range = 0-5), *t*(557) = 2.75, *p* < .01, r = .08. However, the results tended to be the same regardless of sibling sex, unless otherwise noted in text.

[54] Daughters (14.00%, *n* = 78, *M* = .18, SD = .47, range = 0-3) were no more likely to be nominated than sons (13.10%, *n* = 73, *M* = .16, SD = .47, range = 0-3), *t*(557) = .67, *p* = .50, r = .02, and independent children (using a cut off of 18 years of age; 12.00%, *n* = 67, *M* = .20, SD = .62, range = 0-4), were more likely to be nominated than dependent children(8.60%, *n* = 48, *M* = .13, SD = .46, range = 0-3), *t*(557) = 2.02, *p* = .04, r = .06. However, the results were the same regardless of child's sex or independence.

relationship nominated their partner as an attachment figure (85.27%, n = 330).[55] A small number nominated a same-sex partner (4.14%, n = 14) or multiple partners (0.01%, n = 3). We opted to include these participants in our analyses as the results were the same regardless of whether they were included or excluded. For friendships, female friends (51.30%, n = 286, M = 1.14, SD = 1.53, range = 0-10) were more likely to be nominated than male friends (38.71%, n = 216, M = .71, SD = 1.16, range = 0-6), $t(557) = 4.23$, $p < .01$, $r = .16$.

Consistent with previous research (e.g., Doherty & Feeney, 2004), the most commonly nominated relationships across participants in our sample was friend (n = 392, 70.30%), mother (n = 344, 61.60%), romantic partner (n = 338, 60.60%), sibling (n = 258, 46.20%) and father (n = 258, 44.40%). Given the frequency of these reported relationships, we opted to focus the majority of our analyses on these relationships as they would be sufficient for our planned analyses. While the frequencies of participants nominating a child (n = 103, 18.50%) or extended family member (n = 84, 15.10%) were lower than required for EFA, we included these relationships for our other analyses as they appeared to be approximately sufficient for our purposes. We also focussed on several broader categories of relationship type into which these relationships could be grouped (i.e., overall attachment scores, family, parents, peers),[56] as they presented with sufficient frequency and have been found to show some differential associations in previous attachment and psychopathy research (Christian & Sellbom, 2016b; Kosson et al., 2002).

Psychopathy and Composition of Intimate Social Network

[55] A small number of participants (4.68%; 8 of 171) nominated a partner without being in a relationship. While previous studies have removed these participants, we opted to retain them as it is possible to have a partner and not be in a relationship (e.g. separated in a marriage).

[56] Overall refers to the averaged counts of attachment behaviour displayed across participant's full network of figures. Family denotes all biological and non-biological family members. Parents include the average scores of all nominated parents. Peers include all peer type relationships (e.g. romantic relationships, ex partners, romantic interests, friendships).

Next, we conducted a series of logistic regression analyses to determine whether psychopathy was associated with the nomination (vs. absence) of particular relationship types whilst controlling for participant age and sex. The distribution of scores for the total (M = 2.65, SD = .58), Egocentricity (M = 2.60, SD =.81), Callousness (M = 2.47, SD = .66) and Antisocial (M = 2.87, SD = .69) scales indicated that the means of this measure were generally towards the centre of the scale and, though there was a degree of positive skew, there did not appear to be an unreasonable truncation in range for the psychopathy scales. The results indicated the participants generally nominated the same types of relationships as significant figures in their lives regardless of their psychopathy levels (p > .05; see Supplementary Materials). However, an exception to this pattern was that those higher on total psychopathy and the Callousness scale were less likely to nominate romantic partners (b(S.E.) = -.35(.16), Wald = 4.70, p < .05, OR = .72; b(S.E.) = -.30(.14), Wald = 4.32, p < .05, OR = 0.63; respectively) than those lower on these scales whilst controlling for age and sex; the associated effect sizes were small.

Psychopathy and Intimate Social Network

Prior to conducting our Poisson regression analyses to determine the association between psychopathy and number of figures nominated, we removed mother, father and romantic partner from the analysis as these relationships were dichotomous or ostensibly dichotomous responses, meaning their association to psychopathy had already been examined with the logistic regression analyses. We also opted to conduct our regressions for the total number of nominated figures using Ordinary Least Squares regression and ordinal regression for number of parents nominated, as the distribution of these variables more closely aligned to the normal and uniform distribution than Poisson distribution, respectively. Similar to our logistic analyses, when controlling for age and sex, there appeared to be limited associations between psychopathy scores and the number of figures nominated overall or within any type

of relationship (see Table 2). However, we did find that total psychopathy scores significantly, negatively predicted number of nominated of peer relationships, specifically female friends. At the factor level, the Antisocial scale significantly, negatively predicted overall number of figures nominated, which is an effect that appears to have been driven by less nomination of peers, specifically friends and female friends for those higher on the Antisocial scale. The Egocentricity scale also significantly, negatively predicted number of female friends nominated, but the Callousness scale was not significantly associated with overall count of figures overall or in any relationship category. The effect sizes were small.

Attachment Scale: Exploratory Factor Analyses

Due to the novel nature of the attachment scale, the psychometric properties of the scale (specifically latent factor structure and internal consistency) were investigated. We identified 11 types/groupings of relationships which were nominated frequently enough across participants in order to conduct EFA. We opted to include father and sibling/siblings in the analyses, as even though the number of participants nominating these figures was lower than the initial bench mark (n = 300), the inter-correlations between items was substantially higher than expected (typically Pearson's r = .60-.85). These groupings included five relationships with a specific figure (i.e., mother, father, best sibling, romantic partner and best friend) [57] and six relationship domains (i.e., overall, family, parents, siblings, peers, and friends). For the relationship domains, we averaged each item for all the relationships nominated in that grouping. For example, for the peer domain we averaged each item for all peer relationships (i.e. all friends, romantic partners or other peer relationships). Following initial EFAs, an inspection of the item loadings suggested that one item ("I feel sad when … has to go somewhere without me") tended to load poorly for relationship types and groups in

[57] "Best" figure in any category of relationship with participants that nominated more than one figure for that category was determined by taking the figure with the highest averaged score across the eight CAHM items for that category of relationship. Where there was a tie for the highest averaged score, we took the first of the highest tied figures for the analysis.

the family domain (i.e., $\lambda < .40$) and removal of a second item ("I would contact … first in an emergency") tended to improve the internal consistency of the scale. We re-specified these EFA models with these two items removed. Factor loadings, descriptive statistics and internal consistency for the items and scale respectively are present in Table 3. Review of the descriptive statistics for each of the scales and visual inspection suggested some negative skew to the attachment scales, which is consistent with previous research using this style of attachment scale (Tancredy & Fraley, 2006). Inspection of the eigenvalues (see Table 3 notes) suggested that a single latent factor underlay the measure regardless of the relational target or relational domain, consistent with Tancredy and Fraley's (2006), measure. Factor loadings were strong for all items, regardless of relational context and indicators of internal consistency were within acceptable ranges (Cronbach's $\alpha = .86$ to .92, Inter-item correlations = .52 to .66). Overall, the scale appears to reflect an internally consistent one factor structure that measures the degree to which a relationship or context represents an attachment relationship.

Psychopathy and Attachment

The results of our regressions examining the association between psychopathy variables and the CAHM scales, controlling for age and sex, are presented in Table 4. Although we were unable to conduct EFAs on the relational contexts of child/children and extended family due to there being too few participants nominating these relationships, we decided to include these relational contexts in the regression analyses as one factor models given the uniform support for this model and the strong internal consistency for other scales. For the total psychopathy scales, we found a significant small, negative association with use of family members as attachment figures. When examining more specific relationships and subdomains, total psychopathy scores had significant, small negative association with use of mother, father, parents in general, and sibling/s as attachment figures, but no significant

associations with use of children, extended family or peer relationships. However, when the best female and male friend were analysed separately, there was a significant negative relationship between use of best female friend as an attachment figure (β = -.13, p < .05), but no significant association between total psychopathy and use of best male friend as an attachment figure (β = -.03, p > .05).

For the psychopathy variables at the subscale level, Egocentricity displayed a small negative association with attachment to parents; specifically with attachment to fathers, but the scale displayed no further significant associations with the attachment scales. Callousness displayed consistent significant, but small, negative associations with attachment to relationships both inside the family (e.g., family, mother, father, siblings) and with peers (i.e., peers, and friends), regardless of whether the attachment variable reflected a broader domain of relationship (e.g. peers) or a particular relationship of interest (e.g. a friendship). However, we again found that when the best female and male friend were analysed separately, there was only a significant relationship between use of best female friend as an attachment figure and the Callousness scale (β = -.18, p < .01), while the association between Callousness use of best male friend as an attachment figure was non-significant (β = -.09, p > .05). We found no significant association between the Callousness scale and use of children, extended family, or romantic partner as attachment relationships. For the Antisocial scale, there were small significant negative associations with the general domains of family, parents and siblings, but not with peer relationships. For specific relationships, there were small negative associations between the antisocial scale and the use of mother and father attachment, which is understandable given the negative associations between overall parental attachment and the antisocial scale. However, the negative association with attachment to siblings in general and the Antisocial scale did not translate to participant's highest scoring sibling on the attachment

scale, with no significant association observed between the Antisocial scale and attachment to best sibling.

Discussion

The purpose of the current study was to investigate the association between psychopathy and the presence of attachment bonding. Based on current conceptualisations of psychopathy as a construct partly defined by difficulties in bonding capacity, we expected that those higher on psychopathy (compared to those lower on the construct) would have more restricted intimate social networks; be less likely to nominate different types of relationships and report less attachment behaviour towards the figures nominated in their network (i.e. indicating weaker attachment bonds), particularly for those higher on the affective component of psychopathy. Our results showed some consistency with each of our hypotheses, but the effects were not as strong as expected.

Regarding the size and composition of intimate social networks, our results suggest that these features do tend to differ as a function of psychopathy, but the effect is small and tends to be limited to relationships in the peer domain. The absence of any broader reduction in number of relationships reported or types of relationships reported by more psychopathic individuals is perhaps intuitively inconsistent with previous research showing links between psychopathy and family environments which are less conducive to or may strain early bonding (e.g., early separation from parents, paternal un-involvement, low socioeconomic status, familial delinquency; Farrington, 2006; Gao et al., 2010; Marshall & Cooke, 1999). Our findings seem to indicate that while individuals higher on psychopathy may experience familial stressors, these stressors do not seem to be sufficient to warrant exclusion of these family relationships in their intimate social network, at least in an adult noninstitutionalised sample. Given that previous research has indicated that psychopathy is associated with insecurity in parental attachment (Christian et al., 2016b; Pasalich et al., 2012), our findings

may suggest that those higher on psychopathy in adult noninstitutionalised samples may have similar intimate familial relationships to others, but the *quality* of those attachment relationships may be poorer, or less secure from the perspective of the individual differences component of attachment theory.

In the peer domain, we found that participants higher on the Callousness scale tended to be less likely to report having a romantic relationship as part of their intimate social network. This finding is unsurprising given the previous research linking psychopathy and the 'dark triad' to short term mating strategies, which would typically not be conducive to having a stable romantic relationship (e.g., Jonason & Buss, 2012; Brewer et al., 2015; Jones & Weiser, 2014; Jonason & Kavanagh, 2010). Individuals scoring higher on the Egocentricity and Antisocial scales were found to report fewer female friends. This is an interesting and unexpected finding and could reflect previous research which has found that female dominated social networks reduce criminality, likely through social influence (McCarthy, Felmlee, & Hagan, 2004). Alternatively, individuals higher on psychopathy may have fewer female friends as they tend to endorse more stereotypically masculine trait descriptors (Hamburger, Lilienfeld, & Hogben, 1996), and may therefore find female friends to be less satisfying company or difficult to maintain female friends due to their attitudes regardless of participant gender. Overall, in light of previous research, the current findings suggest that the intimate peer networks of those higher on psychopathy are characterised by minor reductions in the presence of certain relationships, depending on the psychopathy factor considered, and that those relationships they do have also tend to be characterised by poorer attachment quality (Christian et al., 2016b; Savard et al., 2015).

Our results regarding the associations between attachment behaviour and psychopathy displayed were partially consistent with our hypotheses. Firstly, the psychopathy scales generally displayed negative associations with familial relationships, indicating that family

members nominated as part of an intimate social network tend to be used less for attachment needs for those higher on psychopathy. This is an interesting finding in light of previous research, as it would indicate that those higher on psychopathy tend to have similar intimate family relationships to others, but the quality of these relationships tend to be poorer and they tend to function less as attachment figures (Christian et al., 2016b; Kosson et al., 2002; Pasalich et al., 2012). Psychopathy's negative association with attachment behaviour in familial relationships is consistent with conceptualisations of psychopathy as a construct with limitations in bonding capacity (e.g. Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Patrick et al., 2009). However, given that causality cannot be attributed with the method used in this study, our findings may alternatively indicate that family environments that are not as conducive to attachment formation may display a tendency to produce elevated psychopathic traits compared to family environments more conducive to attachment formation, which is also consistent with previous research (Farrington, 2006; Gao et al., 2010; Marshall & Cooke, 1999). It is also worth briefly noting that the Egocentricity scale only displayed reductions in attachment behaviours towards fathers. Previous research has found that the absence of a father during early development is associated with increased likelihood of psychopathy (Oltman & Friedman, 1967) and attachment insecurity with fathers has been associated with various facets of the construct (Christian et al., 2016b; Flight & Forth, 2007). However, it is not clear as to why egocentricity would specifically be associated with reductions in attachment behaviour towards fathers in this study and is a finding warranting further investigation. Our results in the family domain also did not appear to extend to children and extended family members. While statistical power is likely related to the significance of the findings regarding extended family (given the number of participants nominating extending members [n = 84] and the magnitude of the effect), there did not appear to be any relationship between psychopathy and attachment behaviour toward children. The association between

psychopathy and bonds to children may be an avenue for future research, as attachment theory suggests that bonds from parents to children are predominately supported by the *caregiving* behaviour system. Bowlby (1982/1969) suggested that unlike the attachment system, which is associated with seeking support for oneself, the caregiving behaviour system is associated with the provision of support for significant others that acts reciprocally with the attachment system of the significant other (see George & Solomon, 2008, for further review of the caregiving behavioural system). Therefore, given that an individual's relationship to their child is generally characterised by the caregiving behavioural system, more so than the attachment system, it may be important to consider the role of the caregiving behavioural system in future research investigating psychopathy and bonds from parents to their children.

In the peer domain, only the Callousness scale was significantly associated with attachment behaviour. More specifically, as levels of callousness increased, reports of attachment behaviour toward peers, specifically friendships, decreased. When combined with previous research it would suggest that those individuals higher on the affective component of psychopathy tend to display less attachment behaviours toward friends, but also have a poorer quality of attachment models with the friends they do have (Christian et al., 2016b). From a theoretical perspective, the fact that the affective component of psychopathy displayed consistent negative associations across most relationship contexts is not only consistent with our hypotheses, but is also consistent with conceptualisations of this aspect of the construct (Cooke et al., 2012; Hare, 2003; Patrick et al., 2009). However, it should be noted that the effect size is smaller than expected given the centrality with which bonding deficits are attributed to psychopathy. When considering specific relationship types within the peer domain, it should be noted that callousness was only associated with deficits in attachment behaviour towards female and not male best friends, further supporting consideration of female friendship attachments and psychopathy. In contrast, no psychopathy

scale was associated with deficits in attachment behaviour with romantic partners, which is perhaps unexpected given previous research suggesting that psychopathy tends to be associated with poorer quality attachment models (Christian et al., 2016b; Savard et al., 2015). However, the findings do suggest that attachment quality may be more important to consider in the relationship between psychopathy and romantic attachment, rather than the actual presence of an attachment bond.

While our findings appear to contribute to the current state of knowledge regarding psychopathy and bonding, there are several limitations to caveat our findings. Firstly, our study was conducted with an adult non-institutionalised sample and therefore the results may not generalise to samples where psychopathy may manifest in a more extreme manner. This may suggest a restriction in the range of psychopathy and attachment scores in this study which may relate for the small effect sizes observed and suggests a need to use forensic or correctional samples in future studies. Second, our study only focused on bonding from an attachment perspective. While there is evidence to suggest that psychopathy is associated with poorer quality in attachment models (Christian et al.,2016a, 2016b; Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011; Miller et al., 2010; Pasalich et al., 2012; Savard et al., 2015), there are numerous conceptualisations of relationships which may be more relevant to psychopathy and the presence of a bond (see Sternberg & Weis, 2006), which could also account for the small effect sizes observed. Third, our study is correlational; therefore making it impossible to infer directionality of the associations found in this study. While our study is couched more in terms of bonding capacity being a result of or feature of psychopathy, the possibility that environments unconducive to attachments produce psychopathic traits has supporting research (Farrington, 2006; Gao et al., 2010; Marshall & Cooke, 1999), suggesting that the direction of association may need further consideration. Fourth, our results are based entirely on self-report. While self-report scales in these fields have tended to

broadly reflect interview and observed behaviour (Fraley & Shaver, 1998; Miller, Jones, & Lynam, 2011; Poythress et al., 2010; Shaver, Belsky, & Brennan, 2000), there could be some inflation in the correlations due to shared method variance. Fifth, our measure of attachment is relatively novel and requires further validation. However, given that the scale was constructed based on items from previous measures and the pattern of relationships nominated appears to roughly equate to previous studies (Doherty & Feeney, 2004; Tancredy & Fraley, 2006; Trinke & Bartholomew, 1997), the scale is likely to be valid, though further confirmation is required. Finally, the analyses conducted were necessarily simplistic given the complexity of individual's intimate social networks. Using the current study as a foundation, it may be interesting to investigate alternative questions regarding the relationship between psychopathy and intimate social networks, such as psychopathy levels in individuals who nominate figures in one domain, but none in another (e.g. individuals without family attachments, but do have peer attachments and vice versa).

Overall, our results are broadly consistent with conceptualisations of psychopathy as a construct with defects in bonding behaviours, particularly for the affective component of psychopathy and use of others as attachment figures. However, our results are weaker than we expected given the importance to which bonding deficits are ascribed to psychopathy. While this finding could be due to use of a non-institutionalised sample or operationalisation of bonding in this study (i.e., attachment and intimate social network properties), our preliminary results in this field appear to suggest that greater consideration of the quality of bonds of those higher on psychopathy is necessary in order to understand this construct, at least in non-institutionalised samples, rather than simply the capacity to bond. However, further research in forensic samples and with alternative conceptualisations of bonding and psychopathy is necessary to replicate and extend these findings.

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Table 4.1
Size and Composition of Participants Nominated Intimate Social Networks

Figure	N Nominated	%	Mean No. (SD)	Min-Max
Total	558	100.00	5.08 (2.87)	1-15
Family	460	82.40	2.46(1.95)	0-8
Parent	362	64.90	1.06(.87)	0-2
Mother	344	61.60	.62(.49)	1-1
Father	248	44.40	.44(.50)	1-1
Sibling	258	46.20	.69(.91)	0-5
Child	103	18.50	.34(.80)	0-4
Extended	84	15.10	.24(.65)	0-5
Other family	48	8.60	.13(.50)	0-5
Peer	512	91.80	2.55(2.02)	0-14
Partner	338	60.60	.61(.49)	0-3
Ex-Partner	30	5.40	.07(.31)	0-3
Friend	392	70.30	1.85(1.98)	0-10
Other Peer	5	.90	.01(.15)	0-3
Other	30	5.40	.06(.29)	0-3

Note. N Nominated indicates the number of participants that nominated at least one figure from that category.

Table 4.2

Association Between Psychopathy Variables and Number of Figures Nominated Across Relational Contexts with Age and Sex as Covariates

	Psychopathy Variable							
	Total		Egocentricity		Callous		Antisocial	
Context	B (S.E.)	Exp(b)	B (S.E.)	Exp(b)	B (S.E.)	Exp(b)	B (S.E.)	Exp(b)
Total[a]	-.06(.21)	N/A	-.03(.15)	N/A	-.06(.19)	N/A	-.07(.18)	N/A
Age	-.11*(.01)	N/A	-.11*(.01)	N/A	-.10*(.01)	N/A	-.11*(.01)	N/A
Sex	-.13**(.26)	N/A	-.14**(.25)	N/A	-.13**(.26)	N/A	-.13**(.25)	N/A
Family	-.01(.05)	.99	.01(.04)	1.01	-.03(.04)	.97	-.01(.04)	.99
Age	.00(.00)	1.00	.00(.00)	1.00	.00(.00)	1.00	.00(.00)	1.00
Sex	.22**(.06)	1.24	.22**(.06)	1.25	.21**(.06)	1.24	.22**(.06)	1.24
Parents[b]	.01(.14)	1.01	.01(.10)	1.01	.04(.13)	1.04	-.02(.12)	.98
Age	-.05**(.01)	.95	-.05**(.01)	.95	-.05**	.95	-.05**(.01)	.95
Sex	.12(.17)	1.12	.12(.17)	1.12	.13(.17)	1.13	.11(.17)	1.11
Siblings	-.07(.09)	.93	-.05(.07)	.95	-.08(.08)	.93	-.01(.08)	.99
Age	-.01(.00)	1.00	-.01(.00)	1.00	-.01(.00)	1.00	-.01(.00)	1.00
Sex	.33**(.00)	1.39	.34**(.11)	1.40	.33**(.11)	1.39	.35**(.11)	1.41
Children	.05(.13)	1.05	.05(.09)	.105	-.03(.11)	.97	.07(.10)	1.07
Age	.08**(.01)	1.08	.08**(.01)	1.08	.08**(.01)	1.08	.08**(.01)	1.08
Sex	.01(.15)	1.01	.01(.15)	1.01	-.01(.15)	.99	.01(.15)	1.01
Extended	.09(.15)	1.09	.15(.11)	1.17	-.00(.14)	1.00	-.02(.13)	.98
Age	-.02*(.01)	.98	-.02*(.01)	.98	-.02*(.01)	.98	-.02*(.01)	.98
Sex	.71**(.21)	2.04	.73**(.21)	2.07	.69**(.21)	1.99	.68(.21)	1.98
Peers	-.10*(.05)	.90	-.04(.03)	.96	-.06(.04)	.94	-.09*(.04)	.91
Age	-.01**(.00)	.99	-.01**(.00)	.99	-.01**(.00)	.99	-.01**(.00)	.99
Sex	.09(.06)	1.09	.10(.06)	1.11	.09(.06)	1.10	.09(.06)	1.09
Friends	-.10(.06)	.90	-.04(.04)	.96	-.06(.05)	.94	-.10*(.05)	.90
Age	-.02**(.00)	.98	-.02**(.00)	.98	-.02**(.00)	.98	-.02**(.00)	.98
Sex	.15*(.07)	1.16	.17*(.07)	1.18	.16*(.07)	1.17	.15**(.07)	1.16
Female Friends	-.24**(.07)	.79	-.14**(.05)	.87	-.13(.07)	.88	-.21**(.06)	.81
Age	-.02**(.00)	.98	-.02**(.00)	.98	-.02**(.00)	.98	-.02**(.00)	.98
Sex	1.20**(.07)	3.31	1.23**(.07)	3.42	.16**(.11)	3.42	1.21**(.07)	3.34
Male Friends	.11(.09)	1.11	.10(.06)	1.11	.03(.08)	1.03	.06(.07)	1.06
Age	-.02**(.00)	.98	-.02**(.00)	.98	-.02**(.00)	.98	-.02**(.00)	.98
Sex	-1.12**(.11)	.33	-1.12**(.11)	.33	-1.14**(.11)	.32	-1.13(.11)	.32

Note. * = $p < .05$, ** = $p <. 01$. [a] Analyses for the total number of nominate figures were conducted using Ordinary Least Squares regression as the distribution of the responses approximated the normal distribution. [b] Analyses for the number of nominated parents were conducted using Ordinal regression as the distribution of the responses approximated the uniform distribution.

Table 4.3
Exploratory Factor Analyses of Attachment Scales: Item Loadings and Scale Properties

	Relational Context										
	Specific Relationships						Relationship Domains				
Item	Mother	Father	Sibling	Rom	Friend	Total	Family	Parent	Siblings	Peers	Friends
1. … will always be there for me	.86	.81	.85	.73	.76	.79	.93	.90	.91	.80	.78
2. I know I can always count on …	.84	.80	.81	.67	.72	.80	.91	.89	.86	.80	.78
3. I go to … for emotional support	.58	.58	.66	.81	.81	.70	.68	.59	.65	.80	.78
5. It is important that I see or talk to … regularly	.77	.78	.73	.85	.78	.87	.78	.71	.67	.84	.79
6. It is important to me to stay in contact with …	.84	.77	.73	.83	.78	.86	.81	.78	.68	.83	.83
7. I miss … if I know I won't be able to contact them for a while	.70	.59	.56	.75	.74	.73	.69	.61	.52	.74	.70
Mean	5.90	5.53	5.67	6.17	5.66	5.54	5.53	5.79	5.55	5.58	5.33
SD	1.04	1.11	1.01	.94	1.04	.86	1.05	.99	1.02	.96	.99
Min	1.00	1.67	1.00	1.00	2.33	2.08	1.67	2.00	1.00	1.83	1.83
Max	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00	7.00
Cronbach's α	.89	.86	.86	.90	.89	.91	.92	.88	.87	.91	.90
Inter-item	.59	.52	.53	.60	.59	.63	.66	.58	.54	.64	.60

Note. All items significantly loaded at < .001. Eigenvalues for mother (3.968, .672, .578, .354, .252), father (3.643, .828, .631, .488, .247), sibling (3.670, .827, .542, .463, .319), romantic partner (4.000, .959, .347, .337, .221), friend (3.929, .806, .400, .349, 313), total (4.150, .797, .472, .294, .174), family (4.294, .619, .492, .292, .204), parents (3.902, .726, .592, .378, .266), siblings (3.706, .847, .539, .452, .308), peers (4.210, .748, .364, .312, .230) and friends (4.026, .805, .378, .333, .288) supported a one factor structure. Rom = Romantic partner.

Table 4.4.
Regression of Attachment Scales on Psychopathy Variables Controlling for Age and Sex

	Relational Context														
	Specific Relationships								Relationship Domains						
Model	Mother	Father	Sib	Child	Ext	Rom	Fri	Tot	Fam	Par	Sibs	Childs	Ext	Peer	Fris
Total	-.14*	-.24**	-.16*	.03	-.17	.06	-.06	-.07	-.12*	-.17**	-.16**	.05	-.12	-.03	-.07
Age	-.18**	-.13*	-.09	-.12	-.16	.01	-.13*	-.01	-.15**	-.18**	-.10	.03	-.19	.06	-.10
Sex	-.09	-.06	-.16*	-.33**	-.10	-.20**	-.32**	-.25	-.14**	-.09	-.13*	-.34**	-.11	-.29**	-.29**
R^2	.08	.09	.08	.11	.08	.04	.14	.08	.08	.09	.07	.11	.07	.08	.12
Ego	-.06	-.22**	-.10	.05	-.12	.09	-.03	-.03	-.07	-.12*	-.09	.08	-.07	.01	-.05
Age	-.18**	-.14*	-.09	-.02	-.16	.01	-.13**	-.01	-.15**	-.18**	-.10	.03	-.18	.06	-.10*
Sex	-.12*	-.08	-.18**	-.34**	-.11	-.20**	-.32**	-.26**	-.16**	-.12*	-.16*	-.34**	-.12	-.30**	-.30**
R^2	.07	.09	.06	.11	.07	.04	.14	.07	.07	.08	.06	.11	.07	.08	.12
Cal	-.11*	-.19**	-.18**	-.01	-.15	-.02	-.11*	-.10*	-.10*	-.13*	-.18**	.04	-.10	-.10*	-.12*
Age	-.17**	-.12	-.08	-.02	-.15	.00	-.12*	-.01	-.15**	-.17**	-.10	.03	-.18	.06	-.09
Sex	-.10	-.08	-.16*	-.33**	-.11	-.18**	-.31**	-.24**	-.15**	-.11*	-.13*	-.34**	-.12	-.27**	-.29**
R^2	.07	.08	.08	.11	.08	.03	.15	.08	.07	.08	.08	.11	.07	.09	.13
Anti	-.17**	-.15*	-.12	.03	-.16	.06	-.01	-.04	-.12*	-.17**	-.13*	.01	-.13	.02	-.01
Age	-.17**	-.12	-.09	-.02	-.18	.01	-.12*	-.01	-.15**	-.18**	-.10	.03	-.20	.06	-.09
Sex	-.09	-.10	-.17**	-.33**	-.11	-.20**	-.33**	-.26**	-.15**	-.10	-.15*	-.33**	-.11	-.30**	-.31**
R^2	.09	.06	.07	.11	.08	.04	.14	.07	.08	.09	.06	.11	.08	.08	.12

Note. * = $p < .05$, ** = $p <. 01$. Mom = Mother, Dad = Father, Sib = Sibling, Ext = Extended, Rom = Romantic partner, Fri = Friend, Tot = Total, Fam = Family, Par = Parents, Sibs = Siblings, Childs = Children, Fris = Friends, Ego = Egocentricity, Cal = Callousness, Anti = Antisocial. All regressions were conducted using Ordinary Least Squares.

General Discussion

The purpose of this thesis was to begin to clarify the associations between psychopathy and attachment. Specifically, we aimed to clarify the associations between psychopathy and individual differences in general attachment style and individual differences in attachment styles in specific relationships using validated psychometric instruments. Moreover, we sought to understand the relative importance of individual differences in specific attachment relationships amongst each other and their associations between psychopathy, as well as the relative importance of individual differences in general attachment styles beyond individual differences in specific attachment relationships. We also sought to examine whether psychopathy was associated with the absence of attachment bonds, a long held attribute of the construct (Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Lilienfeld & Widows, 2005; Patrick et al., 2009), yet contrary to the assumptions under which research involving individual differences in attachment is based (i.e., there must be a bond present to vary in quality upon it). Through this process we aimed to develop, improve upon and validate the psychometric instruments we used, a process which was necessary to ensure as reliable and valid a measurement of our constructs of interest as possible. What follows is a broad discussion regarding the outcomes of our research, the degree to which we satisfied our original aims and of the implications of this body of work to the understanding of the associations between psychopathy and attachment theory.

Psychopathy and Individual Differences in General Attachment Styles

Through our investigations, we were able to demonstrate the presence of consistent associations between the components of psychopathy and individual differences in general attachment styles. More specifically, we found that boldness was consistently negatively associated with insecure attachment styles, that the behavioral features of psychopathy were consistently positively associated with insecure attachment styles and that the affective

features of psychopathy were consistently positively associated with attachment avoidance. These findings were generally replicable across measures of psychopathy, general attachment styles and samples (i.e., Australian and US community samples). Findings regarding the interpersonal component of psychopathy (as measured by the E-LSRP) and the association between attachment anxiety and the affective component of psychopathy were less consistent.

The demonstration of consistent associations between individual differences in general attachment styles and the components of psychopathy is a substantial contribution to the literature in the context of previous research in this area. Owing to a combination of employing non-validated measures, sampling constraints (e.g., sample size), ambiguity regarding the context of attachment relationships investigated, and inconsistent findings, there has been a lack of clarity regarding the associations between general attachment styles and psychopathy. The current findings provide much needed clarity to the field, through the use of validated measures, large sample sizes and an initial focus on the most replicable and generalisable findings. Moreover, these findings provide a foundation from which to understand individual differences in attachment styles and psychopathy, and therefore findings which can be easily built upon to understand how psychopathy relates to other areas in which individual differences in attachment styles can be explored (e.g., specific attachment relationships).

When examining the associations between individual differences in general attachment styles and the factor level of psychopathy, several key findings arose. Boldness was consistently negatively associated with attachment insecurity and was found to positively correlate with the Attachment Styles Questionnaire (ASQ; Feeney et al. 1994) scale for secure attachment styles (i.e. the Confidence scale). This finding was consistent with previous research by Craig et al. (2013) and Miller et al. (2016), though it is difficult to make comparisons to these studies given that neither clearly reference the context in which

individual differences in attachment models are measured. Our findings with boldness were inconsistent with Conradi et al. (2015) who found boldness to be positively associated with both dimensions of attachment insecurity. However, given that Conradi et al. (2015) were measuring individual differences in romantic attachment styles, their results could reflect a domain specific association between boldness and attachment insecurity, or alternatively, the scale which they used to measure boldness, which shares more variance with meanness and disinhibition compared to other scales measuring boldness or fearless-dominance (Drislane et al., 2015; Lilienfeld & Widows, 2005). Regardless, there is a consistent empirical trend in the literature to suggest that boldness is negatively associated with attachment insecurity. From a theoretical standpoint, these findings indicate that attachment relationships in those higher in boldness are characterised by confidence, assertiveness and social competency, consistent with conceptualisations of the construct (Lilienfeld & Widows, 2005; Patrick et al., 2009). When visualising boldness on the two dimensions of attachment insecurity (see Appendix A; Figure 1), individuals high on boldness would fall into the secure attachment quadrant. However, these results offer little to discussions regarding whether to include boldness with the construct of psychopathy or not, as the results are also consistent with the idea that boldness has a nomothetic network generally characterised by adjustment over dysfunction (Lynam & Miller, 2012; Miller & Lynam, 2012).

For the behavioural components of psychopathy, we found that there were consistent positive associations between this component of psychopathy and both dimensions of attachment insecurity. Our finding regarding the behavioural component of psychopathy are broadly consistent with previous studies which have investigated psychopathy and individual differences in attachment regardless of attachment context (Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011; Miller et al., 2010; Miller et al., 2016; Savard et al., 2015), and is also consistent with previous research linking both the behavioural features of psychopathy

and attachment insecurity to negative emotionality (Bowlby, 1973; Fearon, Bakermans-Kranenburg, Van IJzendoorn, Lapsley, & Roisman, 2010; Hare, 2003; Hicks & Patrick, 2006; Mikulincer & Shaver, 2007). Interestingly, we found that individual differences in general attachment anxiety tended to account for the relationship between individual differences in general attachment styles and the behavioural factor of psychopathy. This finding would tend to place this component of psychopathy across the anxious attachment quadrant, suggesting a tendency towards frustration, preoccupation and need for reassurance in relationships when considered on the two dimensional space of attachment insecurity (see Appendix A; Figure 1). Linking attachment anxiety to the behavioural component of psychopathy is interesting because Mikulincer and Shaver (2007) characterise attachment anxiety as a 'hyperactivation' strategy, while Hawes and Dadds (2006) describe a similar process in antisocial children, in which children can negatively reinforce their parents with escalating confrontational behaviour. Even though the current program of research is unable to definitively link these processes, we did find a consistent association between the behavioural factor of psychopathy and a style of relating to others which is characterised by a pattern of escalation and interpersonal preoccupation.

Our results regarding the association between individual differences in general attachment styles and the affective and interpersonal features of psychopathy were more mixed than that seen with the other psychopathy factors. Specifically, individual differences in general attachment avoidance appear to consistently display a positive association with the affective features of psychopathy and inconsistent and null associations with the interpersonal component of psychopathy. Additionally, individual differences in general attachment anxiety appeared to display a trend toward a small negative association with the affective features of psychopathy and inconsistent and null association with the interpersonal features of psychopathy. This pattern of findings tends to place the affective component of

psychopathy in the avoidant quadrant of the two dimensional space of attachment insecurity (see Appendix A; Figure 1), suggesting a tendency to avoid intimacy, dismiss relationships, defensively inflate self-esteem and supress emotional responses. However, the interpersonal component cannot be clearly placed in this two dimensional space, except perhaps weakly towards attachment anxiety. Our findings regarding the affective and interpersonal components of psychopathy have been found in several other studies across various attachment contexts (Conradi et al., 2015; Craig et al., 2013; Miller et al. 2010), and suggests the need to separate these features in investigations involving individual differences in attachment and psychopathy. Findings regarding general attachment avoidance and the affective features of psychopathy are interesting given the conceptualisation of attachment avoidance as a 'deactivation' strategy (Mikulincer & Shaver, 2007), in which the individual supresses affect and minimises the importance of interpersonal needs, which seems to match with the interpersonal relations seen in psychopathy. This is a relationship that could be useful in understanding problematic interpersonal behaviours in psychopathy (e.g., proactive violence, as the individual deprioritises the importance of others and supresses internal cues of discomfort), though further research is clearly required in this area. The inconsistent associations between the interpersonal features of psychopathy and individual differences in general attachment is a surprising finding to arise in our research given the background of attachment theory in understanding interpersonal relations, but it is consistent with findings in other studies regarding the interpersonal component of psychopathy in specific attachment relationship contexts (Flight & Forth, 2007; Gordts et al., 2015). Our results, combined with those of the rest of the literature suggest that individual differences in general attachment styles may currently offer little regarding the understanding of the interpersonal facet of psychopathy.

One of the broader implications to arise during the course of this research is that the interpersonal relations associated with psychopathy, with the exception of boldness, are broadly characterised by poorer attachment quality (i.e. attachment insecurity) in one form or another. Despite some inconsistences at the factor level, previous research investigating attachment styles in various contexts has typically shown a similar broad tendency for psychopathy to be associated with attachment insecurity (Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011; Miller et al., 2010; Miller et al., 2016; Savard et al., 2015). This means that individuals higher on psychopathy tend to be less fulfilled in their attachment relationships and broadly interact with others in a ways that others find disruptive from an attachment perspective (i.e. having their attachment needs fulfilled). While research demonstrating that psychopathy is associated with interpersonal dysfunction is certainly not a novel finding (e.g. Boddy, 2014; Hawes et al., 2013; Lalumiere & Quinsey, 1996; Leistico et al., 2008; Reidy et al., 2011), it is important to note that the self-fulfilling belief systems associated with attachment insecurity are likely to make the formation of positive relationships which may buffer against antisociality (Arbona & Power, 2003; Buist, Dekovic, Meeus, & van Aken, 2004; Sousa et al., 2011; Van IJzendoorn, 1997) a generally more difficult task for those higher on psychopathy.

Psychopathy and Individual Differences in Attachment in Specific Relationships: Associations, Relative Importance and Findings in the Context of General Attachment Styles

In building on our findings with psychopathy and individual differences in general attachment styles, we next sought to expand our findings to understand individual differences in attachment styles in specific normative relationships (e.g., mother, father, romantic partner, friends), as these are important relationships in themselves and have been found to inform the nature of general attachment styles (Pierce & Lydon, 2001). Consistent with findings at the

level of general attachment, we found that the components of psychopathy generally displayed positive associations with both dimensions of attachment insecurity.[58] This finding is also consistent with the general pattern of findings regarding attachment security in specific attachment relationships (Conradi et al., 2015; Flight & Forth, 2007; Gordts et al., 2015; Mack et al., 2011; Savard et al., 2015), and indicates that individuals higher on psychopathy tend to display a pattern of attachment insecurity in what are typically considered normatively important attachment relationships in adulthood (Doherty & Feeney, 2004; Trinke & Bartholmew, 1997).

However, the exception to the pattern of attachment insecurity identified across specific attachment relationships was that attachment anxiety in romantic relationships and with friends tended to have a null to small negative association with the affective component of psychopathy. This finding reflects that seen at the level of general attachment styles and research investigating individual differences in romantic attachment and psychopathy (Conradi et al., 2015), suggesting that those higher in the affective component of psychopathy show a slight tendency towards less 'clingy' and preoccupied behaviour in romantic relationships and friendships. However, this finding is inconsistent with those of Mack et al. (2011) and Savard et al. (2015; for males only), who independently reported positive associations between romantic attachment anxiety and the affective/interpersonal features of psychopathy. Moreover, Mack et al. (2011) reported a positive interaction between romantic attachment avoidance and anxiety to predict higher scores on the affective/interpersonal factor of psychopathy, which is inconsistent with the negative interactive effect between attachment avoidance and anxiety for psychopathy broadly across our three samples. In this effect, typically the association for one dimension of attachment insecurity with psychopathy became stronger as the individual's score on the other attachment dimension decreased.

[58] Excluding boldness, as a measure of boldness was not included in this study.

Differences in findings here may be accounted for by our using scales which allowed us to separate the affective and interpersonal features of psychopathy, which was not done in either Mack et al.'s (2011) or Savard et al.'s (2015) studies, though differences in cultural setting cannot be currently ruled out as an alternative explanation for the differences in findings. Nevertheless, our reported findings were generally more consistent with theories regarding the low-anxiety nature of the affective features of psychopathy (Lykken, 1995; Patrick et al., 1993; Verona et al., 2004).

In terms of the relative importance of any specific attachment models in the relationship between individual differences in attachment and psychopathy, our findings generally supported the assertion that peer attachment models (i.e., romantic partners and friends) were generally more important in this relationship. Peer attachment models tended to display the largest effect sizes, more independent variance associated with the components of psychopathy (compared to parental attachment), and they accounted for the majority of the relationship between individual differences in general attachment styles and psychopathy. In particular, peer attachment avoidance appeared to have a strong association with the components of psychopathy, indicating that peer attachment models for those higher on psychopathy tend to be characterised by avoidance of intimacy, de-prioritising relationships, cynicism regarding relationships and rigid independence (Brennan & Shaver, 1998). The importance of peer relationships to the associations between individual differences in attachment and psychopathy may relate to the stage of life that participants were recruited at in this sample. During early adulthood, individuals tend to transfer the focus of their attachment needs from parents to romantic partners and friends (Fraley & Davis, 1997; Hazan & Zeifman, 1994). Given that experiences in new relationships tend to 'update' the general attachment models (Pierce & Lydon, 2001), it is perhaps unsurprising that previous studies have found that peer attachment models in adulthood tend to be the strongest predictors of

variables of interest when considered alongside parental attachment models (e.g., self-esteem, ego-resilience and emotional stability; Klohnen et al., 2005). The relative importance of peer attachment models compared to parental attachment models in our study may therefore reflect the attachment relationships that are most influential at the stage of life in which responses were collected from participants (i.e. adulthood). This explanation is consistent with findings regarding psychopathy in adolescence (in which peer attachment insecurity was unrelated to psychopathy and parental attachment insecurity was positively related to psychopathy; Flight & Forth, 2007; Kosson et al. 2002), where attachment functions may not have yet transferred from parents to peers (Fraley & Davis, 1997; Hazan & Zeifman, 1994).

While our findings indicate an important role for peer relationships in the association between individual differences in attachment and psychopathy in adulthood, this does not discount the role of parental relationships in this association. We found typically smaller effects sizes and fewer independent associations between parental attachment styles and the components of psychopathy relative to peer attachment styles. However, it should be noted that parental attachment relationships are considered to form the foundation for peer attachment relationships (Bowlby, 1982; Fraley, 2002), which suggests that there may be some indirect impact for parental attachment models to psychopathy through peer attachment models. If our current findings regarding the importance of specific attachment relationships are indeed reflective of the life stage of our sample, it is important to consider whether the association between psychopathy and individual differences in attachment then differs between adults, adolescents and children, and is therefore dynamic in nature. Given Pasalich et al.'s (2012) findings regarding individual differences in attachment to parents in children (i.e. the disorganised attachment styles are disproportionally represented amongst callous/unemotional children), it may be that the course of psychopathy's association with individual differences in attachment begins with disorganised and insecure attachment

representations with parents during childhood and adolescence; which then matures into attachment insecurity with peers in adulthood, where attachment avoidance with peers becomes more prominent for the affective component of psychopathy (Conradi et al., 2015; Craig et al., 2013). However, there is clearly more research required to understand the association between psychopathy and individual differences in attachment from a developmental perspective in order to validate this explanation.

Given that the majority of the variance regarding the associations between psychopathy and individual differences in general attachment styles was accounted for by specific normative attachment relationships, this finding raises questions regarding the utility of general attachment styles in psychopathy research with adults. In fact, research focused on peer relationships such as with romantic partners and friends appears likely to account for the majority of the variance in general attachment styles as well (e.g., Conradi et al., 2015; Mack et al., 2011; Savard et al., 2015). However, it has been previously argued by Collins and Read (1994) that general attachment models are an automatic representation built up through chronic access, which may be defaulted upon during times of stress, when cognitive resources are strained and when the context of the relationship is ambiguous. Therefore, there may still be a role for general attachment models in psychopathy research, but it would likely be under very specific circumstances that require further investigation.

Psychopathy and the Presence of Attachment Bonding Behaviours

Having established an understanding of the associations between psychopathy and individual differences in attachment, we sought to investigate whether psychopathy was associated with deficits in the actual presence of attachment bonds, rather than the quality of attachment bonds. In our results, increases in psychopathy were associated with minor differences in the size and composition of an individual's intimate social network, in that more psychopathic individuals were slightly less likely to report having a romantic partner

and were slightly more likely to have fewer friends, specifically, female friends. More importantly, psychopathy was associated with a weak tendency to report less attachment towards family figures, except for the affective component of psychopathy, which was associated with a weak but general pattern of reporting less attachment behaviour towards both family members and peers. These findings have two major implications for the literature.

The first implication of our findings regarding attachment bonding and psychopathy relates to the study of psychopathy and individual differences in the attachment literature. In order to vary in the quality of an attachment bond, an individual must actually have a bond present. This is an important distinction made by attachment theorists (e.g., Ainsworth, 1979), which is often overlooked. Given the small magnitude of the association between psychopathy and deficits attachment bonding behaviour, our findings suggest that this assumption, on which the psychopathy and individual differences in attachment literature is built (i.e., that there are bonds present), is generally met. This means that more psychopathic individuals still tend to report behaviour indicative of attachment bonding and therefore that they are likely to have attachment bonds on which they may vary in quality, at least in an adult non-institutionalised samples.

The second implication of our findings relates to the conceptualisation of psychopathy. More specifically, there are a number of theories of psychopathy which conceptualise psychopathy as a construct defined by an incapacity to form attachments to others, particularly for the affective component of the construct (e.g. Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Lilienfeld & Widows, 2005; Patrick et al., 2009). Our findings are only partially consistent with this conceptualisation, in that we found that psychopathy displayed a weak tendency to report less attachment behaviour towards family members, and a more generalised, but still weak tendency, to report less attachment behaviour towards both

peers and family for those higher on the affective component of psychopathy. Given the effect size associated with deficits in the presence of attachment behaviour, compared to the magnitude of effect sizes relating to psychopathy and the quality of attachment relationships (e.g., Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011; Miller et al., 2016; Savard et al., 2015), our results indicate that the attachment deficits in psychopathy are more related to the quality (i.e. individual differences component of attachment theory) than the actual presence of attachment bonds. This interpretation should be considered in the context of the population from which we collected our sample (i.e., an adult non-institutionalised sample), as our findings have yet to have been validated in an incarcerated sample and could reflect an important difference between psychopathic individuals who are and are not incarcerated.

Measurement and Validation: A Consistent Theme

An important aim of this thesis has been the use of validated psychometric measures, including improving upon and validating existing measures. While perhaps an implicit aim of any psychological investigation, for the purposes of the current body of work it was important to explicitly state this aim so as to remain conscious of the pitfalls of previous research regarding attachment and psychopathy. Perhaps the most substantial outcome from this aim was the extension and validation of the three-factor LSRP or E-LSRP in the first manuscript, a manuscript which had direct implications for this thesis, as well as implications for the broader psychopathy literature. From the perspective of the thesis, the E-LSRP has provided a measure of psychopathy which underlay the investigation of psychopathy and attachment for nearly the entirety of the thesis, making it critical to ensure that measure was well validated. In addition, the validation of the E-LSRP has contributed to identifying the differential association between individual differences in attachment style and the affective and interpersonal components of psychopathy. Unlike previous studies on attachment and psychopathy which have used the two-factor LSRP (which combines the

affective/interpersonal feature of psychopathy into a single scale; Mack et al., 2011; Savard et al., 2015), extension and validation of an extended version of the LSRP allowed us the confidence to consider the more appropriate latent three-factor structure to the scale (Brinkley et al. 2008; Sellbom, 2011), thus allowing us to consider differential associations between the affective and interpersonal components of psychopathy.

From the perspective of the broader psychopathy literature, our validation of the E-LSRP has several implications. First, it provides significant improvements to the LSRP in terms of construct coverage, construct validity and the internal consistencies of several scales, which allows more valid and reliable self-report measurement of psychopathy, hopefully in future studies as well. Second, the results have provided further support for the three-factor latent structure to the LSRP, consistent with previous research (Brinkley et al., 2008; Sellbom, 2011), and therefore some support to a three-factor conceptualisation of psychopathy more broadly (Cooke & Michie, 2001). Third, the results are supportive of considering the affective component of psychopathy as low in anxiety (Lykken, 1995; Patrick et al., 1993; Verona et al., 2004), but do suggest that this is a relatively small effect. Finally, it should be noted that the decision not to include several items relating to low anxiety and interpersonal charm within the E-LSRP could lead some to argue that these features are not relevant to the construct of psychopathy. However, as Lilienfeld et al. (2012) have argued, boldness may be a component of psychopathy which has limited direct correlation with the rest of the construct, but may modify the presentation of psychopathic individuals. Therefore, the decision to remove three items related low anxiety and interpersonal charm within the development of the E-LSRP due to low factor loadings appear to have limited implications for this debate.

In having the aim of using validated psychometric measures as part of this thesis, it is important to acknowledge the various attempts at ensuring the validity of the attachment

measures chosen. This included an attempt to revise the Experiences in Close Relationships – Revised Structures (see Appendix A.), a scale originally developed by Fraley et al. (2011), which appears to have produced limited psychometric improvement, and developing a measure for attachment behaviours in the fourth manuscript, which appears to behave quite consistently with other measure of attachment (Doherty & Feeney, 2004; Trinke & Bartholomew, 1997). Therefore, while the expansion and validation of the E-LSRP was certainly an important component of this thesis, it is perhaps better to be considered a highlight within a broader trend of attempts at validation and improvement upon psychometric measures throughout this body of work.

Practical Implications

There are a number of practical implications for our findings. Firstly, our results could be used to begin to understand the interpersonal relations of individuals higher on psychopathy (Conradi et al., 2015). Our results suggest that individuals higher on psychopathy, with the exception of the boldness component, generally tend to display insecurity in their attachment relationships rather than deficits in attachment bonding capacity. That is, more psychopathic individuals tend to have bonds, but those bonds are poorer in quality compared to those with less psychopathic traits. Knowing that individuals higher on psychopathy are likely to display attachment insecurity allows researchers and clinicians to expect some predictable patterns of thoughts, feelings, beliefs and behaviours in relating to others depending on their pattern of psychopathic traits possessed (e.g., individuals higher on the affective component of psychopathy may display less need for reassurance, but a greater tendency to avoid intimacy, to supress concerns regarding relationships, display interpersonal cynicism and defensive self-inflation; Bartholomew & Horowitz, 1991). Understanding these patterns of relating to others may provide practitioners in clinical and occupational settings with useful information in terms of overcoming the defensive processes

present in some insecure attachment styles, but this of course, only represents a starting point as it would be problematic to apply group data to an individual case without flexibility.

Another area in which the current findings may have some practical implication is to intervention. The current findings suggest that individuals higher on psychopathy tend to have the capacity to form attachments, but that the quality of their attachments tends to be poorer. Relational quality may therefore be a point of intervention given the positive outcomes associated with attachment security (see Mikulincer & Shaver, 2007 for reviews), including buffering against antisocial behaviour and increased compassion and empathy for others (Arbona & Power, 2003; Buist et al., 2004; Mikulincer et al., 2001; Mikulincer et al., 2005; Sousa et al., 2011; Van IJzendoorn, 1997). Interventions targeting attachment quality between parent and child have already been investigated with antisocial children (Hawes & Dadds, 2006), and while the results have not been as successful with callous/unemotional children, they are successful for some and can produce lasting changes to the child's degree of callous/unemotional traits (Hawes, Price, & Dadds, 2014).

Given that our findings supported a more influential relationship for peer relationships than parental relationships in the associations between individual differences in attachment and psychopathy in adulthood, our results suggest that interventions targeting peer relationships in adults could be an interesting point of intervention rather than in parental relationships. This finding may have implications for an intervention technique such as Interpersonal Psychotherapy (Klerman, Weissman, Rounsaville, & Chevron, 1984), which focuses on resolving interpersonal concerns related to psychopathology in a structured therapeutical intervention, typically through the focus on one or more specific problem areas (e.g. grief, role transition). Our current findings could not only be useful in understanding the overarching interpersonal dynamic during such therapeutic processes with a more psychopathic individual, but they may also suggest specific problem areas of focus. For

example, one could focus upon resolving disputes in peer relationships, as peer relationships account for the majority of the variance in the relationship between attachment styles and psychopathy and interpersonally disruptive behaviours could be acting to reinforce insecure models of attachment. However, given that the current findings are based on a non-institutionalised sample, the results should be replicated in samples likely to have a higher loading of psychopathy (e.g., forensic samples; Hare, 1996), before attempts to implement an attachment based intervention for psychopathy with adults.

Theoretical Implications

The current body of work poses several theoretical implications regarding how psychopathy relates to attachment theory, as well as to currently established theories of psychopathy. First and foremost, there are several theories of psychopathy which suggest that relational experiences, including attachments, are more associated with the behavioural components of psychopathy (Lykken, 1995; Saltaris, 2002). Typically these theories are commenting on psychopathic traits more from an etiological perspective, but regardless, the finding that the components of psychopathy have been consistently positively associated with attachment insecurity (with the exception of boldness), including the affective and interpersonal features, runs contrary to the idea that it is predominantly the behavioural features of psychopathy that are associated with poorer relational experiences. In fact, the affective features of psychopathy have consistently correlated with attachment avoidance across multiple studies and relational contexts (Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011; Miller et al., 2010; Savard et al., 2015), and studies which found that relational experiences are related to both the behavioural and affective/interpersonal features of psychopathy (e.g. Farrington, 2006; Marshall & Cooke, 1999). The current findings, combined with the aforementioned studies show a degree of shared variance between

constructs related to relational experience (i.e. attachments) and the affective/interpersonal feature of the construct than traditionally considered.

Our findings also indicate the need to potentially reconsider how attachment is considered in psychopathy research. For example, psychopathy has been characterised as a construct deficient in bonding capacity (Cleckley, 1941; Cooke et al., 2012; Hare, 2003; Lilienfeld & Widows, 2005; Patrick et al., 2009). Typically, descriptions such as "Disdain for and lack of close attachments with others" (p. 933, Patrick et al., 2009) have been used to portray psychopathy. While the current findings cannot rule out this possibility in samples with more extreme manifestations of psychopathy, as the only study to date on the presence of attachment bonds and psychopathy, our findings suggest that lacking attachments may be less accurate in characterising psychopathy than poor quality of attachments. Furthermore, references to 'deficits in attachments' need to be more appropriately defined in the literature. As we have clearly demonstrated, attachments require relational contexts for an individual to have attachment deficits. In addition, attachment in psychopathy research can sometimes be discussed as a predominantly childhood process (e.g., Patrick et al., 2009). However, individual differences in attachment style are not only related to earlier life experiences (Fraley, 2002), but are dynamic processes which are updated with current relational experiences (Peirce & Lydon, 2001). Our results suggest that peer attachment models in adulthood are more influential in psychopathy and could be considered as a maintenance factor for psychopathy given the self-fulfilling nature of the schemas developed in attachment relationships (e.g. sabotaging developing relationships due to a belief that relationships are unfulfilling), though further research is required to further validate this idea.

Given that we demonstrated consistent associations between the components of psychopathy and individual differences in attachment theory over the course of several studies, our results may be supportive of further research regarding the potential etiological

interplay between psychopathy and individual differences in attachment. However, this is not to state a definitive causal relationship between these constructs, as this would be beyond the methods employed across our studies. Rather, it is merely to suggest that the results are supportive of further consideration as they do not disprove a connection between the constructs. It is also important to be mindful that causative associations may not move from attachment to psychopathy, but that poor attachments may develop as a result of psychopathic traits, there could be a bi-directional relationship, or a third variable may account for the association between the two. Nevertheless, given the current findings, the broader literature linking individual differences in attachment and psychopathy (Blanchard & Lyons, 2016; Conradi et al., 2015; Craig et al., 2013; Mack et al., 2011; Miller et al. 2010; Miller et al., 2016; Sarvard et al., 2015), and the numerous conceptual overlaps between aspects of psychopathy and individual differences in attachment (Bowlby, 1944; De Ganck & Vanheule, 2015; Farrington, 2006; Gao et al., 2010; Hicks & Patrick, 2006; Jonason & Buss, 2012; Lang et al., 2002; Marshall & Cooke, 1999; Mikulincer et al., 2003; Patrick et al., 2006; Verona et al., 2004), there is strong support for further consideration of an attachment perspective on psychopathy and additional research in this area.

In future considerations of an attachment perspective on psychopathy, it will be important to understand the relationship of attachment theory to the cognitive-interpersonal theory of psychopathy (i.e. Blackburn, 1998). Both theories include the development of cognitive schemata based on interpersonal experiences which drives behaviour in a self-fulfilling way. However, empirical research designed to understand the associations between individual differences in attachment and the interpersonal circumplex (the measure underlying the broader interpersonal theory) only found low to moderate correlations between individual differences in attachment models and broader interpersonal theory (e.g., Florsheim, Henry, & Benjamin, 1996; Pincus, Dickinson, Schut, Castonguay, & Bedics,

1999). Furthermore, attachment theory draws heavily on evolutionary and ethological theories, which have yet to have been integrated into the cognitive-interpersonal theory of psychopathy. These factors suggest that individual differences in attachment models and broader interpersonal theory may be best considered distinct, but overlapping constructs until further research is conducted.

Limitations and Future Directions

Across this thesis there is a pattern of several consistent limitations which should be addressed in future research. Firstly, the populations from which we sampled participants were non-institutional (i.e., university and community samples), and therefore may not display the most extreme manifestations of the construct, which is more typically investigated in forensic or correctional populations (Hare, 1996). However, findings regarding psychopathy in university and community populations have typically been similar to those found in forensic samples (Birkley et al., 2013; Book, Quinsey, & Langford, 2007; Hawes et al., 2013; Kastner & Sellbom, 2012; Knight & Guay, 2006; Kosson et al., 1997; Lalumiere & Quinsey, 1996; Leistico et al., 2008; Lynam et al., 1999; Reidy et al., 2011; Neumann & Hare, 2008; Sellbom, 2011; Sellbom & Phillips, 2013), suggesting that our findings have a strong potential to be replicated in an incarcerated sample. Nevertheless, the investigation of attachment and psychopathy represents an important avenue for future research in order to replicate the current findings within samples in which psychopathy is often considered most problematic (i.e. incarcerated samples).

Secondly, and another limitation related to our sampling procedures, the majority of our participants across our studies were sampled through the Internet. This procedure allows for less supervision of participants which in the case of online sampling makes it difficult to verify responses. In addition, it is not possible to truly randomly sample with online surveys, as most individuals would be expected to complete only those surveys that they were

interested in. For the most part this procedure does not necessarily present as a major concern as previous research has generally been supportive of online sampling (Behrend, Sharek, Meade, & Wiebe, 2011; Buhrmester, Kwang, & Gosling, 2011; Casler, Bickel, & Hackett, 2013; Shapiro, Chandler, & Mueller, 2013; Wright, 2005). For instances, in their review of the literature regarding one online sampling service, Buhrmester et al. (2011) concluded that online sampling via Amazon's Mechanical Turk provided fast, inexpensive results from samples that were typically more demographically diverse and as reliable as university populations. Furthermore, the majority of our online samples were gathered through the Qualtrics panelling service, which appear to have a stronger verification process when collecting data (e.g., in terms of attention checking items). Nevertheless, given that our sampling procedures have been largely restricted to online samples, it is important to investigate the relationship between attachment and psychopathy with alternative sampling procedures, such as in-person assessments (regardless of whether these are interview or self-report assessments), in order to validate and generalise our findings beyond online samples.

Thirdly, our studies all relied on self-report measures to measure both psychopathy and attachment. Exclusive reliance of a single measurement method presents concerns regarding shared method variance, which could have artificially inflated estimates of the correlations found in our studies. This is a concern to address in future research with the use of mixed methods which include interview (e.g., George et al., 1996; Hare, 2003) and/or experimental measurement/priming (e.g., Lynam et al., 1999; Mikulincer et al., 2001; Mikulincer et al., 2003; Mikulincer et al., 2005) with self-report methods. Experimental priming of attachment models appears to be a particularly interesting line of research which could be used to examine the causal relationship between attachment models and

psychopathy through activation of the attachment system.[59] This method involves subliminal or supraliminal presentation of either attachment related threats or attachment security primes, in order to activate the attachment system or prime the attachment system towards attachment security (Mikulincer et al., 2001; Mikulincer et al., 2003; Mikulincer et al., 2005). Attachment system priming could be used to further investigate the presence of bonding capacity in psychopathic individuals, as without the capacity to bond, these individuals should be unaffected by priming of the attachment system. Researchers could also investigate supraliminal priming of attachment threat, which when combined with high cognitive load has been found to break down the psychological defences present in individuals with avoidant attachment (i.e. the ability to supress separation related thoughts and negative thoughts about oneself), which result in them behaving more like anxiously attached individuals (Mikulincer, Dolev, & Shaver, 2004). It would be interesting to see whether a similar procedure would be able to produce similar effects (i.e. the inability to suppress unwanted and negative thoughts) in individuals with higher levels of attachment anxiety, given the overlap we found between attachment avoidance and attachment anxiety.

Another concern that some may have regarding the use of self-report methods to investigate psychopathy is that it is a construct which is in part defined by lying. However, a recent meta-analysis reported that individuals higher on psychopathy tend not to engage in positive impression management in most research (Ray et al., 2013), which is actually consistent with the ruthless self-interest of more psychopathic individuals as there may be limited motivation to distort their responses for research. Regardless, interview methods which may be considered less prone to response distortion, tend to produce the same results as self-report measures (Camp et al., 2013; Lynam et al., 1999; Marcus & Norris 2014; Seibert et al., 2011; Vitacco et al., 2014).

[59] The author is aware of one study completed as a master's thesis which has yet to be published.

Finally, we have consistently employed cross sectional and correlational designs across our studies. This presents the obvious limitation that the correlations between attachment and psychopathy in our studies should not be regarding as causative. While it is tempting to consider a causal attachment perspective on psychopathy, in which aspects of psychopathy are causatively influenced by relational experiences through working models of attachment, it is equally reasonable to assume that the traits defining psychopathy lead to insecure attachment relationships. Alternatively, attachment and psychopathy may have a bi-directional relationship in which both variables influence one another or a third, as of yet un-identified variable could causally relate to both attachment and psychopathy. An interesting candidate for a third variable here could be an underlying genetic factor which becomes activated when there are variables present in an individual's environment which promote attachment insecurity but also overlap with psychopathy (e.g. separation from parents, abuse, maternal depression; Farrington, 2006; Lyons-Ruth & Jacobvitz, 2008). Should this be validated, it would highlight the need to consider environmental contributors to psychopathy, as socio-environmental variables may then be considered to be factors that activate biological processes.

Further research employing longitudinal designs is needed to elucidate the nature of attachment and psychopathy's associations to one another. While it may seem logical to consider longitudinal designs from birth through to adulthood, and such a study would likely be very beneficial in understanding the associations between attachment and psychopathy, it is a study that is likely to be expensive and difficult to derive validated responses from due to the measurement of psychopathy (i.e., there is currently no measure of psychopathy in very young children or concerns as to whether this construct could even apply to a child so young). As an alternative to longitudinal research over the course of an individual's lifespan, it may be worth considering longitudinal associations between psychopathy and peer

attachment relationships over a shorter period of time (i.e. weeks, months or years). Findings from such a study could demonstrate the causal relationships between attachment and psychopathy. Even if the causal relationship regarding the origins of the associations between attachment styles and psychopathy cannot be demonstrated in such a study, findings from a study considering longitudinal associations between psychopathy and peer attachment relationships could inform treatment and interventions should a causative relationship between peer attachment quality and psychopathy be established. This could allow researchers a way to causally influence psychopathy with other methods previously discussed (i.e., through relational experiences and attachment priming; Mikulincer et al., 2001; Mikulincer et al., 2003; Mikulincer et al., 2005). However, it is clearly necessary to validate attachment priming methodology with individuals higher in psychopathy, particularly in samples with more extreme manifestations of psychopathy (i.e. incarcerated samples; Hare, 1996), as these would be the individuals considered most pertinent to treat.

Conclusion

In summary, across the course of several studies we demonstrated that there are reliable associations between individual differences in general attachment styles and psychopathy using validated self-report measures of both individual differences in attachment and psychopathy in adult non-institutionalised samples. Moreover, we demonstrated that peer attachment models tended to account for the majority of the variance in the association between general attachment styles and the components of psychopathy. In addition, peer attachment models tended to have more independent associations with psychopathy when considered with parental attachment models, suggesting that peer attachment models may have a more important role in the association between psychopathy and individual differences in attachment in adulthood compared to parental attachment models. Finally, we found a small negative association between psychopathy and behaviours indicating the presence of an

attachment bond, particularly with family members and for the affective component of psychopathy. The magnitude of this effect, however, was insufficient to state that individuals higher on psychopathy lack the capacity to form attachment bonds. Taken together, our results suggest that the attachment deficits associated with psychopathy tend to be more reflective of problems regarding the quality of attachment relationships rather than the absence of attachment bonds. Our results have broader implications for understanding how individuals higher on psychopathy understand and interact in their intimate relationships and provide preliminary support for further consideration of attachment theory in the etiology of psychopathy.

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List of Appendices

Appendix A.

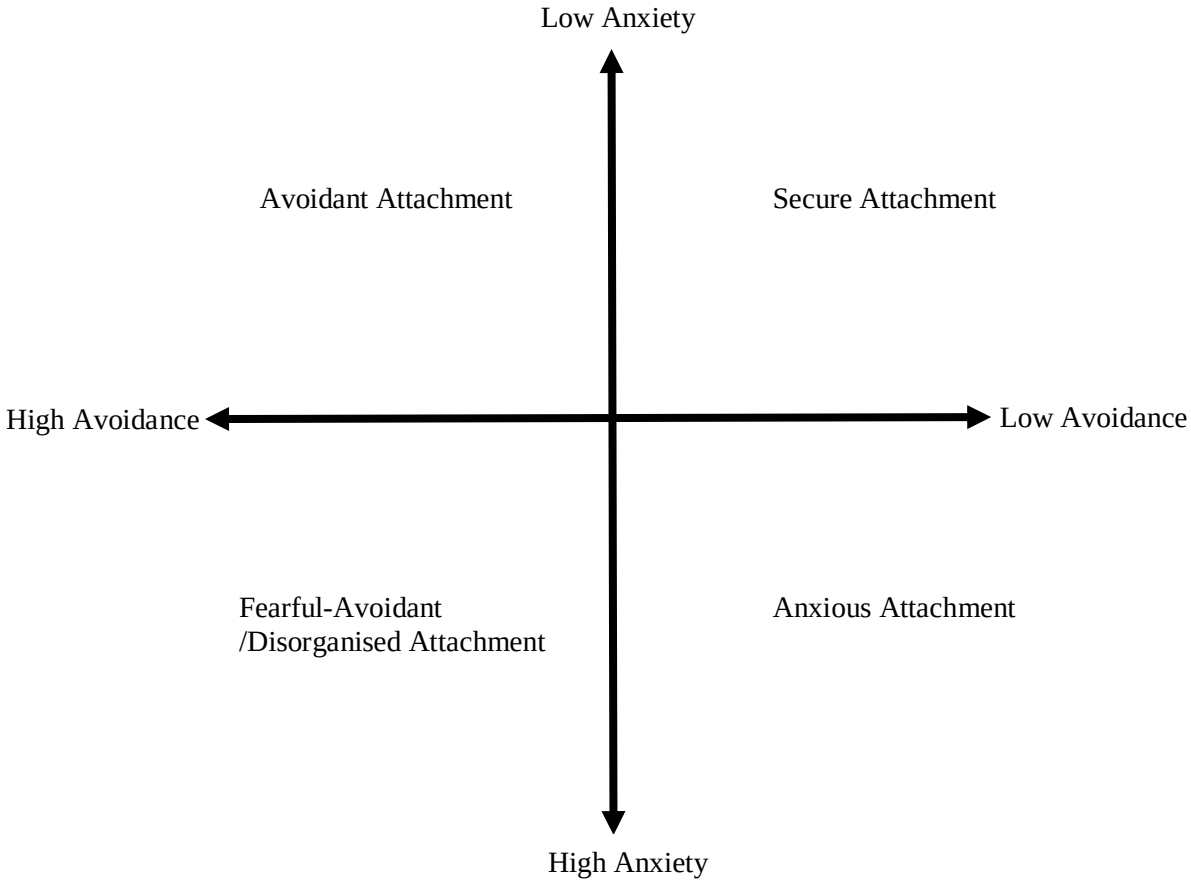

Figure 5.1. Two dimensional representation of attachment avoidance and attachment anxiety based on figure by Mikulincer & Shaver 2007.

Appendix B.

Supplementary Materials: Revising the Experiences in Close Relationships – Revised Structures

In 2011, Fraley, Heffernan, Vicary and Brumbaugh developed a self-report scale designed to measure individual differences in attachment style in specific relationships, the Experiences in Close Relationships – Revised – Structures (ECR-RS). Based on the widely used Experiences in Close Relationships – Revised (ECR-R; Fraley, Waller, & Brennan, 2000), the scale includes six items measuring attachment avoidance and three items measuring attachment anxiety for each relationship, totalling 36 items when investigating normative attachment relationships (e.g. mother, father, romantic partner, best friend). The items are the same across relationships, excluding the relationship referenced in each item (e.g. "I usually talk things over with my ..."), allowing for comparison between relationships. The total length of the scale is the same as the original ECR-R, reducing burden on participants. Fraley et al. also suggest that items across all the scales can be summed and averaged to create a measure of general attachment styles. This idea is based on the results of Overall, Fletcher, and Friesen (2003), which indicate that attachment styles can be represented as a hierarchy with specific attachment models superseded by more generalised models.

While the ECR-RS performs well in terms of internal consistency (i.e. coefficient α) and evinces support for construct validity (Donbaek & Elklit, 2014; Fraley et al. 2011; Moreira, Martins, Gouveia, & Canavarro, 2015), there are several issues which detract from the quality of the scale. Firstly, given the small number of items, the attachment anxiety scale is relatively restrictive in content, without reference to aspects of the construct such as attachment anger and desire to merge which are present in longer measures (e.g. Brennan, Clark, & Shaver, 1998; Feeney, Noller, & Hanrahan, 1994; Fraley, Waller, & Brennan, 2000;

Wilkinson, 2011). Secondly, one item on the attachment avoidance scale cross loads with (.33-.46) with attachment anxiety, meaning that it poorly discriminates between the dimensions of attachment insecurity. Finally, the summing and averaging of items to create a measure of general attachment styles is potentially problematic as it assumes that each specific relationship contributes equally to the generalised model. This idea is inconsistent with Overall et al.'s (2003) findings, as well as others (Klohnen, Weller, Luo, & Choe, 2005; Pierce & Lydon, 2001), which have found that certain relationships tend to contribute more to generalised attachment models than others.

Given the concerns noted above, we opted to make several small adjustments to the item content of the ECR-RS in an ongoing effort to improve the scale. First, three additional items were added to the attachment anxiety scales to equal that of the attachment avoidance scales and increase construct coverage reflecting attachment frustration and desire to merge, which are currently underrepresented in the scale.[60] Second we removed the item "I find it easy to depend on this person" due to cross-loading for certain figures (Fraley et al. 2011) and replaced it with "I try to avoid getting too close to others". Thirdly, in addition to having scales for mothers, father, romantic partners and friends, we also created a scale for general attachment styles using the same items used in the specific figure scales. Finally, we collected responses with a second sample which included several criterion measures in order to verify the construct validity of the scale after making our adjustments. Consistent with previous findings, we expected that peer attachment models (i.e. friends and romantic partners) would show stronger associations with general attachment models than parent attachment models and that specific relationship variables (e.g. relationship quality) would correlate more strongly with attachment measures of their own relationship than other relational models (Cozzarelli, Hoekstra, & Bylsma, 2000; Klohnen et al. 2005). Regarding the construct

[60] All new and replaced items were selected from the Experiences in Close Relationships (Brennan et al. 1998).

validity of the scales, we expected that the avoidance scales would correlate positively with other measures of attachment avoidance, independence, emotional detachment and negatively correlate with measures of warmth, reassurance seeking and relationship quality: while we expected that attachment anxiety would be positively correlated with other measures of attachment anxiety, reassurance seeking and neuroticism, and negatively correlate with measures of independence, self-esteem and relationship quality. These predictions are consistent with how these constructs have previously been conceptualised (Brennan et al. 1998; Collins & Read, 1990; Feeney et al. 1994; Fraley et al. 2000; Mikulincer & Shaver, 2007).

Method

Participants

Sample One. The details of the first sample are included in the main document for which this is the supplementary material (See participants section).

Sample Two. For our second sample, we collected 320 completed responses from a US community sample via Mechanical-Turk. Of this sample, 24 responses were removed due to positive endorsement of items on our infrequency scale (see materials section) and a further four were removed as they were deemed to be non-cooperative responses, [61] leaving a final sample of 292. A slight majority of the sample was female (55.10%) with a mean age of 39.63 (SD = 11.89, range = 18-68). The majority of participants identified as White (80.50%,), followed by African American (6.50%), Hispanic/Latino (5.50%) and Other (7.50%). It should be noted that this sample was previously used by Christian, Sellbom and Wilkinson (submitted), but the analyses conducted here have not be presented before.

Materials

[61] We used the same criteria to determine non-cooperative responses as with our samples in the main text. However, we also included <12 minutes completion time as it seemed unreasonable to expect individuals to be able to complete the approximately 300 items in less than this time whilst remaining attentive.

Measures Used in Both Samples.

Revising the Experiences in Close Relationships – Revised – Structures (ECR-RS; Fraley et al. 2011). Following our revisions to the ECR-RS, scales for each specific figure contained six items to measure attachment avoidance and six items to measure attachment anxiety, making a total of 12 items for each relationship of interest (i.e. mother, father, romantic partner, best friend). All items were scored on a 7-point Likert scale (*Strongly Disagree*, *Disagree*, *Slightly Disagree*, *Neither Agree nor Disagree*, *Slightly Agr*ee, *Agree*, *Strongly Agree*), with the items phrased for each specific relationship. For our general attachment styles measure we asked participants to "*Please answer the following questions about how you think about relationships generally*", we used the terms "*others*" to refer to relationships in general, and made appropriate grammatical changes to each item to ensure the interpretability of each item while maintaining the content of the item. The items for the scales, as well as the scale properties, fit, internal consistency and construct validity can be seen in the results section.

Sample Two Measures.

Experiences in Close Relationships – Revised – General Short Form (ECR-R-GSF; Wilkinson, 2011). The ECR-R-GSF is a 20 item scale designed to measure general attachment styles, based on the ECR-R (Fraley et al. 2000), which is more a measure of romantic attachment style. The scale contains 10 items to measure attachment avoidance and 10 items to measure attachment anxiety, with all items scored on a 5-point Likert scale (*Strongly Disagree*, *Disagree*, *Neutral/Mixed*, *Agree*, *Strongly Agree*). Wilkinson (2011) found evidence to support the construct validity of the scale and it performed well in terms of internal consistency for the current sample (anxiety α = .92, avoidance α = .95, total α = .94).

Attachment Style Questionnaire (ASQ; Feeney et al. 1994). The ASQ is a 40 item scale designed to measure general attachment styles which can be broken into the widely used two factor structure (avoidance *k* = 16, anxiety *k* =13) or a five factor structure (Confidence *k* = 8, Discomfort with Closeness *k* = 10, Relationships as Secondary *k* = 7, Need for Approval *k* = 7 and Preoccupation *k* =8). In the five factor structure, Discomfort with Closeness and Relationships as Secondary can be considered as sub-dimensions of attachment avoidance, while Need for Approval and Preoccupation can be considered as aspects of attachment anxiety. Confidence can be considered as a measure of attachment security. Previous research has supported the validity of both factor models (Feeney et al. 1994; Fossati et al., 2003) and internal consistency was acceptable in the current sample for both two (avoidance α = .92, anxiety α = .92, total α = .94) and five factor models (Confidence α = .88, Discomfort with Closeness α = .91, Relationships as Secondary α = .76, Need for Approval α = .84 and Preoccupation α = .83). All items are scored on a 5-point Likert scale (*"Not at all like me", "Not like me", "Somewhat like me", "Like me", "Very much like me"*).

Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). The RSES is a 10 item unitary measure of global self-esteem which has been widely used in self-esteem research (e.g. Schmitt & Allik, 2005). All items were scored on a 4-point Likert scale ("*Strongly disagree*", "*Disagree*", "*Agree*", "*Strongly agree*") and The Cronbach's α for the RSES in the current sample was .95.

Selected Scales From The International Personality Item Pool (IPIP; Goldberg et al. 2006; International Personality Item Pool, n.d.). Several scales were selected from the IPIP as short measures to be used to evaluate the construct validity of the ECR-RS. Specifically, we selected the 10-item Neuroticism scale, the 11-item Warmth scale and the

10-item Independence scale. All scales were scored with the same 7-point Likert scale (“*Strongly disagree*”, “*Disagree*”, “*Somewhat disagree*”, “*Neither agree nor disagree*”, “*Somewhat agree*”, “*Agree*”, “*Strongly agree*”) and each displayed acceptable levels of internal consistency (Neuroticism α = .93, Warmth α = .94, Independence α = .82,). The IPIP website provides correlation coefficients between the selected Neuroticism, Warmth and Independence scales and their established counterparts (i.e. Abridged Big Five Dimensional Circumplex [Hofstee, de Raad, & Goldberg, 1992]; NEO Personality Inventory - Revised [NEO PI-R; Costa & McCrae, 1992]; Six Factor Personality Questionnaire [Jackson, Paunonen, & Tremblay, 2000; International Personality Item Pool, n.d.), supporting their construct validity.

Emotional Detachment scale (Simms et al. 2011). The Emotional Detachment scale from the Computerized Adaptive Test of Personality Disorder - Static Form (CAT-PD-SF; Simms et al. 2011) was used as a measure of social aloofness and difficulty expressing emotions. Wright and Simms (2014) found that the scale tends to load well with established measures of detachment and introversion. The scale contains 7-items, showed acceptable internal consistency (α = .91) and was scored on a 7-point Likert scale (“*Strongly disagree*”, “*Disagree*”, “*Somewhat disagree*”, “*Neither agree nor disagree*”, “*Somewhat agree*”, “*Agree*”, “*Strongly agree*”).

Excessive Reassurance Seeking Scale (ERSS; Joiner & Metalsky, 2001). The ERSS is a 4-item scale designed to measure excessive reassurance seeking from others. In their 2001 paper, Joiner and Metalsky report six studies to support the construct validity of the scale including internal consistency, comparison with peer reports and construct validity in the context of depression. The scale was scored on a 7-point Likert scale (“*Strongly disagree*”, “*Disagree*”, “*Somewhat disagree*”, “*Neither agree nor disagree*”, “*Somewhat*

agree", "*Agree*", "*Strongly agree*") and displayed acceptable levels of internal consistency in the current study (α = .92).

Relationship Quality. Based on the measure of relationship quality used by Klohnen et al. (2005), we requested that participants rate their level of satisfaction, conflict and closeness for each of the relationships included in the ECR-RS for this study. This procedure led to 12 items per participant (3 items for each relational context). Satisfaction was measured on a 7-point Likert scale ("*Very dissatisfied*", "*Dissatisfied*", "*Somewhat dissatisfied*", "*Neutral*", "*Somewhat satisfied*", "*Satisfied*", "*Very Satisfied*") as was closeness ("*Very close*", "*Close*", "*Somewhat close*", "*Neither close nor distant*", "*Somewhat distant*", "*Distant*", "*Very distant*"), however, conflict was measured on a 4-point Likert scale ("*None*", "*A little*", "*Some*", "*A lot*") as easily interpretable scale points were difficult to generate. Scores for each of the scales were z-scored and averaged to create a unitary value for relationship quality with the Closeness and Conflict scales reversed so that higher scores would reflect greater quality (Mother α = .88, Father α = .85, Romantic α = .78, Friend α = .71).

Infrequency Validity Scale (Christian & Sellbom, 2016). In order to detect invalid responses from participants, we included a short infrequency scale (6 items; e.g. *"I am close personal friends with the prime minister of Zanzibar"*), which we have previously used to detect problematic responding (see Christian & Sellbom, 2016 for item hit frequency). Items were distributed evenly within other scales throughout the survey, adopting the metric of the scale in which it was embedded. Hits were scored when the participant affirmatively endorsed an item. In the current sample, based rate hits for the items ranged from 0.94% - 5.31%).

Procedure

Details regarding the administration of the survey for sample one are discussed in the main document to which this is the supplementary material (See procedure section). Administration of the survey for sample two was similar to sample one. The survey was administered online and the questionnaires were administered in a single randomised order, with items within each questionnaire randomised between each participant. Participants were informed that the study was about personality and relationships, and took approximately thirty minutes to complete.

Results and Discussion

Descriptive statistics for the ECR-RS in sample one are presented in the main document, while descriptive statistics for the second sample are presented in Table 1.

Measurement Modelling

To evaluate the model fit of each ECR-RS scale, a Confirmatory Factor Analysis (CFA) using Maximum Likelihood estimation with robust scaling (MLR) was conducted for each relational context using M*plus* 7. These analyses were conducted on both samples. Values of .08 or lower for the Root Mean Square Error of Approximation (RMSEA) and Standardised Root Mean Square Residual (SRMR), as well as values of .90 or higher for the Confirmatory Fit Index (CFI) and Tucker-Lewis Index (TLI), were used as benchmarks to assess adequacy of model fit (Little, 2013). The Chi-square ratio was also calculated, but not interpreted as it is strongly influenced by sample size and can therefore overly liberal in rejecting plausible models (Brown, 2015). The results of these analyses for both samples are presented in Table 2. Also included in this table are α and inter-item correlations for each of the scales. All of which reached acceptable levels of internal consistency.

Initially we inspected the item loadings for each of the scales, all of which significantly loaded on their respective factors ($p < .001$). However, an attachment anxiety item, “I get frustrated when ... is not available when I need him/her”, loaded < .4 on the

mother attachment anxiety scale for the first sample (.27) and then < .4 for the mother and father attachment anxiety scales in the second sample (.29 and .34, respectively). We nevertheless opted to retain the item as it loaded at >.4 for the other attachment anxiety scales and provided construct coverage regarding attachment frustration. However, it should be noted that this item may need to be reconsidered in future versions of the scale as it appears to tap less variance in attachment frustration with parents than desirable.

Inspection of the fit indices suggested that none of the scales reached our a priori benchmarks (see unmodified in Table 2.), which is consistent with previous CFA studies of self-report attachment measures (Karantzas, Feeney, & Wilkinson, 2010; Wei, Russell, Mallinckrodt, & Vogel, 2007; Wilkinson, 2011), including with the ECR-RS (Moreira et al. 2015). Like this previous research we consulted the modification indices to improve fit. Modification indices were selected if they were on the same factor, meaningful and occurred in the majority of the scales (as the same modifications were applied to all scales to maintain consistency).[62, 63] The analyses were re-specified and re-estimated, and modification indices were re-applied until no further indices could be identified. Using this method we identified four modification indices[64] and found that the model fit statistics improved to levels of acceptable fit across all scales for all indicators in sample one. In sample two we used the same modification indices and again found substantial improvements in model fit. However, RMSEA and SRMR still failed to reach benchmarks for the mother, father and friend scales in this sample. This could reflect the nature of the items as they were derived from scales designed for romantic relationships or differences between the samples such as sample size or

[62] Modification indices were selected if they were above 30, consistent with previous research (Wilkinson, 2011)
[63] Fortunately the same or similar pattern of modification indices was seen across scales.
[64] (1) "I don't feel comfortable opening up to others" with "I prefer not to show others how I feel deep down",
(2) "I usually discuss my problems and concerns with others" with "I talk things over with others",
(3) "I talk things over with others" with "It helps to turn to others in times of need",
(4) "I usually discuss my problems and concerns with others" with "It helps to turn to others in times of need"

nationality. However, it should be noted that the cut-offs selected in this study can be overly restrictive in the context of individual differences variables (Marsh, Hau, & Wen, 2004), suggesting that model fit may still be tolerable for sample two.

In order to evaluate item loading across the various scales we conducted Exploratory Factor Analyses (EFA) on each of the scales for both samples using M*plus*.[65] For these analyses we used MLR with a varimax rotation and requested between one and four factor solutions. Inspection of each of the factor solutions suggested that the two factor model displayed the most coherent factor solution. Factor loadings for both samples can be seen in Table 3. For most items there appeared to be little cross loading. However, we found that items 2, 3, and 6 of the avoidance items displayed some cross loading across relational contexts. One the other hand, the items on the anxiety scales displayed limited cross loading across relational contexts. Our results appear to suggest that further changes to the avoidance scales may be necessary in order to find items with lower cross loading, but that the new anxiety items appear to perform well in this domain.

Overall, the results of our measurement modelling suggest that each of the scales has acceptable levels of internal consistency and can reach appropriate model fit following modification. Rewording or replacement of our attachment frustration item on the anxiety scale may be necessary to obtain a higher factor loading with parents, but the other new anxiety items appear to have loaded appropriately on across relational context. Further consideration of the avoidance items may also be necessary, as we found several items that cross loaded between factors, including the replacement item we included to reduce cross loading. Donbaek and Elklit (2014) also found cross loading for items on the avoidance scale in an adolescent sample in Demark, which was consistent with our findings for items 2 and 6

[65] We fully and readily acknowledge the logical inconsistency in conducting CFA and EFA on the same samples. However, conducting an EFA was necessary to evaluate item cross loading as the CFA restricts cross loading to 0 across factors.

in this study, but different to the cross loading item reported by Fraley et al. (2011). Continued efforts to formulate more items that have low cross loading across samples and relational context appears necessary at this time, though it is important to acknowledge that several of the ECR-RS currently display these properties.

Construct Validity

In sample 2, correlations between each of the relational contexts in the ECR-RS were broadly consistent with our predictions and previous research (Cozzarelli et al. 2000; Fraley et al. 2001; Klohnen et al. 2005), as can be seen in Table 4. Initially we noted that most of the attachment scales were positively related to one another, consistent with the idea of there being some within person consistency in attachment style (Fraley et al. 2011). However, the associations between attachment scales tended to be stronger for those sharing a relational domain (e.g. parents or peers) and congruent style (e.g. mother anxiety with father anxiety); again, consistent with previous research (Fraley et al., 2011; Klohnen et al., 2005).[66] For correlations between specific relational contexts and our general attachment scales, the strongest associations occurred with those from the peer domain, consistent with our hypotheses and previous research suggesting that peer attachment models have an influential role in adult attachment (Doherty & Feeney, 2004; Klohnen et al. 2005). It should be noted that ECR-RS scales typically displayed moderate cross dimension associations within each figure. While some degree of correlation between avoidance and anxiety on the same figure may be expected (Cameron, Finnegan, & Morry, 2012), the shared variance between these dimensions is somewhat higher than expected.

To further evaluate the construct validity of the scales we calculated correlation coefficients between each of our scales and the variables of interest using z-scored versions

[66] There were exceptions to this pattern, such as mother avoidance displaying as strong an association with friend avoidance as father avoidance, though our results are more consistent with the idea that within domain associations are stronger than cross domain associations.

of all variables (see Table 5.). Given that there were moderate associations between attachment anxiety and attachment avoidance for each specific relational context, we also conducted multiple regressions in which attachment avoidance and anxiety regressed together on each variable of interest, in order to account for the shared variance between scales. Age, gender, relationship status and relationship length displayed small and mostly non-significant relationships with the attachment measures.

Consistent with our hypotheses, the dimensions of attachment on the ECR-RS tended to correlate moderately to strongly with their counterparts on other measures of attachment insecurity and negatively with attachment security (see ECR-R-GSF and ASQ in Table 5. and Table 6.). The exception to this was the ASQ Relationships As Secondary scale, which displayed limited differentiation regarding attachment avoidance and anxiety for father and romantic attachment contexts. The associations for our general attachment style measure correlated with the ECR-R-GSF and ASQ at near redundant levels (> .80), suggesting the measurement of the same construct. Similarly, romantic and friend attachment models also displayed strong style congruent associations with the ASQ and ECR-R-GSF, which is consistent with the correlations found between these specific figures and our own general attachment scale. The strength of this association is somewhat higher than expected, but may reflect some inflation due to shared items between the ECR-RS and the criterion scales.

For relationship specific variables, the strength of the association between relationship quality and attachment insecurity tended to be strongest in the same relational context, consistent with previous research (Cozzarelli et al. 2000; Kholen et al. 2005). However, the attachment anxiety scales tended to show poorer discriminant validity in this domain, with several of the attachment anxiety scales displaying as strong an association with relationship quality within context as across relational context. However, given that attachment anxiety tended to be a poor predictor of relationship quality across relational contexts this could

suggest that the criterion measure may not be entirely appropriate for this scale rather than a problem with the scale itself. We also found that our general attachment style scales were stronger predictors of peer relationship quality than parent relationship quality, consistent with the greater shared variance between peer and general attachment models in adults (Klohnen et al. 2005).

Associations between the ECR-RS and broader individual differences variables (e.g. neuroticism, warmth, self-esteem) were again broadly consistent with our hypotheses. The attachment avoidance scales were positively associated independence and emotional detachment and negatively associated with warmth. The attachment avoidance scales also positively correlated with neuroticism and negatively with self-esteem. While unexpected, these findings have not been unusual in the attachment literature (e.g. Schmitt & Allik 2005). Inconsistent with our hypotheses, we found that some of the avoidance scales (i.e. father, romantic, friend) showed a small positive association with reassurance seeking. However, when accounting for attachment anxiety, reassurance seeking tended to display null associations with these attachment avoidance scales, suggesting that the overlap between scales may account for these results. For the attachment anxiety scales, there were positive associations with excessive reassurance seeking and neuroticism and negative associations with self-esteem and independence, as predicted. We also found that the attachment anxiety scales tended to correlate positively with emotional detachment, though this effect diminished to small and mostly non-significant effect sizes when attachment avoidance was accounted for in this relationship.

Conclusions

Overall, our findings were broadly consistent with our hypotheses and supportive of the validity of the scale. Firstly, we found that the scales reached acceptable levels of internal consistency and benchmarks for acceptable model fit for most indices (excluding absolute fit

indices in our second sample). Although modification indices were required to reach acceptable model fit, this is typical for ECR based scales (e.g. Karantzas et al., 2010; Moreira et al. 2015; Wei et al., 2007; Wilkinson, 2011). Secondly, our findings were supportive of the construct validity of the version of ECR-RS used in these analyses. The ECR-RS scales tended to display the expected associations with other measures of attachment style, individual differences variables and relationship specific variables with limited exceptions. However, several of these associations may have been inflated by method variance, as only self-report measurement was used. Further consideration of alternative or rewarded items may be useful in future research in order to improve on the scale. An alternative criterion measure to relationship quality may also need to be considered for attachment anxiety, in order to determine whether the scale or criterion performed ineffectively in this study. Finally, it should be explicitly noted that the changes made to the ECR-RS in this study are small incremental changes and do not constitute a redefined scale. Like Fraley et al. (2011), we see the development of psychological measurement as an evolving process, with our changes to this scale representing a small, but nevertheless important part of this process.

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Table 5.1
Descriptive Statistics for Sample 2

Scale	Mean	SD	Range (Min – Max)	Skew	Kurtosis
ECR-RS					
General					
Avoidance	3.53	1.28	6.00 (1.00 - 7.00)	.19	-.56
Anxiety	3.49	1.55	6.00 (1.00 - 7.00)	.28	-.94
Mother					
Avoidance	3.65	1.73	6.00 (1.00 - 7.00)	.43	-.93
Anxiety	2.34	1.16	6.00 (1.00 - 7.00)	1.29	1.81
Father					
Avoidance	3.89	1.64	6.00 (1.00 - 7.00)	.22	-.90
Anxiety	2.33	1.16	5.17 (1.00 - 6.17)	1.10	1.06
Romantic					
Avoidance	2.79	2.30	5.33 (1.00 - 6.33)	.62	-.47
Anxiety	3.29	1.60	6.00 (1.00 - 7.00)	.53	-.77
Friend					
Avoidance	3.10	1.31	6.00 (1.00 - 7.00)	.76	.26
Anxiety	2.84	1.45	6.00 (1.00 - 7.00)	.84	.01
ECR-R-GSF					
Avoidance	3.01	.89	4.00 (1.00 - 5.00)	.12	-.64
Anxiety	2.39	.99	3.80 (1.00 - 4.80)	.45	-.67
ASQ					
Confidence	3.77	1.01	5.00 (1.00 - 6.00)	-.47	-.07
Avoidance	3.50	.93	4.88 (1.00 - 5.88)	-.06	-.46
RAS	2.76	.86	5.00 (1.00 - 6.00)	.42	.33
Dismissive	3.73	1.09	5.00 (1.00 - 6.00)	-.13	-.64
Anxiety	2.88	1.06	5.00 (1.00 - 6.00)	.50	-.37
Preoccupation	3.09	.99	4.50 (1.25 - 5.75)	.50	-.29
NFA	2.85	1.04	5.00 (1.00 - 6.00)	.46	-.21
Relationship Quality					
Mother	.00	.35	1.58 (-.54 - 1.05)	.45	-.70
Father	.00	.37	1.93 (-.84 - 1.10)	.43	-.50
Romantic	.00	.38	2.37 (-.91 - 1.47)	.77	.83
Friend	.00	.38	2.15 (-.84 - 1.31)	.58	.52
RSES	3.01	.72	3.00 (1.00 - 4.00)	-.65	-.07
IPIP					
Neuroticism	3.26	1.49	6.00 (1.00 - 7.00)	.60	-.65
Warmth	5.24	1.14	6.00 (1.00 - 7.00)	-1.06	1.33
Independence	4.05	.99	5.90 (1.10 - 7.00)	-.03	.07
ED	3.82	1.46	6.00 (1.00 - 7.00)	.16	-.66
ERSS	2.31	1.39	6.00 (1.00 - 7.00)	1.25	1.05

Note. N = 292, standard error for skew = .14, standard error for kurtosis = .28, ECR-RS = Experiences in Close Relationships – Revised Structures, ECR-R-GSF = Experiences in Close Relationships – Revised – General Short Form, ASQ = Attachment Style Questionnaire, RAS = Relationships as Secondary, NFA = Need for Approval, RSES = Rosenberg Self-Esteem Scale, IPIP = International Personality Item Pool, ED = Emotional Detachment, ERSS = Excessive Reassurance Seeking Scale.

Table 5.2

Model Fit and Internal Consistency for Experiences in Close Relationships – Revised Structures in Sample 1 and Sample 2

			Model fit					α		Inter-item
Scale		N	RESEA	χ^2	CFI	TLI	SRMR	Av	Ax	Av	Ax
Sample 1											
General	unmod	695	.110 (.101-.119)	9.35	.86	.83	.113	.85	.89	.50	.53
	mod	695	.060 (.051-.070)	3.52	.96	.95	.084	-	-	-	-
Mothers	unmod	683	.099 (.090-.108)	7.66	.87	.84	.090	.90	.83	.60	.47
	mod	683	.062 (.052-.072)	3.61	.95	.94	.068	-	-	-	-
Fathers	unmod	663	.111 (.102-.120)	9.13	.83	.79	.096	.87	.85	.53	.50
	mod	663	.078 (.068-.087)	4.99	.92	.90	.075	-	-	-	-
Romantic	unmod	690	.093 (.084-.102)	6.93	.89	.86	.071	.87	.88	.53	.54
	mod	690	.045 (.035-.056)	2.42	.98	.97	.046	-	-	-	-
Friends	unmod	689	.093 (.084-.102)	6.98	.88	.85	.093	.86	.87	.50	.54
	mod	689	.058 (.049-.068)	3.34	.96	.94	.073	-	-	-	-
Sample 2											
General	unmod	292	.107 (.093-.121)	4.34	.89	.86	.089	.86	.92	.50	.65
	mod	292	.057 (.040-.074)	1.95	.97	.96	.064	-	-	-	-
Mothers	unmod	292	.119 (.105-.133)	5.11	.87	.83	.099	.93	.82	.69	.44
	mod	292	.087 (.072-.102)	3.21	.93	.91	.091	-	-	-	-
Fathers	unmod	292	.134 (.120-.148)	5.72	.83	.78	.105	.92	.85	.66	.50
	mod	292	.085 (.070-.101)	3.13	.93	.91	.091	-	-	-	-
Romantic	unmod	292	.119 (.105-.133)	5.13	.88	.85	.085	.91	.92	.63	.65
	mod	292	.058 (.041-.075)	1.99	.97	.96	.064	-	-	-	-
Friends	unmod	292	.140 (.126-.154)	6.70	.81	.76	.145	.89	.92	.58	.65
	mod	292	.091 (.077-.107)	3.44	.92	.90	.106	-	-	-	-

Note. Confirmatory Factor Analyses with Maximum Likelihood Estimation with Robust Estimators was used to obtain model fit statistics. α and Inter-item correlations were calculated using ordinary least squares correlations. RMSEA = Root Mean Square Error of Approximation, CFI = Confirmatory Fit Index, TLI = Tucker-Lewis Index, SRMR = Standardised Root Mean Square Residual, Av = Attachment avoidance, Ax = Attachment anxiety, unmod = unmodified, mod = modified.

Table 5.3

Items and Item Loadings Using Exploratory Factor Analyses for Sample 1and Sample 2

	Relational Context									
	General		Mother		Father		Romantic		Friend	
Item	Avoid	Anxiety	Avoid	Anxiety	Avoid	Anxiety	Avoid	Anxiety	Avoid	Anxiety
1. I usually discuss my problems and concerns with others.	**.79(.81)**	-.08(.04)	**.89(.92)**	.03(.02)	**.82(.91)**	-.07(-.00)	**.84 (.86)**	.04(.05)	**.79(.87)**	-.05(-.02)
2. I don't feel comfortable opening up to others.	**.65(.71)**	.27(.31)	**.67(.76)**	.30(.23)	**.66(.75)**	.24(.22)	**.69(.77)**	.27(.33)	**.65(.70)**	.25(.31)
3. I try to avoid getting too close to others.*	**.60(.65)**	.30(.38)	**.63(.74)**	.39(.28)	**.59(.70)**	**.41**(.35)	**.61(.67)**	.29(.34)	**.59(.57)**	.33(**.53**)
4. I talk things over with others.	**.85(.73)**	-.11(.04)	**.89(.91)**	.06(.07)	**.85(.89)**	.02(-.05)	**.82(.82)**	.06(.07)	**.78(.91)**	-.06(-.04)
5. It helps to turn to others in times of need.	**.76(.63)**	-.08(-.09)	**.79(.89)**	.07(.07)	**.77(.86)**	.06(.05)	**.73(.81)**	.01(.05)	**.75(.84)**	-.05(-.02)
6. I prefer not to show others how I feel deep down.	**.54(.61)**	.32(.32)	**.61(.66)**	.24(.29)	**.58(.66)**	.29(.21)	**.58(.69)**	.31(.32)	**.64(.56)**	.29(.37)
7. I'm afraid others may abandon me.	.14(.23)	**.81(.85)**	.13(.26)	**.77(.80)**	.24(.20)	**.75(.78)**	.20(.30)	**.82(.86)**	.14(.18)	**.81(.86)**
8. I worry others won't care about me as much as I care about them.	.07(.14)	**.87(.90)**	.23(.15)	**.84(.81)**	.17(.20)	**.81(.84)**	.19(.21)	**.85(.90)**	.12(.19)	**.80(.90)**
9. I get frustrated when others are not available when I need them.*	-.11(-.05)	**.55(.59)**	-.20(-.28)	.37(**.42**)	-.14(-.23)	**.50(.44)**	-.06(-.13)	**.46(.55)**	-.13(-.19)	**.48(.55)**
10. I often worry that others don't really care for me.	.17(.23)	**.83(.87)**	.31(.38)	**.75(.79)**	.33(.36)	**.67(.78)**	.32(.37)	**.76(.83)**	.22(.26)	**.78(.86)**
11. I worry that my desire to be closer to others will scare them away.*	.20(.10)	**.73(.75)**	.19(.10)	**.72(.57)**	.11(.06)	**.75(.73)**	.18(.26)	**.73(.73)**	.18(.13)	**.73(.83)**
12. I worry a lot about my relationships.*	.02(.17)	**.74(.81)**	.21(.12)	**.64(.56)**	.12(.10)	**.70(.63)**	.16(.21)	**.70(.85)**	.08(.07)	**.77(.81)**

Note. Exploratory Factor Analyses with Maximum Likelihood Estimation with Robust Estimators was used to obtain item loadings. Loading above .40 are in bold. Loadings for sample 1 are before the brackets and loadings for sample 2 are within the brackets. Avoid = attachment avoidance, Anxiety = attachment anxiety, * = new items. N = 663-695 for sample 1 with pairwise deletion and N = 292 for sample 2.

Table 5.4

Inter-Correlation Between Relational Contexts with the Experiences in Close Relationships – Revised – Structures

	Relational Context									
	General		Mother		Father		Romantic		Friend	
Context	Avoid	Anx	Avoid	Anx	Avoid	Anx	Avoid	Anx	Avoid	Anx
General										
Avoid	-									
Anx	**.23*(.38*)**	-								
Mother										
Avoid	.42*(.42*)	.19*(.24*)	-							
Anx	.22*(.20*)	.41*(.52*)	**.38*(.32*)**	-						
Father										
Avoid	.38*(.33*)	.16*(.24*)	.43*(.35*)	.21*(.13[t])	-					
Anx	.14*(.18*)	.36*(.45*)	.18*(.07)	.55*(.54*)	**.34*(.29*)**	-				
Romantic										
Avoid	.43*(.73*)	.27*(.36*)	.30*(.26*)	.36*(.21*)	.24*(.26*)	.30*(.26*)	-			
Anx	.22*(.44*)	.61*(.87*)	.15*(.23*)	.35*(.48*)	.20*(.27*)	.32*(.49*)	**.39*(.46*)**	-		
Friend										
Avoid	.65*(.62*)	.16*(.38*)	.35*(.39*)	.24*(.20*)	.28*(.32*)	.19*(.24*)	.36*(.55*)	.12*(.37*)	-	
Anx	.18*(.36*)	.65*(.73*)	.15*(.19*)	.38*(.44*)	.12*(.25*)	.39*(.48*)	.19*(.37*)	.50*(.69*)	**.27*(.35*)**	-

Note. [t] = $p < .05$, * = $p <. 01$. Displaying Pearson's correlation coefficients. Correlations for sample 1 are before the brackets and correlations for sample 2 are within the brackets. Avoid = attachment avoidance, Anx = attachment anxiety. Correlations between attachment avoidance and attachment anxiety for the same relational context are in bold. N = 663-690 with pairwise deletion.

Table 5.5

Pearson's Correlations Between Experiences in Close Relationships – Revised – Structures and Criterion Measures

	Relational Context									
	General		Mother		Father		Romantic		Friend	
Scale	Av	Ax	Av	Ax	Av	Ax	Av	Ax	Av	Ax
ECR-R-GSF										
Avoidance	.84**	.42**	.46**	.21**	.35**	.18**	.66**	.45**	.65**	.37**
Anxiety	.47**	.85**	.32**	.55**	.31**	.53**	.48**	.82**	.43**	.80**
ASQ										
Confidence	-.72**	-.55**	-.47**	-.28**	-.36**	-.25**	-.63**	-.54**	-.63**	-.51**
Avoidance	.81**	.51**	.50**	.26**	.36**	.22**	.60**	.53**	.62**	.45**
Dismissive	.78**	.54**	.47**	.28**	.36**	.23**	.60**	.55**	.60**	.47**
RAS	.53**	.36**	.32**	.24**	.24**	.23**	.42**	.39**	.49**	.38**
Anxiety	.46**	.81**	.32**	.48**	.30**	.43**	.45**	.75**	.46**	.74**
Preoccupation	.29**	.84**	.23**	.49**	.21**	.43**	.29**	.78**	.29**	.73**
NFA	.38**	.70**	.27**	.45**	.24**	.38**	.40**	.64**	.40**	.65**
Quality										
Mother	-.25**	-.22**	-.83**	-.39**	-.22**	-.15*	-.16**	-.21**	-.25**	-.17**
Father	-.11	-.20**	-.31**	-.19**	-.76**	-.29**	-.08	-.25**	-.21**	-.26**
Romantic	-.40**	-.36**	-.15*	-.22**	-.17**	-.23**	-.58**	-.45**	-.32**	-.36**
Friend	-.46**	-.43**	-.27**	-.19**	-.23**	-.21**	-.42**	-.41**	-.63**	-.42**
RSES	-.41**	-.54**	-.25**	-.33**	-.21**	-.30**	-.42**	-.54**	-.38**	-.51**
IPIP										
Neuroticism	.50**	.64**	.30**	.37**	.26**	.32**	.46**	.60**	.43**	.55**
Warmth	-.57**	-.21**	-.28**	-.07	-.26**	-.14*	-.42**	-.25**	-.53**	-.26**
Independence	.25**	-.32**	.06	-.18**	.05	-.11	.14**	-.21**	.13*	-.22**
ED	.80**	.39**	.38**	.16**	.29**	.10	.62**	.38**	.59**	.31**
ERSS	.10	.61**	.05	.36**	.16**	.35**	.19**	.55**	.16**	.53**
Age	-.08	-.19**	-.09	-.10	-.13*	-.01	-.02	-.16**	-.11	-.14*
Gender	-.02	.06	.02	.19**	-.01	.07	-.01	.08	-.05	.05
Relationship Status	-.20**	-.16**	-.02	.01	-.11	-.04	-.18**	-.17**	-.08	-.11
Relationship Length	-.20**	-.15**	-.05	-.05	-.17**	-.10	-.26**	-.20**	-.11	-.14*

Note. * = $p < .05$, ** = $p < .01$. Displaying Pearson's correlation coefficients. Av = attachment avoidance, Ax = attachment anxiety, ECR-R-GSF = Experiences in Close Relationships – Revised – General Short Form, ASQ = Attachment Style Questionnaire, RAS = Relationships as Secondary, NFA = Need for Approval, RSES = Rosenberg Self-Esteem Scale, IPIP = International Personality Item Pool, ED = Emotional Detachment, ERSS = Excessive Reassurance Seeking Scale. N = 292.

Table 5.6
Regression Analyses with Experiences in Close Relationships – Revised – Structures and Criterion Measures

	Relational Context									
	General		Mother		Father		Romantic		Friend	
Scale	Av	Ax	Av	Ax	Av	Ax	Av	Ax	Av	Ax
ECR-R-GSF										
Avoidance	.80**	.12**	.43**	.07	.32**	.09	.58**	.19**	.60**	.16**
Anxiety	.17**	.79**	.15**	.51**	.18**	.48**	.14**	.76**	.17**	.74**
ASQ										
Confidence	-.60**	-.32**	-.42**	-.15**	-.31**	-.16**	-.49**	-.32**	-.51**	-.33**
Avoidance	.71**	.24**	.46**	.11*	.33**	.13*	.45**	.32**	.53**	.27**
Dismissive	.67**	.29**	.42**	.14**	.32**	.14*	.44**	.35**	.49**	.29**
RAS	.46**	.19**	.27**	.15**	.19**	.18**	.30**	.26**	.41**	.24**
Anxiety	.18**	.74**	.18**	.42**	.19**	.38**	.14**	.68**	.23**	.66**
Preoccupation	.14**	.65**	.14*	.40**	.14*	.34**	.14**	.58**	.19**	.59**
NFA	-.03	.85**	.08	.47**	.10	.41**	-.08*	.81**	.04	.72**
Quality										
Mother	-.19**	-.14*	-.79**	-.14**	-.20**	-.09	-.09	-.16*	-.21**	-.09
Father	-.04	-.18**	-.28**	-.10	-.73**	-.08*	.05	-.27**	-.14*	-.21**
Romantic	-.31**	-.24**	-.09	-.19**	-.11	-.20**	-.47**	-.24**	-.22**	-.28**
Friend	-.35**	-.30**	.23**	-.12	-.19**	-.16**	-.29**	-.28**	-.55**	-.22**
RSES	-.23**	-.45**	-.16**	-.28**	-.14*	-.26**	-.22**	-.44**	-.23**	.43**
IPIP										
Neuroticism	.30**	.52**	.20**	.30**	.19**	.26**	.24**	.49**	.27**	.46**
Warmth	-.58**	.01	-.30**	.03	-.24**	-.07	-.39**	-.07	-.51**	-.08
Independence	.43**	-.49**	.14*	-.23**	.08	-.13*	.30**	-.34**	.24**	-.30**
ED	.76**	.10*	.37**	.04	.28**	.02	.57**	.12*	.55**	.12*
ERSS	-.15**	.66**	-.07	.39**	.06	.34**	-.08	.59**	-.03	.54**
Age	-.01	-.18**	-.07	-.08	-.14*	.03	.06	-.19**	-.07	-.11
Gender	-.05	.07	-.05	.20**	-.03	.08	-.06	.10	-.07	-.08
Relationship Status	-.16*	-.10	-.03	.02	-.11	-.01	-.13*	-.11	-.05	-.10
Relationship Length	-.19**	-.08	-.04	-.04	-.15*	-.06	-.21**	-.10	-.07	-.12

Note. * = $p < .05$, ** = $p <. 01$. Displaying standardised betas calculated using ordinary least squares. Av = attachment avoidance, Ax = attachment anxiety, ECR-R-GSF = Experiences in Close Relationships – Revised – General Short Form, ASQ = Attachment Style Questionnaire, RAS = Relationships as Secondary, NFA = Need for Approval, RSES = Rosenberg Self-Esteem Scale, IPIP = International Personality Item Pool, ED = Emotional Detachment, ERSS = Excessive Reassurance Seeking Scale. N = 292.

Table 5.7

Each factor run separately with CVs (part 1 of 2)

	Mother (n = 344)			Father (n = 248)			Sibling (n = 258)			Child (n = 103)			Extended Family (n=84)		
E-LSRP	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR
Sex	.17(.19)	.79	1.19	.06(.19)	.09	1.06	.54(.19)	8.61**	1.72	-.07(.30)	.05	.94	.89(.28)	9.84**	2.42
Age	-.05(.01)	52.04**	.95	-.04(.01)	35.48**	.96	-.02(.01)	6.53*	.98	.10(.01)	55.07**	1.11	-.02(.010)	2.75	.98
Total	.01(.16)	.00	1.01	-.01(.16)	.00	1.00	-.19(.15)	1.46	.83	.02(.26)	.00	1.02	.12(.21)	.30	1.12
Sex	-.17(.19)	.83	.84	-.06(.19)	.09	.95	-.56(.18)	9.50**	.57	.06(.30)	.04	1.07	-.90(.28)	10.42**	.41
Age	-.05(.01)	51.84**	.95	-.04(.01)	35.44**	.96	-.02(.01)	6.70**	.98	.10(.01)	55.16**	1.11	-.02(.01)	2.60	.98
Ego	.01(.12)	.01	1.01	-.01(.11)	.01	.92	-.13(.11)	1.33	.88	.04(.18)	.05	1.04	.18(.15)	1.42	1.19
Sex	.19(.19)	1.00	1.21	-.05(.19)	.08	.95	-.53(.18)	8.37**	.59	.08(.30)	.06	1.08	-.87(.28)	9.42**	.42
Age	-.05(.01)	52.20**	.95	-.04(.01)	35.43**	.96	-.02(.01)	6.22*	.98	.10(.01)	55.20**	1.11	-.02(.01)	2.77	.98
Cal	.08(.14)	.31	1.08	-.02(.14)	.02	.98	-.21(.14)	2.25	.82	-.02(.22)	.01	.98	.04(.19)	.05	1.04
Sex	.15(.19)	.64	1.17	-.06(.19)	.11	.94	-.58(.18)	10.02**	.56	.07(.30)	.06	1.07	-.85(.28)	9.12**	.43
Age	-.05(.01)	52.22**	.95	-.04(.01)	35.46**	.96	-.02(.01)	6.41*	.98	.10(.01)	55.08**	1.12	-.02(.01)	2.74	.98
Anti	-.07(14)	.23	.94	.02(.13)	.02	1.02	-.04(.13)	.11	.96	.00(.21)	.00	1.00	-.02(.18)	.02	.98

Note. * = $p < .05$, ** = $p <. 01$. E-LSRP = Extended Levenson Self Report Psychopathy, Total = total average psychopathy scores, Ego = Egocentricity, Cal = Callousness, Anti = Antisocial, R^2 = Nagelkerke R Square. Mother/Total model $\chi^2(3) = 64.02$, $p <. 01$, $R^2 = .15$. Father/Total model $\chi^2(3) = 42.02$, $p <. 01$, $R^2 = .10$. Sibling/Total model $\chi^2(3) = 24.17$, $p <. 01$, $R^2 = .06$. Results were the same for brother and sister. Child/Total model $\chi^2(3) = 79.58$, $p <. 01$, $R^2 = .27$. Results were the same for reported regardless of the child's sex or status as independent/dependent. Extended/Total model $\chi^2(3) = 17.18$, $p <. 01$, $R^2 = .05$. Mother/Ego model $\chi^2(3) = 64.03$, $p <. 01$, $R^2 = .15$. Father/Ego model $\chi^2(3) = 42.03$, $p <. 01$, $R^2 = .10$. Sibling/Ego model $\chi^2(3) = 24.04$, $p <. 01$, $R^2 = .06$. Results were the same for brother and sister, except that sex was non-significant in the brother model. Child/Ego model $\chi^2(3) = 79.63$, $p <. 01$, $R^2 = .27$. Results were the same for reported regardless of the child's sex or status as independent/dependent. Extended/Ego model $\chi^2(3) = 8.28$, $p <. 01$, $R^2 = .05$. Mother/Callous model $\chi^2(3) = 64.32$, $p <. 01$, $R^2 = .15$. Father/Callous model $\chi^2(3) = 42.04$, $p <. 01$, $R^2 = .10$. Sibling/Callous model $\chi^2(3) = 24.97$, $p <. 01$, $R^2 = .06$. Results were the same for brother and sister, except that sex was non-significant in the brother model. Child/Callous model $\chi^2(3) = 79.58$, $p <. 01$, $R^2 = .27$. Results were the same for reported regardless of the child's sex or status as independent/dependent. Extended/Callous model $\chi^2(3) = 16.93$, $p <. 01$, $R^2 = .05$. Mother/Anti model $\chi^2(3) = 64.03$, $p <. 01$, $R^2 = .15$. Father/Anti model $\chi^2(3) = 42.04$, $p <. 01$, $R^2 = .10$. Sibling/Anti model $\chi^2(3) = 22.81$, $p <. 01$, $R^2 = .05$. Results were the same for brother and sister, except that sex was non-significant in the brother model. Child/Anti model $\chi^2(3) = 79.58$, $p <. 01$, $R^2 = .27$. Results were the same for reported regardless of the child's sex or status as independent/dependent. Extended/Anti model $\chi^2(3) = 16.90$, $p <. 01$, $R^2 = .05$

Appendix C. Supplementary Tables for Manuscript 4 (continued)

Table 5.8
Each factor run separately with CVs (part 2 of 2)

	Other Family (n = 48)			Romantic Partner (n = 335)			Ex Romantic Partner (n = 30)			Friend (n = 392)			Other (n = 30)		
E-LSRP	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR	*b* (SE)	Wald	OR
Sex	.75(.34)	4.98*	2.12	-.10(.20)	.25	.91	1.84(.45)	10.94**	4.41	-.30(.20)	2.33	.74	-.26(.42)	.37	.77
Age	.05(.01)	18.88**	1.05	.05(.01)	39.07**	1.05	-.03(.02)	3.58	.97	-.03(.01)	20.84**	.97	-.01(.02)	.77	.99
Total	-.13(.27)	.23	.88	-.35(.16)	4.70*	.70	.29(.34)	.72	1.33	-.11(.17)	.41	.90	-.35(.35)	1.00	.71
Sex	-.80(.33)	5.71*	.45	-.15(.19)	.59	.86	1.52(.44)	11.83**	4.58	-.33(.20)	2.75	.72	-.31(.42)	.54	.74
Age	.05(.01)	19.05**	1.05	.05(.01)	38.41**	1.05	-.03(.02)	3.53	.97	-.03(.01)	20.71**	.97	-.01(.02)	.81	.99
Ego	.07(.19)	.15	1.08	-.20(.11)	2.99	.82	.19(.23)	.63	1.20	-.03(.12)	.05	.97	-.19(.25)	.61	.82
Sex	-.74(.34)	4.77*	.48	-.11(.20)	.31	.90	1.50(.45)	11.17**	4.47	-.33(.20)	2.78	.72	-.28(.42)	.44	.76
Age	.05(.01)	19.08**	1.05	.05(.01)	40.06**	1.05	-.03(.02)	3.78	.97	-.03(.01)	20.66**	.97	-.01(.02)	.70	.99
Cal	-.18(.25)	.51	.84	-.30(.14)	4.32*	.74	.23(.29)	.63	1.26	-.00(.15)	.00	1.00	-.26(.31)	.68	.77
Sex	-.74(.34)	4.93*	.48	-.14(.20)	.53	.87	1.53(.45)	11.75**	4.63	-.29(.20)	2.13	.75	-.29(.42)	.47	.75
Age	.05(.01)	18.91**	1.05	.05(.01)	39.17**	1.05	-.03(.02)	3.65	.97	-.03(.01)	21.00**	.97	-.01(.02)	.75	.99
Anti	-.20(.23)	.78	.82	-.20(.14)	2.19	.82	.13(.28)	.20	1.14	-.18(.14)	1.56	.84	-.24(.29)	.67	.79

Note. * = $p < .05$, ** = $p < .01$. E-LSRP = Extended Levenson Self Report Psychopathy, Total = total average psychopathy scores, Ego = Egocentricity, Cal = Callousness, Anti = Antisocial, R^2 = Nagelkerke R Square. Other Family/Total model $\chi^2(3) = 22.13$, $p < .01$, $R^2 = .09$. Romantic/Total model $\chi^2(3) = 49.68$, $p < .01$, $R^2 = .11$. Results were the same whether poly was included or not. Romantic Ex/Total model $\chi^2(3) = 16.58$, $p < .01$, $R^2 = .09$. Friend/Total model $\chi^2(3) = 29.61$, $p < .01$, $R^2 = .07$. Other/Total model $\chi^2(3) = 3.07$, $p < .38$, $R^2 = .02$. Other Family/Ego model $\chi^2(3) = 22.04$, $p < .01$, $R^2 = .09$. Romantic/Ego model $\chi^2(3) = 47.32$, $p < .01$, $R^2 = .11$. Results were the same whether poly was included or not. Romantic Ex/Ego model $\chi^2(3) = 16.49$, $p < .01$, $R^2 = .09$. Friend/Ego model $\chi^2(3) = 29.25$, $p < .01$, $R^2 = .07$. Other/Ego model $\chi^2(3) = 2.68$, $p < .44$, $R^2 = .01$. Other Family/Callous model $\chi^2(3) = 22.41$, $p < .01$, $R^2 = .09$. Callous remained non-significant for both step family or in-law models. Only age remained significant in the in-law model when it was separated for step family. Romantic/Callous model $\chi^2(3) = 48.69$, $p < .01$, $R^2 = .11$. Results were the same whether poly was included or not. Romantic Ex/Callous model $\chi^2(3) = 16.49$, $p < .01$, $R^2 = .09$. Friend/Callous model $\chi^2(3) = 29.20$, $p < .01$, $R^2 = .07$. Other/Callous model $\chi^2(3) = 2.75$, $p < .43$, $R^2 = .01$. Other Family/Anti model $\chi^2(3) = 22.68$, $p < .01$, $R^2 = .09$. Callous remained non-significant for both step family or in-law models. Only age remained significant in the in-law model when it was separated for step family. Romantic/Anti model $\chi^2(3) = 49.52$, $p < .01$, $R^2 = .11$. Results were the same whether poly was included or not. Romantic Ex/Anti model $\chi^2(3) = 16.07$, $p < .01$, $R^2 = .08$. Friend/Anti model $\chi^2(3) = 30.76$, $p < .01$, $R^2 = .08$. Other/Anti model $\chi^2(3) = 2.73$, $p = .44$, $R^2 = .01$.