Gender Differences in Attachment in Youth Involved with the Street:
An Exploratory Study

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Abstract

Youth involved in the street (YIS) suffer from higher rates of attachment insecurity, childhood maltreatment, and psychopathology than their non-street involved peers, yet little is known about how boy and girl YIS differ in their expression of attachment. The aim of this study was to explore the relationship between gender, attachment orientation, childhood maltreatment, and psychopathology in a sample of YIS to generate hypotheses for future research and inform targeted therapeutic interventions in this underserved population. The study combined data from two previously collected samples of youth (108 total: 41 girls, 67 boys), aged 15 to 24, recruited from a community non-profit organization in St. John's, Newfoundland and Labrador, Canada, who were administered validated self-report measures of attachment orientation, childhood maltreatment, and psychopathology. Statistical analyses included one-way multivariate analyses of variance (MANOVA), independent samples *t* tests, and multiple regressions using a running-interval smooth. The analysis revealed that girl YIS report significantly higher rates of attachment anxiety and childhood maltreatment, but comparable rates of attachment avoidance and psychopathology relative to boy YIS. Rates of attachment anxiety strongly predict rates of attachment avoidance in girl but not boy YIS; further, this is expressed in a strongly curvilinear fashion. Implications of these findings are discussed relative to gender-based theories of attachment and the provision of targeted mental health interventions in YIS.

Keywords: at-risk youth, adolescents, street-involved youth, gender, attachment, ECR-R, psychopathology, BSI, SCL-90-R, childhood maltreatment

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List of Abbreviations

ACE. Adverse Childhood Experiences

ADHD. Attention-Deficit Hyperactivity Disorder

BSI. Brief Symptom Inventory

CD. Conduct Disorder

CT-CM. Childhood Trauma – Composite Measure

CTQ-SF. Childhood Trauma Questionnaire – Short Form

DSM-5. Diagnostic and Statistical Manual of Mental Disorders - Fifth Edition

ECR-R. Experiences in Close Relationships – Revised

GSI. Global Severity Index

GSST. Gender Self-Socialization Theory

ICEHR. Interdisciplinary Committee on Ethics in Human Research

IWM. Internal Working Model

LHT. Life History Theory

MANOVA. Multivariate Analysis of Variance

MDD. Major Depressive Disorder

OCD. Obsessive-Compulsive Disorder

OR. Odds Ratio

PSDI. Positive Symptom Distress Index

PST. Positive Symptom Total

PTSD. Post-Traumatic Stress Disorder

SCL-90-R. Symptom Checklist 90 – Revised

SES. Socio-economic Status

SUD. Substance Use Disorder

YIS. Youth Involved with the Street

YPP. Youth Participant Profile

M_t**.** Trimmed Mean

ρ_{pb}. Percentage Bend Correlation

ξ. Explanatory Measure of Effect Size

ϵ_p. Prediction Error

η. Explanatory Strength of Association

η^2. Explanatory Power

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Gender Differences in Attachment in Youth Involved with the Street:

An Exploratory Study

Youth involved with the street (YIS[1]) constitute a population of adolescents and young adults that face immense daily challenges to their wellbeing (Cleverley & Kidd, 2011; Gaetz, O'Grady, et al., 2016; Kidd, 2004). A 2018 survey of Canadian youth aged 15-24 found that 18.77% reported some form of physical abuse and 3.14% reported sexual abuse during childhood (Statistics Canada). Most YIS come from impoverished or chaotic home environments where they may have witnessed substance abuse and endured childhood maltreatment characterized by varying levels of physical, emotional, and/or sexual abuse and neglect (Homeless Link, 2014; Raising the Roof, 2009). In a systematic review and meta-analysis of the causes of youth homelessness globally, Embleton et al. (2016) found that 26% of YIS reported childhood abuse (N = 2172, k = 28) and 32% reported family conflict (N = 4685, k = 47), as a reason for street involvement. As Kidd (2004) observes "the majority of street involved youth trade difficult lives at home for difficult lives on the street" (p.30). The daily life experience of YIS under such adverse conditions is one characterized by surviving rather than thriving. Although some of the unique challenges girl and boy[2] YIS face have been documented (Gaetz, O'Grady, et al., 2016), there has been little research on how they differ in terms of the psychological methods they use to cope with such challenges. One of the most theoretically well developed and clinically relevant theories to

[1] Much of the literature refers to street-involved youth (SIY), but in the interest of adopting person-first language the term 'youth involved with the street' (YIS) will be used in this paper.

[2] To avoid using 'male' and 'female' as nouns it is generally advised to use specific nouns for people of different ages (American Psychological Association, 2019). Because the term 'YIS' is typically applied to youth aged 15-24 it spans both adolescence (e.g., girl, boy) and young adulthood (e.g., woman, man). An arbitrary decision was made to use the nouns 'girl' and 'boy' when referring to the YIS involved in the current study, recognizing that for some of the older YIS the terms 'woman' and 'man' may have been appropriate.

understanding how an individual copes with challenges in his or her social environment is attachment theory (Bowlby, 1969, 1973, 1979, 1980).

Attachment theory highlights the influence of early relational experiences on an individual's developmental course. A bond with an attachment figure serves to provide children with a foundation of security in which they can explore the social world (Ainsworth et al., 1978). An adolescent's or adult's place on the attachment dimensions of anxiety and avoidance characterize their sense of security, self-worth, view of others; and the strategies they use to manage stress, threats, and emotional intimacy (Kobak et al., 2015). Those low on anxiety and avoidance are characterized as securely attached while those high on either or both are considered insecurely attached. In a meta-analysis of 33 studies (*N* = 2,042) on attachment representations in both clinical and non-clinical adolescents and adult samples, Van Ijzendoorn and Bakermans-Kranenburg (1996) found that approximately two-thirds of people demonstrated attachment security in the countries sampled (i.e., Canada, the UK, the Netherlands, USA, and Australia). The remaining one-third of people demonstrated some form of attachment insecurity.

Attachment theory is generally proposed in both sex & gender neutral terms[3]; however, Schmitt (2003) using data from the International Sexuality Description Project (*N* = 17,804) found that cisgender

[3] Though separate concepts, sex and gender are often conflated in the literature (Johnson et al., 2014). Sex refers to a set of biological attributes (e.g., sex chromosomes, gene expression, hormone levels, reproductive anatomy) that differentiates between male, female, and intersex individuals at birth. Gender refers to the socially constructed norms that impose and determine roles, relationships, and positional power for individuals in society. Gender is a non-binary concept that is meant to account for varying degrees of expression of femininity and masculinity in any one individual at a given time regardless of their biological sex (Mauvais-Jarvis et al., 2020). In practice, many studies only differentiate between cisgender men, cisgender women, and occasionally also transgender people (Johnson et al., 2014). In the present study, respondents were asked to report their gender but not their sex, so we cannot be certain as to the degree of concordance between an individuals' reported gender identity and their biological sex. Every effort has been taken within the constraints of the current state of the literature to avoid 'genderism'—the belief that there are only two genders, and that gender is automatically linked to an individual's sex assigned at birth (American Psychological Association, 2019). Because in the present study we do not know the sex of respondents, we can not state whether they are cisgender (i.e., individuals whose sex assigned at birth aligns with their gender identity) or transgender (i.e., individuals whose sex assigned at birth does not align with their gender identity), only that at this

men showed on average more avoidance than cisgender women in most but not all of the 62 assessed cultural regions. This finding was corroborated by Del Giudice (2011) in a meta-analysis of 113 studies (*N* = 66,132) of gender differences in romantic attachment who found that cisgender men tend to be higher in avoidance and cisgender women higher in anxiety across countries, though with considerable cross-cultural variation. World-average effect sizes comparing attachment differences between cisgender women and cisgender men are small, with Cohen's *d* values between 0.10 to 0.20 in community samples.

Several theories have been proposed to account for observed gender differences in the expression of insecure attachment. For example, both life history theory (LHT; Hill, 1993) which is an evolutionary psychology approach, and gender self-socialization theory (GSST; Kohlberg, 1969; Martin et al., 2002) attempt to explain gender differences in insecure attachment. According to LHT, differences in insecure attachment develop among children in the presence of adverse social experiences as a post adrenarche sex-differentiated reproductive strategy (Del Giudice, 2009). It is hypothesized that post-adrenarche attachment avoidance in cisgender boys partly functions as a strategy to minimize commitment and promote short-term mating, whereas attachment anxiety in cisgender girls serves to maximize continued investment from sexual partners (Del Giudice, 2019). LHT predicts that for cisgender men under increasingly adverse conditions, levels of attachment avoidance should rise, while levels of attachment anxiety should remain static or even drop (Del Giudice, 2009). Conversely, for cisgender women under increasingly adverse conditions, levels of attachment avoidance should remain

time they identify as a man or women. It is also important to bear in mind that gender identity is distinct from sexual orientation; thus, an individuals self-reported gender does not necessarily tell us anything about their sexual orientation (American Psychological Association, 2019). For the purposes of this paper the term gender will be used except in cases where a study or theory is explicitly concerned with biological sex as opposed to gender and has differentiated between the two concepts in data collection. In cases where the referenced source assumes a concordance between sex and gender, the term cisgender males and cisgender females will be used to make this clear.

low while levels of attachment anxiety should rise (Del Giudice, 2009). There is one caveat: under conditions of very high adversity LHT predicts that the attachment avoidance gap between cisgender women and cisgender men should decrease as women begin to show higher levels of attachment avoidance, which is speculated to be indicative of reproductive suppression (Del Giudice, 2011).

According to GSST, gender differences in attachment should be greatest for girls and boys who identify confidently with, and feel pressure to conform to, their gender collective (Kohlberg, 1969). These children will tend to emulate same gender stereotypes; for example, children who are aware that boys are 'expected to be' more avoidant and girls are 'expected to be' more anxious are more likely to conform to these attachment orientations (Martin et al., 2002). GSST further posits that in cultures with more modern gender-role ideologies (e.g., Canada), gender differences in attachment should not be as strong as in cultures with more traditional gender-role ideologies (Schmitt, 2003).

Schmitt (2003) and Pauletti et al. (2016) found limited and inconsistent support for LHT and GSST in two separate cross-sectional studies, indicating that neither theory can adequately account for observed gender differences in attachment. Specifically, Schmitt (2003) using data from the International Sexuality Description Project (N = 17,804) found that cisgender differences in romantic attachment were not as strong in some of the 62 assessed cultural regions with more traditional gender-role ideologies (e.g., cisgender women were slightly more avoidant than cisgender men in some African and Oceanic cultures), counter to predictions of GSST. However, Schmitt (2003) also found inconsistent cross-cultural support for LHT, as cisgender differences in attachment avoidance were smaller in many but not all countries with higher mortality, higher fertility, and fewer resources. Pauletti et al. (2016) using an ethnically diverse sample of fifth graders (n_{girl} = 443, n_{boy} = 420) in Florida, U.S., assessed the children's self-reported avoidant and anxious attachment strategies, environmental adversity (as measured by maternal hostility and maternal unresponsiveness), and gender identity (as measured by three scales adapted from Egan and Perry, 2001). The LHT hypothesis that differences in attachment

avoidance and anxiety between cisgender women and cisgender men increase under conditions of environmental adversity was not supported. The authors found that although high maternal hostility and unresponsiveness were significantly associated with increased avoidant attachment, there was no significant gender × adversity interaction (Pauletti et al., 2016). Also, compared to the statistically significant gender difference in attachment anxiety under low perceived maternal hostility and unresponsiveness, the gender difference under high perceived maternal hostility and unresponsiveness disappeared (Pauletti et al., 2016). On the other hand, the gender self-socialization hypothesis that gender differences in attachment anxiety are present when felt gender typicality is high but not low, when gender contentedness is high but not low, and when felt pressure for gender differentiation is high but not low was supported (Pauletti et al., 2016). However, no significant gender identity × attachment avoidance interaction was found, failing to support this portion of the GSST. To summarize, although Schmitt (2003) and Pauletti et al. (2016) found support for some of the predictions of both LHT and the GSST, neither was fully supported. These findings point to the need for more exploratory research and hypothesis generation to understand gender differences in attachment. This gap in understanding is particularly apparent in the YIS population. For example, most of the studies which address gender differences in attachment (Blanchard & Lyons, 2016; Del Giudice, 2011; Pauletti et al., 2016) employ student or community youth populations, not YIS. Given that LHT posits that cisgender differences should become most apparent under conditions of high environmental stress, studying a population such as YIS who are known to live under conditions of high environmental stress could be illustrative.

To ensure a clearer understanding of the relationship between gender differences and attachment orientation, it is important to consider other theoretically relevant variables such as childhood maltreatment and psychopathology. Several studies on adolescents have found a positive association between insecure attachment and childhood maltreatment (Langton et al., 2017), insecure

attachment and psychopathology (Bosmans et al., 2010), and childhood maltreatment and psychopathology (Kim & Cicchetti, 2010). However, only one study to date (Reinert & Edwards, 2009) has investigated the relationship between all three variables (attachment, childhood maltreatment, psychopathology) and gender[4]. In a cross-sectional study of 272 (135 men, 137 women) university students in the U.S., Reinert and Edwards (2009) found that a self-reported history of verbal and physical childhood abuse was significantly associated with increased symptoms of psychopathology as measured by the Trauma Symptom Checklist-40 (TSC-40; Elliott & Briere, 1992) in both men (r_{verbal} = .37, p < .001; $r_{physical}$ = .25, p < .01) and women (r_{verbal} = .49, p < .001; $r_{physical}$ = .28, p < .001). Reinert and Edwards (2009) also found that verbal abuse was significantly associated with insecure attachment to one's mother and father in both men (r = .23 to .48, p < .01) and women (r = .28 to .65, p < .001). This study is important because it demonstrates a positive association between insecure attachment, childhood maltreatment, and psychopathology in men and women, but also that significant gender differences exist (Reinert & Edwards, 2009). However, findings from studies employing student or community samples may not generalize well to YIS, a population which suffers from higher rates of childhood maltreatment and psychopathology than their non-YIS peers (Gaetz, O'Grady, et al., 2016).

The current study seeks to address the gender gap in attachment research by exploring the relationship between gender, attachment orientation, childhood maltreatment, psychopathology, and demographic variables in a de-identified dataset based on two independent samples of YIS.

Youth Involved with the Street

Approximately 40,000 adolescents and young adults aged 13-24 years (57.6% identify as boys, 36.4% identify as girls) are homeless every year in Canada, representing 20% of the homeless population

[4] Greger et al. (2017) and Shahab et al. (2021) have also investigated the relationship between attachment, childhood maltreatment, and psychopathology; however, neither included gender as a variable.

in Canada (Gaetz, Dej, et al., 2016; Gaetz, O'Grady, et al., 2016). YIS may find themselves as part of the overtly homeless population living on the street or as part of the 'hidden homeless' living a transient lifestyle at constant risk of having nowhere to turn. According to Raising the Roof (2009) upwards of 80% of YIS may be part of the hidden homeless. Hodgson et al. (2013) points out that it is important to distinguish the most common precipitating factors of youth homelessness (e.g., family relationship breakdown, insecure accommodation, 'ageing out' of care, living with a stepparent) from that of adult homelessness (e.g., eviction, job loss, partner relationship breakdown). For YIS, simply obtaining adequate nutrition is a challenge, with 46.3% reporting that they only have access to quality food once a week or less (Gaetz, O'Grady, et al., 2016). Poor mental health is also a serious concern for YIS. Gaetz, O'Grady, et al. (2016) administered the Global Appraisal of Individual Needs (GAIN; Dennis et al., 2003) Short Screener (GSS; Dennis et al., 2006), a measure of the probability that an individual has an internalizing, externalizing, or substance disorder, or be at risk for crime/violence, to a sample of Canadian YIS (*N* = 1,103). They found that 85.4% of YIS fell above the high symptom cut-off (which in the general population indicates youth midway between inpatient and outpatient psychiatric care), with 42% reporting at least one suicide attempt (Gaetz, O'Grady, et al., 2016). In a longitudinal study, Whitbeck et al. (2004) observed that a sample of 428 YIS (241 girls, 187 boys) across eight midwestern cities in the U.S. were six times more likely than same-aged normative respondents to meet criteria for two or more of the following disorders in their lifetime: substance use disorder (SUD), major depressive disorder (MDD), post-traumatic stress disorder (PTSD), or conduct disorder (CD). Mental health and addiction challenges can function as both predisposing and perpetuating factors of homelessness; YIS come by these challenges honestly. For YIS there is a palpable sense of being trapped, hopeless, worthless, and alone (Kidd, 2004).

A majority of YIS (63.1%) report having experienced one or more forms of childhood abuse, with 77.5% indicating that a key reason they left home was an inability to get along with their parents (Gaetz,

O'Grady, et al., 2016). The average age in which YIS first leave home is 15.7 years, with 40.1% reporting that they were under 16 when they first experienced homelessness (Gaetz, O'Grady, et al., 2016). Many YIS (57.8%) have had some form of involvement with child protection services in the past, with 47.2% having experienced at least one placement in a foster or group home (Gaetz, O'Grady, et al., 2016). Most YIS (65%) fail to complete high school, with half reporting that they have been tested for a learning disability in school (Gaetz, O'Grady, et al., 2016). Of those YIS who drop out of high school, 47.9% report having a physical disability, 46.1% report having attention deficit hyperactivity disorder (ADHD), and 41.8% report having a learning disability (Gaetz, O'Grady, et al., 2016). These factors make it harder for YIS to take advantage of post-secondary education even when they are fortunate enough to have the financial resources to do so.

YIS face some unique challenges based on their gender identity. Although life is difficult on the streets for both genders, girls are exposed to exceedingly high levels of gender-based violence. Sadly, this is true for normative youth populations as well. Regardless of social status or race, girls and women experience higher rates of gender-based violence than boys and men (Statistics Canada, 2019). Girl YIS (73.5%) report higher rates of childhood abuse than boys (53.6%), and are at much greater risk of sexual assault (37.4% versus 8.2%; Gaetz, O'Grady, et al., 2016). Girl YIS are more likely to engage in 'survival/safety sex' for money, food, drugs, clothing, or shelter than boy YIS (23.8% versus 19.6%; Halcón & Lifson, 2004). Girl YIS are also more likely to attempt suicide than boys (59% versus 39%; Gaetz, O'Grady, et al., 2016). Boy YIS (25.8%) on the other hand are more likely than girl YIS (17.3%) to engage in illegal activities to gain an income (e.g., selling drugs), exposing them to higher rates of criminal justice involvement (Gaetz, O'Grady, et al., 2016). How YIS cope with these challenges is thought to be influenced by their dominant attachment orientation.

Attachment

Attachment theory emphasizes the enduring developmental influence of early infant-caregiver relational experiences on a person's life trajectory. It was first proposed by John Bowlby (1969, 1973, 1979, 1980, 1988), a British psychoanalyst who practiced at the Tavistock Clinic in London, England. Given Bowlby's background as a psychoanalyst, attachment theory has been heavily influenced by, and in turn has influenced the development of, psychodynamic[5] approaches to the study and treatment of psychopathology (Luyten et al., 2017). Bowlby's major intellectual descendant Mary Ainsworth was an expert on developmental psychopathology and clinical assessment (Mikulincer & Shaver, 2017). This has contributed to attachment theory playing a significant role in the understanding, assessment, and treatment of psychopathology, in addition to it being a mainstay of social and personality psychology (Mikulincer & Shaver, 2017).

In studying preschool children's reactions to being separated from maternal care, Bowlby (1969) identified three behavioral patterns: protest, despair, and detachment. During the protest phase, which would last from separation up to a week or more; children would cry loudly, appear distressed, and

[5] The psychodynamic perspective has its roots in Freudian psychoanalysis, but has been heavily influenced by ego psychology, object relations theory, attachment theory, self psychology, and more recently by empirical findings in cognitive and social psychology, and neuroscience (Luyten et al., 2017). In turn, basic psychoanalytic assumptions have been (often implicitly) incorporated into clinical psychology, psychiatry, the social sciences and humanities, and neuroscience (Luyten et al., 2017). The psychodynamic approach adopts a fundamentally developmental, person-centered perspective, with an emphasis on understanding unconscious motivation and intentionality (Luyten et al., 2017). Focus is placed on transference (i.e., past relationships influencing current relationships and perceptions) and on how psychological factors often mediate the influence of biological and social factors (Luyten et al., 2017). Specifically, there is an emphasis on "the importance of nonlinear processes, regression, and progression on multiple interrelated developmental lines, and the role of deferred action, which refers to the reciprocal relationship between developmental events and circumstances and their later reinvestment with new meaning" (Luyten et al., 2017, p. 2). Mental health and psychopathology are viewed as being on a spectrum, rather than being conceptualized as categorically distinct states (Luyten et al., 2017). Furthermore, both conscious and unconscious motivational factors are believed to conflict with each other in normal and pathological functioning. The adaptive resolution of these conflicts to maintain psychological balance is referred to as *compromise formations* in psychodynamics or *constraint satisfaction* in neuroscience (Luyten et al., 2017).

show hyper-observance for any indications of their mother's return. This was followed by a despair phase characterized by withdrawal and only intermittent crying. The final detachment phase was characterized by increased interest in surroundings, but a distant and apathetic response to their mother's return. Interestingly, the detachment phase was mistakenly viewed by some as a sign of decreased distress in the child. Bowlby recognized that this was not a sign of recovery, but rather a closing off of attachment-related feelings and behaviors to cope with distress.

Attachment Behavioral System

It has been formulated that the attachment behavioral system evolved primarily to maintain proximity between infant and caregiver to protect against real or perceived dangers, with the caregiver providing a 'safe haven' for downregulation of negative emotions, and a 'secure base' from which the infant could explore the social world (Ainsworth et al., 1978; Bowlby, 1979). The attachment behavioral system does not operate in isolation but is affected by the operation of other *behavioral systems*[6] (e.g., caregiving system, sexual system, cooperative system, ranking system, exploration system); however, it becomes dominant when proximity-seeking is triggered as a result of distress, fear, loss, pain, or separation (Bowlby, 1973; Mikulincer & Shaver, 2003). This biological instinct to seek proximity with one's caregiver is hardwired in an infant's central nervous system from birth, as their survival is

[6] The concept of behavioral systems comes from the field of ethology, the scientific study of animal behavior under natural conditions, and was first formulated clearly by Baerends (1976). Behavioral systems are conceptualized as groups of causally related, cognitively regulated, goal-corrected behavior patterns that are evolutionarily adaptive to a species (Grossman et al., 2006). Goal-corrected implies that such behaviors can be altered to fit specific environments or social situations (Gillath et al., 2016). Although each behavioral system may have its own function, triggers, and responses, they are thought to interact with one another to affect a person's behavior (Gillath et al., 2016). Empirical support for the concept of behavioral systems generally and the attachment behavior system specifically has come from phylogenetic analysis of data examining the evolution of specific behaviors across multiple mammalian species (Fraley et al., 2005), as well as results from experimental studies exposing participants to hypothesized system triggers and measuring the outcome of the system's activation (Simpson et al., 1992; Mikulincer, et al., 2002; Gillath et al., 2008). For an in-depth discussion of the attachment behavioral system and a review of empirical support for it in humans, see Gillath et al., 2016, Chapter 8.

contingent upon it (Ainsworth et al., 2015). Primary attachment behaviors such as an infant rooting, suckling, crying or smiling serve to signal the caregiver to come closer, and once able to walk a child can actively seek proximity to his or her attachment figure (Ainsworth et al., 2015). Depending on whether their caregiver is attentive or distant, calm or distressed, gentle or abusive, or altogether inconsistent, the child will develop an emotion regulation coping strategy that allows them to have at least some of their needs met (Van Der Kolk, 2014). Bowlby (1973) hypothesized that the attachment behavioral system although most critical during infancy (as the infant is dependent on the caregiver for survival), continues to serve a protective role throughout the lifespan.

According to Simpson (2019) the most salient environmental cue for most children is the quality and reliability of care they receive on a daily basis. Numerous studies have shown that parenting quality suffers in poorer neighbourhoods (Nettle, 2010), under lower levels of socio-economic status (SES; Conger et al., 2010; Shelleby et al., 2014), and in unstable family environments characterized by frequent marital conflict (Belsky & Jaffee, 2006). These are precisely the conditions under which many YIS grow up. Given these findings Szepsenwol and Simpson (2019) have proposed that the quality of parental caregiving received can serve as a marker for the level of harshness and/or unpredictability in a child's environment. Childhood maltreatment, then, can serve as a marker of the degree of adversity a child has experienced growing up.

The child's recollections and interpretations of their experiences with their caregiver inform their beliefs, attitudes, and expectations of others' availability and responsiveness, and their own self-worth (Bowlby, 1988; Simpson & Karantzas, 2019). These implicit memories and cognitions (beliefs, attitudes, and expectations) are collectively referred to as the internal working model (IWM) in attachment literature, representing the cognitive component of the attachment behavioral system. Any life event that activates the attachment system will also activate the IWM of attachment (Liotti, 2011).

These IWMs help define the different emotion regulation coping strategies that constitute individual attachment patterns (in children) and orientations (in adults).

Attachment Patterns/Orientations

Bowlby (1969, 1973, 1979, 1980, 1988) identified three stages of maternal separation in infants which he labelled protest, despair, and detachment. Ainsworth et al. (1978) built on the work of Bowlby by developing a procedure called the strange situation to study infant-parent attachment in the laboratory. They noticed that most infants when reunited with their parent after separation would actively seek the parent and be easily comforted; a pattern they labelled *secure.* Some infants had great difficulty being soothed and expressed anger toward the parent; a pattern labelled *insecure-resistant* or *anxious-ambivalent*. Other infants showed little distress and actively avoided contact with their parent; a pattern labelled *insecure-avoidant*. Main and Solomon (1986), later identified a fourth attachment pattern in the strange situation paradigm whereby infants exhibited confused and uncoordinated attachment behaviors; which they labelled *disorganized/disoriented*. Hazan and Shaver (1987) adapted Ainsworth's three infant attachment patterns for use with adults, employing the terms *secure, ambivalent, and avoidant*. Bartholomew and Horowitz (1991) then added a fourth adult attachment pattern, yielding the adult attachment typology most commonly used today: *secure* (low anxiety, low avoidance), *preoccupied* (high anxiety, low avoidance), *dismissing* (low anxiety, high avoidance), and *fearful-avoidant* (high anxiety, high avoidance).

Each attachment pattern/orientation is a label applied to summarize a semi-distinct cluster of attachment related cognitions and behaviors. A secure attachment for example is characterized by positive IWMs of self and other, problem-focused coping, comfort with seeking and providing support, and a balance between interdependence and autonomy (Simpson & Karantzas, 2019). Preoccupied attachment is characterized by a negative IWM of self and ambivalent IWM of others; and a

hyperactivating coping strategy characterized by excessive support seeking, preoccupation with relationships, and a strong need for external approval. Dismissing attachment is characterized by a fragile IWM of self, and negative IWM of others; and a *deactivating* coping strategy characterized by excessive self-reliance, discomfort with intimacy and relationships, and minimal expressed interest in external approval. Fearful-avoidant attachment (also referred to as disorganized attachment) is characterized by an incoherent IWM of self and other; and a haphazard coping strategy alternating between hyperactivating and deactivating strategies, expressing a need for closeness coupled with a fear of rejection. The different hyperactivating and deactivating strategies used shape the individual's relationships and emotional experiences (Mikulincer & Shaver, 2017). To borrow Bessel Van Der Kolk's (2014) succinct explanation of each attachment orientation, preoccupied (high anxiety, low avoidance) individuals 'feel but don't deal', dismissing (low anxiety, high avoidance) individuals 'deal but don't feel', and fearful-avoidant (high anxiety, high avoidance) individuals experience 'fright without solution'.

Categorical Versus Dimensional Approach

Although providing a theoretically convenient means of categorizing a person's attachment orientation, Bartholomew and Horowitz (1991) proposed that defining attachment orientations in adolescence and adulthood along two orthogonal[7] dimensions of anxiety and avoidance may be more valid than assigning discrete categories. In this conceptualization of the attachment model, the avoidance dimension relates to the IWM of others and expectations of others as trustworthy and

[7] Gillath, Karantzas, and Fraley (2016) argue that although Bowlby intended attachment anxiety and avoidance to be viewed as separable this does not imply that he was making the statistical claim that they are orthogonal to one another. They cite how Bowlby (1973) wrote that attachment anxiety and avoidance can be confounded in practice as evidence that statistical orthogonality was never intended to be part of the core theory (Gillath et al., 2016). Nevertheless, many researchers continue to assume that attachment anxiety and avoidance are orthogonal. Empirically, both dimensions are often correlated which can cause problems in practice, necessitating statistical approaches that allow the researcher to control for this (Gillath et al., 2016). However, Gillath et al., contend that this does not present a problem for the theory.

supportive, whereas the anxiety dimension is related to an individual's IWM of self. For example, individuals high on anxiety and low on avoidance engage in hyperactivating strategies leading to extreme emotional efforts to sustain close contact with their attachment figure. Those high on avoidance and low on anxiety are characterized by difficulties with intimacy, a rigid focus on self-reliance, and utilizing emotion deactivating strategies (Kobak et al., 2015). Common deactivating strategies include denial, minimization, intellectualization, distancing maneuvers, and emotional detachment (Muller, 2010). For those high on both avoidance and anxiety, they show erratic use of hyperactivating and deactivating strategies, internal working models of self and others that lack coherence, and a need for closeness coupled with a fear of rejection (Simpson & Karantzas, 2019).

Research into the validity of this two-dimensional model was conducted by several scholars (Brennan et al., 1998; Griffin & Bartholomew, 1994; Shaver & Fraley, 2000) and confirmed by Fraley et al. (2015) who applied modern taxometric procedures[8] to results on the Experiences in Close Relationships – Relationships Structures questionnaire (ECR-RS; Fraley, Heffernan, et al., 2011) using a large online sample (*N* = 4,700). Fraley et al. (2015) found the two-dimensional model to be superior to a categorical model regardless of level of specificity (i.e., both general attachment representations and context specific attachment representations) or type of attachment relationship (e.g., parent, peer, romantic partner). Given these findings the dimensional approach to measuring attachment was predominantly used in the current study. The categorical model remains helpful in conceptualizing the meaning of such dimensional scores. As such, categorical attachment orientations will also be discussed for the sake of continuity and comparison with previous research literature.

Mutability of Attachment Orientations Over Time

[8] Fraley et al. (2015) used three taxometric procedures to address the categorical versus dimensional debate: MAXCOV-HITMAX (Meehl, 1973; Meehl & Yonce, 1996), MAMBAC (Meehl & Yonce, 1994), and L-Mode (Waller & Meehl, 1998).

There has been debate in the attachment literature regarding how fixed early attachment orientations are across lifespan. Research has shown that IWMs are often carried forward into adolescence, although attachment orientations may change over time in response to changes within the caregiving environment (e.g., previously securely attached children may later develop insecure attachments in response to a changing family environment or family adversities; Bowlby, 1988; Vaughn et al., 1979). This has been acknowledged in contemporary theories of attachment that recognize that attachment orientation is a dynamic construct, involving different attachment orientations within different relationships (Simpson & Karantzas, 2019); and although these attachment orientations are fairly stable across time and context (Fraley, Vicray, et al., 2011), they can change when a person's IWMs are challenged (Arriaga et al., 2018; Mikulincer & Shaver, 2012). For example, it is possible for a youth to be securely attached to a close friend that has been with them through difficult times, while at the same time have an insecure attachment relationship with their family. In a prospective longitudinal study of the stability of attachment security from infancy to early adulthood[9], Weinfield et al. (2000) found that for those who had experienced the most negative life events, attachment orientation was least stable over time. This shows that maternal attachment security in infancy is no guarantee of continued attachment security through to adulthood, particularly for children exposed to poverty and chaotic home environments. This dynamic view of attachment is important for understanding how attachment orientation changes over time, dispelling the deterministic view that the child's attachment relationship with their primary caregiver determines all future relationships. As Fraley and Roisman (2019) put it "foundations are not fate" (p. 28). The influence of an individual's attachment relation with their caregiver is strongest in childhood and adolescence through socialization effects (Groh et al., 2017), but as they enter adulthood selection effects begin to take over (Fraley & Roisman, 2019). The take-away

[9] A sample of 57 infants from Minnesota were chosen originally for poverty and high risk of poor developmental outcomes. Attachment was assessed using the Ainsworth Strange Situation in infancy then again at 19 years of age using the Berkeley Adult Attachment Interview.

from this socialization-selection asymmetry is that a person's attachment orientation in adulthood may be best understood by looking *not only* at their childhood attachment experiences, but also their recent interpersonal experiences with close peers and romantic partners.

Attachment-System Activation

Mikulincer and Shaver (2003) proposed a three-phase model of attachment-system activation in adulthood (see Figure 1) to explain the contingent progression from primary attachment strategies (e.g., successfully seeking support from a responsive attachment figure) to secondary attachment strategies (i.e., hyperactivating and/or deactivating), when a potential or actual threat is perceived. If the attachment figure[10] is available and responsive, a sense of security in one's attachment is reinforced by means of a positive feedback loop (Mikulincer & Shaver, 2003). If the attachment figure is not responsive but proximity seeking is still possible (or perceived as essential) a hyperactivating strategy may be employed in a plea to have at least some of one's needs met by the attachment figure to minimize distress. If on the other hand, the attachment figure is not responsive and/or proximity seeking is perceived as unlikely to alleviate one's distress a deactivating strategy will be employed. The secondary attachment strategy employed (i.e., hyperactivating or deactivating) feeds back into how threat and attachment related cues are processed by the individual moving forward (Mikulincer & Shaver, 2003). An important implication of the three-phase model of attachment is that if the hyperactivating strategies of attachment anxiety are ineffectual or expected to be so, the individual's last resort is the deactivating strategies of attachment avoidance. In either case, compounding distress is what drives both hyperactivating and deactivating strategies. In the case of fearful-avoidant attachment

[10] In the case of adults, the term 'attachment figure' refers not only to parental figures, but also close peers and romantic partners.

(i.e., fright without solution) where neither hyperactivating nor deactivating strategies prove effectual to reduce distress, an individual may fluctuate erratically between both.

Gender Differences in the Expression of Attachment-System Activation. The culture of masculinity heavily penalizes the use of typical hyperactivating strategies (e.g., crying, begging, clinging, controlling) which may act as a disincentive for many men to employ them (Real, 1997). This may contribute to the slightly higher rates of attachment avoidance found in men versus women in many cultures (Schmitt, 2003). The fear of censure imposed by masculine culture prompts many men with insecure attachment to favor deactivating strategies over hyperactivating ones, even in situations where hyperactivating strategies could lead to receiving the emotional support they actually need (Muller, 2010; Real, 1997). Conversely, traditional stereotypes around femininity tend not to penalize women for employing hyperactivating strategies to the same degree, as feminine culture does not prohibit expressions of emotional vulnerability (Cooper et al., 2006; Real, 1997). It follows from the three-phase model of attachment-system activation in adulthood (Mikulincer & Shaver, 2003) that if an insecurely attached women's hyperactivating strategies are effective in minimizing their distress, they should have little need to employ deactivating strategies. However, for men, where there is a very real and often legitimate fear that hyperactivating strategies to minimize distress will be met with condescension—thereby increasing their distress—they may skip over using hyperactivating strategies altogether (Real, 1997). Many men learn as young children that hyperactivating strategies are rarely met with sympathy; a lesson they may carry with them for the rest of their lives (Real, 1997). This is a case where GSST may offer some insight into why many insecurely attached boys and men favor deactivating strategies while girls and women favor hyperactivating strategies (Martin et al., 2002).

Alternatively, LHT would stipulate that due to gender differences in life history trade-offs between mating and parenting, insecurely attached cisgender men (as compared to insecurely attached cisgender women) will tend to favor avoidant deactivating strategies to reduce their commitment to any

one partner and maximize the quantity of potential offspring (Del Giudice, 2009). Furthermore, from an evolutionary standpoint a cisgender woman unable to retain the protection of a cisgender man would likely be at greater risk of threat or serious harm from both human and non-human predators. This could lead to selection pressure for cisgender women to put more effort into attempts to obtain proximity, support, and care (Del Giudice, 2009). Hence, the LHT hypothesis that insecurely attached cisgender women should have a greater propensity to employ hyperactivating strategies than insecurely attached cisgender men (Del Giudice, 2009).

Gender-Specific Attachment Dynamics in Romantic Relationships. Bowlby (1977) believed that the attachment system shapes the development and functioning of the caregiving and sexual systems, all three of which come together in romantic love. Individuals with different attachment styles use sexual intercourse strategically to serve different attachment goals (Davis et al., 2004; Dory & Phillip, 2004; Snyder & Cantor, 1998), the expression of which is hypothesized by Cooper et al. (2006) to be influenced by gender-specific norms of sexual behaviour. For the securely attached, few gender-specific differences have been found in the level of sexual satisfaction (Butzer & Campbell, 2008), or how sexual behavior is expressed (Cooper et al., 2006). However, for the insecurely attached important differences have been found between men and women who are anxiously or avoidantly attached (Bogaert & Sadava, 2002; Dory & Phillip, 2004; Feeney et al., 1993; Gentzler & Kerns, 2004; Gewirtz-Meydan & Finzi-Dottan, 2018).

Anxious Attachment. For both women and men with an anxious attachment style there is a preference for the intimate aspects of sexuality over the sexual aspects (Dory & Phillip, 2004). However, anxiously attached cisgender women are more likely than anxious attached cisgender men to engage in sex to induce their partner to love them more (Dory & Phillip, 2004), avoid partner disapproval (Gewirtz-Meydan & Finzi-Dottan, 2018), and cope with negative emotions (Cooper et al., 2006). Contrary to anxiously attached cisgender men who tend to report an older age of first intercourse (Gentzler & Kerns,

2004), less intercourse (Feeney et al., 1993), and fewer sex partners (Gentzler & Kerns, 2004), anxiously attached cisgender women tend to have sex at a younger age (Bogaert & Sadava, 2002), more frequent intercourse, more sex partners, and riskier sex partners (Bogaert & Sadava, 2002; Gangestad & Thornhill, 1997). The neediness, desire for approval, and fear of abandonment that characterizes anxious attachment (Karantzas et al., 2016), is hypothesized by Cooper et al. (2006) to be exacerbated in cisgender women due to negative aspects of the female sex role that promote dependency and emotionality. This has the unfortunate side effect of making cisgender women more vulnerable to pressures to engage in sex (Karantzas et al., 2016) and less likely to protest unsafe sexual practices (Shaver & Mikulincer, 2012). When coupled with severe environmental adversity (e.g., living on the street) attachment anxiety may render cisgender women especially vulnerable to engaging in survival/safety sex (Shaver & Mikulincer, 2012). These women may be put in the difficult situation of having to trade off vulnerability on the street for vulnerability in a potentially exploitive or abusive relationship (Halcón & Lifson, 2004).

Avoidant Attachment. Sex presents a dilemma for avoidantly attached cisgender women and men due to its inherent intimacy and closeness (Dory & Phillip, 2004); two things which the avoidantly attached eschew (Muller, 2010). In cisgender men and women this dilemma is often resolved by either avoiding/delaying the onset of sexual activity (Tracy et al., 2003), or by having sex in contexts which make true intimacy less likely (Dory & Phillip, 2004). Once sexually active though, avoidantly attached individuals are more likely than securely or anxiously attached individuals to engage in a pattern of coercive (Karantzas et al., 2016), promiscuous, and/or casual sex (Cooper et al., 1998; Paul et al., 2000). The avoidantly attached are also more likely than anxiously or securely attached individuals to engage in sex to affirm their desirability, cope with negative emotions, and avoid partner disapproval; however, they are less likely to engage in sex for intimacy (Dory & Phillip, 2004; Karantzas et al., 2016). Although the motives for sex are similar in avoidantly attached cisgender women and men, the effects are

stronger and more pervasive in men (Cooper et al., 1998). Cooper et al. (2006) hypothesizes that this is due to sex-role norms that restrict the expression of tenderness and vulnerability in cisgender men, and encourage warmth, nurturance, and expressiveness in cisgender women.

How Partner Attachment Style Influences Conflict in Romantic Relationships. Bartholomew and Allison (2006) take the view that the relational dynamics of a couple are more than the sum of each partner's attachment style, thus relational behaviors can only be understood within the context of a self-regulating couple system. Relational conflict dynamics between two insecurely attached heteronormative partners have been found to differ based on whether both are anxious (Cooper et al., 2006), both are avoidant (Gewirtz-Meydan & Finzi-Dottan, 2018), the man is anxious while the women is avoidant, or the man is avoidant while the women is anxious (Cooper et al., 2006). Given the tendency in our culture for insecurely attached men to be avoidant and insecurely attached women to be anxious (Del Giudice, 2011; Schmitt, 2003), the latter scenario is more common.

Despite attachment avoidance being linked with hostility and a lack of forgiveness toward partners (Mikulincer & Florian, 1998), avoidantly attached partners are actually less likely to engage in verbal or physical conflict (Bartholomew & Allison, 2006) given their tendency to withdraw from emotionally charged situations (Gewirtz-Meydan & Finzi-Dottan, 2018). For an anxiously attached woman who may not be able to walk away from a relationship as readily as a man, any fear of abandonment by their partner will increase their attachment anxiety and cause them to grab on harder (Henderson et al., 2005). If the male partner is avoidantly attached and hence unable to cope with the emotionally charged hyperactivating strategies employed by the women, this may have the paradoxical effect of prompting him to further withdraw from or terminate the relationship (Mikulincer & Florian, 1998).

Anxiously attached individuals are hypersensitive to attachment-related threats (e.g., conflict, fear of rejection, separation, abandonment), and are more likely to interpret ambiguous partner behaviors in a threatening way (Bartholomew & Allison, 2006). If an anxiously attached individual is unable to elicit a reassuring response from their partner in other ways, they may strike out with verbal or physical abuse to regain proximity; this is the case whether the anxiously attached partner is a man or a woman[11] (Bartholomew & Allison, 2006). For this reason, reciprocal violence is most common in relationships where both partners are high in attachment anxiety (Bookwala & Zdaniuk, 1998; Henderson et al., 2005). According to Bartholomew and Allison (2006) regardless of whether the man or women is the perpetrator or victim, a common denominator in all the severely abusive relationships they have studied is a history of childhood maltreatment.

Childhood Maltreatment

Childhood maltreatment is a broad term that encompasses multiple forms of harm a child may be exposed to (Bernstein et al., 2003). In the literature childhood maltreatment is frequently divided into physical, emotional, and sexual abuse, as well as physical and emotional neglect (Bernstein et al., 2003). Abuse occurs when something harmful is done to a child (e.g., hitting, yelling, inappropriate touching), while neglect occurs when something that should have been done was not (e.g., not having enough to eat, not being hugged). In a 2014 survey of Canadian residents (*N* = 35,167) three in ten respondents reported experiencing some form of physical and/or sexual abuse before the age of 15 (Statistics Canada, 2015). In this national sample men reported slightly more childhood maltreatment than women (35% versus 31%). Over one-quarter (26%) of Canadians reported experiencing physical abuse in childhood making it the most common form of childhood maltreatment for both men (31%) and women (22%). Only 8% of Canadians reported experiencing childhood sexual abuse, with women

[11] Unfortunately, little is known right now about how these relationship dynamics play out in non-heteronormative couples. This is an area where further research is needed.

reporting a much higher rate compared to men (12% versus 4%). Importantly, women (24%) were three times as likely as men (8%) to report having suffered both physical and sexual abuse (Statistics Canada, 2015). Abuse or neglect often comes from the child's primary caregivers but may also come from another adult or older sibling in a position to interact with and harm the child. Furthermore, neglectful parenting increases the risk of a child being abused or exploited by someone outside the family (Turner et al., 2019). Regardless of who the perpetrator is, childhood maltreatment has been shown to have adverse effects on cognitive development. In a prospective longitudinal study (N = 7223) of the association between childhood maltreatment and cognitive function Mills et al. (2011) found that adolescents with a history of maltreatment scored significantly lower on measures of reading (d = 0.29) and perceptual reasoning (d = 0.32) than controls. However, as illustrated by the adverse childhood experiences (ACE) study (Felitti et al., 1998), the consequences of childhood maltreatment extend much further.

Adverse Childhood Experiences

The ACE study, a collaboration between the Permanente Medical Group and the US Centers for Disease Control and Prevention, was one of the first major studies (N = 8,056; 52% women) to investigate the relationship between exposure to adverse childhood experiences and the leading causes of death in adults (Felitti et al., 1998). Seven categories of ACEs were measured: (a) psychological abuse; (b) physical abuse; (c) sexual abuse; (d) violence against mother; (e) living with an individual who has substance abuse issues; (f) living with an individual who suffers from a mental illness or has attempted suicide; and (g) living with someone who has ever been imprisoned (Felitti et al., 1998). Although all forms of childhood maltreatment constitute ACEs, not all ACEs are considered forms of childhood maltreatment, as some are merely risk factors for maltreatment (e.g., living with an individual who has substance abuse issues). Felitti et al. (1998) found a graded relationship between the number of ACEs reported and a host of adult risk behaviors and diseases. Compared to those with no ACEs, those with

four or more were 4.6 times more likely to have experienced depression in the past year, 4.7 times more likely to have used illicit drugs, 7.4 times more likely to consider oneself an alcoholic, 10.3 times more likely to have injected drugs, and 12.2 times more likely to have ever attempted suicide (Felitti et al., 1998). Also, compared to those with no ACEs, those with four or more were 1.6 times more likely to have diabetes, 1.9 times more likely to have cancer, 2.2 times more likely to have ischemic heart disease, 2.4 times more likely to have suffered a stroke, and 3.9 times more likely to have chronic bronchitis or emphysema (Felitti et al., 1998). There were gender differences as well. Although there was only a small difference between women (45.4%) and men (53.7%) reporting no ACEs, twice as many women (8.5%) reported 4 or more ACEs as men (3.9%), highlighting how girls are at an elevated risk for severe ACEs compared to boys (Felitti et al., 1998). A follow-up study by Dong et al. (2004) found that the presence of one ACE significantly increased the odds of having additional ACEs by 2 to 17.7 times (*Md* = 2.8). Dong et al. (2004) also found that the number of respondents with high ACE scores was significantly higher than expected under the assumption of independence ($p < .0001$), confirming the statistical interrelatedness of ACEs. These ACE studies demonstrate clearly how a history of childhood maltreatment is associated with the adoption of health-risk behaviors, social problems, and disease. A significant body of literature has attempted to understand the neuroanatomical link between childhood maltreatment and these negative outcomes.

Altered Brain Development

Teicher (2000) initiated a program of cross-sectional neuro-imaging studies to investigate the hypothesis that the trauma of childhood abuse is associated with a cascade of hormonal and neural effects that mediate the development of vulnerable brain regions (Ito et al., 1998; Ito et al., 1993; Teicher et al., 1993). In a study of 253 adult outpatients in the U.S., Teicher et al. (1993) found that compared to patients who reported no childhood physical or sexual abuse, men and women who reported both scored 113% higher on a measure of limbic system dysfunction. In a related study of 115

adolescent psychiatric inpatients in the U.S., Ito et al. (1993) found clinically significant brain-wave abnormalities in 54% of male and female patients with a history of childhood abuse, compared to 27% of non-abused patients. Left hemisphere brain-wave abnormalities were six times more prevalent than right hemisphere abnormalities in those with a history of psychological abuse (Ito et al., 1993). To further investigate the link between childhood maltreatment and left-hemisphere development Ito et al. (1998) conducted a study comparing 15 psychiatric inpatients with a history of abuse (aged 6-15) to 15 non-abused controls using a quantitative method of analyzing electroencephalogram readings to provide information about structural differences. As suspected, they found little difference in the right hemispheres of abused and control patients, but left hemisphere development was substantially arrested in the patients who were abused compared to controls regardless of their primary psychiatric diagnosis (Ito et al., 1998). They also found in the abused patients that middle portions of the corpus callosum were significantly smaller than controls, suggesting deficiencies in right-left hemisphere integration (Ito et al., 1998). There was a significant gender difference in that for boys, physical and emotional neglect (but not physical or sexual abuse) were associated with a significant reduction in portions of the corpus callosum, whereas in girls sexual abuse resulted in the greatest reduction (Ito et al., 1998). This suggests that boys and girls may be differentially affected by different forms of childhood maltreatment, which may influence gender differences in insecure attachment.

Maltreatment-Insecure Attachment Hypothesis

The maltreatment-insecure attachment hypothesis proposes that childhood maltreatment is one causal factor in the formation of insecure attachment (Baer & Martinez, 2006; Cicchetti, 2004; Morton & Browne, 1998). Several meta-analyses[12] have been conducted which lend support to this hypothesis. In a descriptive analysis and review of the literature (k = 13, N = 2174) on childhood

[12] The studies in these meta-analyses employed the *strange situation* procedure, *modified strange situation* procedure, or Attachment Q-sort; all of which assess attachment categorically.

maltreatment and attachment on children under 2 years old, Morton and Browne (1998) found that the quality of a child's attachment to his or her mother was dependent upon how sensitive the mother was to her child. Maltreated children were found on average to be less securely attached to their mothers than non-maltreated children (Morton & Browne, 1998). In another review and meta-analysis (k = 8, N = 791) in children under 4 years of age, Baer and Martinez (2006) found that abused infants were significantly more likely to have an insecure attachment than infants who were not abused (OR = 7.5, p < .001). In a meta-analysis (k = 55, $n_{\text{non-maltreated}}$ = 4,336, $n_{\text{maltreated}}$ = 456) of the differential impact of childhood maltreatment and socioeconomic risk on attachment Cyr et al. (2010) found that maltreated children were significantly less secure (d = 2.10) and more disorganized (d = 2.19) than high socioeconomic risk children who were not maltreated (d = 0.48 and d = 0.48, respectively). However, non-maltreated children with five or more socioeconomic risk factors[13] showed almost comparable levels of attachment disorganization (d = 1.20) as maltreated children (Cyr et al., 2010). This suggests that even in the absence of maltreatment the accumulation of socioeconomic risk can increase the likelihood of attachment disorganization. This aligns with the psychodynamic concept of *equifinality* which suggests that there are many possible pathways towards one specific outcome (Luyten et al., 2017); in this case attachment insecurity.

The association between childhood maltreatment and insecure attachment, at least in men, does not seem to disappear in adulthood. In a cross-sectional study of 176 community men in Toronto, Canada, Langton et al. (2017) found a significant correlation between reports of childhood maltreatment and both insecure maternal (r_{anxious} = .28, r_{avoidant} = .54, $r_{\text{disorganized}}$ = .58, p < .001) and paternal (r_{anxious} = .28, r_{avoidant} = .54, $r_{\text{disorganized}}$ = .67, p < .001) attachment, as well as adult attachment avoidance (r = .20, p

[13] The following risk indicators were assessed: low income, substance abuse, ethnic minority group, single parenthood, adolescent mother (≤ 20yrs), and low education (≤ 12yrs).

< .05). There is research to indicate that childhood maltreatment and insecure attachment are associated with increased risk for developing psychopathology.

Psychopathology

The term psychopathology refers to signs or symptoms of underlying mental disorder or disease. The Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5; American Psychiatric Association, 2013) is the most widely used system of classification for mental disorders in North America. The DSM-5 provides a list of polythetic[14] criteria for each recognized mental disorder, with a set numerical threshold required for a clinical diagnosis to be made (American Psychiatric Association, 2013). For this study psychopathology will be operationalized broadly to include both clinical *and* sub-clinical manifestations of mental disorder.

Psychopathology and YIS

In a systematic review and meta-analysis (k = 46, N = 335,516) of the prevalence of psychopathology in YIS, Hodgson et al. (2013) found a strong link between symptoms of psychopathology and youth homelessness. Psychosis, mania, hypomania, suicidal thoughts or behaviors, CD, MDD, PTSD, and ADHD were particularly prevalent[15] in this population compared to community samples (Hodgson et al., 2013). They also found evidence of a reciprocal relationship between psychopathology and homelessness, with each exacerbating the risk for the other (Hodgson et al., 2013). Even in cases where psychopathology does not precede homelessness, traumatic experiences on

[14] Polythetic is an adjective that means relating to or sharing several characteristics which occur commonly in members of a group, but none of which is essential for membership in that group.

[15] Range of prevalence rates found in homeless youth across studies: (a) any psychiatric condition (30.9 – 48.4%), (b) psychosis (14.0 – 21.4%), (c) mania (21.0 – 21.2%), (d) hypomania (21.0 – 30.1%), (e) suicidal thoughts or behaviors (20.0 – 69.0%), (f) conduct disorder (36.0 – 76.7%), (g) major depressive disorder (12.2 – 32.5%), (h) post traumatic stress disorder (8.2 – 51.8%), (i) attention deficit hyperactivity disorder (4.4 – 32%).

the street can leave YIS at increased risk for developing PTSD, SUD, depression, and suicidal ideation (Hodgson et al., 2013). In a mixed-methods study of 70 homeless youth (n_{boys} = 48, n_{girls} = 22, aged 16-24) in Toronto, Canada, McCay et al. (2010) found that approximately one-third of participants had at least one psychiatric diagnosis, with depression and mood disorders the most common. Focus group data revealed that many YIS see mental illness as one of their greatest challenges while living on the street (McCay et al., 2010). According to a report on youth homelessness by Raising the Roof (2009) over 50% of homeless youth are involved in drug and alcohol abuse. Many youth stated that their addiction was both a means to cope with life on the streets and a perpetuating factor in their relapse to street life (Raising the Roof, 2009). Many youth also stated that they frequently use drugs and alcohol as an alternative to prescription medicine to self-medicate their mental health symptoms (Raising the Roof, 2009). In attempting to understand why YIS are at increased risk for developing psychopathology a developmental perspective is needed.

Developmental Psychopathology

The discipline of developmental psychopathology attempts to understand the interplay among biological, psychological, and social factors that contribute to the development of psychopathology within at-risk individuals across the lifespan (Cicchetti & Toth, 2009). Research in this field has revealed that youth are at greater risk of developing mental health problems relative to other age groups. Using data from the Canadian Community Health Survey (Statistics Canada, 2012), Pearson et al. (2013) determined that youth aged 15-24 had higher 12-month rates of SUD (1.9%) and depression or bipolar disorder (8.2%), than any other age group. Furthermore, according to the Mental Health Commission of Canada (2016) 70% of young adults with a mental health problem say their symptoms first appeared in childhood. We know that earlier childhood maltreatment is a risk factor for later psychopathology. In a one-year longitudinal study of 421 ($n_{maltreated}$ = 215, $n_{non\text{-}maltreated}$ = 206) economically disadvantaged children (aged 6-12, 64% boys) from an inner city in the U.S., Kim and Cicchetti (2010) found that

maltreated children showed significantly higher externalizing and internalizing symptoms of psychopathology at the start and end of the year than non-maltreated children. In a cross-sectional study of 190 (45 men, 145 women) university students (M_{age} = 22.02, *SD* = 4.24) in Ireland, Corcoran and McNulty (2018) found that the number of reported ACEs was positively associated with symptoms of depression, and that attachment anxiety mediated this relationship. This suggests that one's attachment orientation may influence the relationship between experiences of childhood maltreatment and the development of psychopathology.

Psychopathology and Attachment

According to Fearon et al. (2016) attachment theory has become a dominant theoretical framework over the last few decades for understanding how childhood experiences inform the development of psychopathology. Based on a review of the literature on attachment and psychopathology, Zeanah et al. (2003) proposed that an insecure attachment to one's caregiver in childhood broadly predicts concurrent and subsequent psychopathology. This hypothesized link has been corroborated in numerous studies. In a cross-sectional study of 272 (137 women, 135 men) university students (M_{age} = 18.9, *SD* = 1.41) in the U.S., Reinert and Edwards (2009) found that verbal abuse and physical abuse from a parent were significantly correlated with psychopathology, and that mother-daughter attachment may be a significant moderator of mental health sequelae resulting from mistreatment by the father. In another cross-sectional study of 289 (241 women, 26 men) college students (M_{age} = 21, *SD* = 1.92) in Belgium, Bosmans et al. (2010) found a significant positive correlation between self-reports of insecure attachment and psychopathology.

Several hypotheses have been proposed for how insecure attachment may increase the risk of an individual developing psychopathology. One hypothesis is that insecure IWMs of a primary caregiver characterized by fear, anger, anxiety, or mistrust color one's view of other social interactions, thereby

increasing risk for developing psychopathology (Fearon et al., 2016). Another hypothesis is that insecure attachment may contribute to a child developing maladaptive emotion regulation strategies which confer greater risk for psychopathology (Fearon et al., 2016). A third hypothesis is that attachment behaviors which may be adaptive in a child's interactions with a distant or distressed caregiver are often maladaptive outside of this context conferring increased risk for social exclusion and psychopathology (Fearon et al., 2016). These three hypotheses are not mutually exclusive, and all of them likely play a role. In fact, Kobak and Bosmans (2019) have proposed a dynamic model of insecure attachment based on mistuned dyadic communication that incorporates insecure IWMs (negative expectancies, interpretative biases, and defensive strategies) and the maladaptive emotions and behaviors that are associated with them. In their model of the insecure cycle, risk for psychopathology can be amplified by self-perpetuating cycles of insecure IWMs that confirm perceived insensitive or rejecting social interactions (Kobak & Bosmans, 2019). Unchecked, the insecure cycle can leave an individual feeling socially isolated and at increased risk for internalizing and externalizing symptoms of psychopathology.

Internalizing and Externalizing Symptoms of Psychopathology

Achenbach and Edelbrock (1978) were two of the first researchers to apply a factor analytic approach to a diverse set of mental health indicators, reducing them to two latent factors: internalizing (e.g., anxiety, depression, phobias) and externalizing (e.g., substance use, conduct problems, antisocial behaviors). Numerous studies have supported a link between insecure attachment and both internalizing and externalizing symptoms of psychopathology. In a meta-analytic review (k = 60, N = 5,236) of the literature on insecure attachment and internalizing behavior, Madigan et al. (2013) found a significant small to medium effect linking the two after adjusting for publication bias. In another meta-analytic review (k = 69, N = 5,947) of the literature on insecure attachment in children and externalizing behavior, Fearon et al. (2010) found that relative to securely attached children, disorganized children were at the greatest increased risk for externalizing problems, followed by avoidant and anxious

children. These meta-analyses also found that the effects of insecure attachment on internalizing (Madigan et al., 2013) and externalizing (Fearon et al., 2010) behaviors did not vary with age, indicating that the association between insecure mother-child attachment and symptoms of psychopathology does not wane from infancy to adolescence.

It has been hypothesized that anxious and avoidant attachment serve as distinct diatheses for internalizing and externalizing symptoms, respectively. However, in a meta-analysis ($k > 80$) on the role of childhood attachment in socioemotional development, Groh et al. (2017) found anxious attachment was not significantly associated with either internalizing or externalizing symptoms while avoidant attachment was significantly associated with both. This finding suggests that the relationship between attachment orientation and internalizing-externalizing symptomatology may not be as straight forward as previously thought. With respect to gender differences, both Fearon et al. (2010) and Madigan et al. (2013) found a significantly stronger association between mother-child attachment insecurity and internalizing problems for boys compared to girls, and between mother-child attachment insecurity and externalizing problems for boys compared to girls. This suggests that the relationship between mother-child attachment insecurity and psychopathology may be more direct in boys than it is in girls. Together these studies highlight the need for more research on the relationship between insecure attachment, psychopathology, and gender differences.

Madigan et al. (2013) found that higher externalizing scores moderated the association between insecure attachment and internalizing problems for both boys and girls, suggesting that internalizing and externalizing problems may not be independent of one another. Interestingly, contrary to the prediction of a diathesis stress model, Madigan et al. (2013) and Fearon et al. (2010) did not find socio-economic status (SES) to moderate the effects of insecure attachment on psychopathology. However, as Fearon et al. (2016) points out few studies have systematically examined the moderating effects of multiple risk

factors together (e.g., gender, childhood maltreatment, low-SES) on the effect of insecure attachment on the development of psychopathology in at risk groups, such as YIS.

The Current Study

The purpose of the current study is to address the gender gap in attachment research by exploring the relationship between gender, attachment orientation, childhood maltreatment, psychopathology, and select demographic variables in a de-identified dataset based on two independent samples of YIS. In particular, the following questions will be explored: (a) do girl and boy YIS significantly differ with respect to attachment, childhood maltreatment, and psychopathology together when the correlations amongst these variables are accounted for; (b) if so, which of these variables do girl and boy YIS significantly differ on; (c) which of these variables individually or in combination best predicts symptoms of psychopathology by gender; and (d) does the nature of the relationship between different variables differ by gender? No hypotheses about these relationships have been made, rather the aim is to identify relevant variables and generate hypotheses for future attachment research. Addressing the gender gap in attachment theory will facilitate more effective and targeted therapeutic interventions, particularly in the underserved and under-researched YIS population.

Method

Participants

Two convenience samples recruited from a community non-profit organization serving YIS in St. John's, Newfoundland and Labrador, Canada, were combined to create the dataset for the current study. The first sample collected by Heather M. Patterson in 2012 consisted of 57 YIS (20 girls, 37 boys). The second sample collected by Heather M. Quinlan in 2013 consisted of 51 different YIS (21 girls, 30 boys). As such the current sample consists of 108 YIS (41 girls, 67 boys) aged from 15 to 24 years old (M = 20.05, SD = 2.66).

Procedure

Both studies in which the two samples constituting the dataset were collected, were approved by the Interdisciplinary Committee on Ethics in Human Research (ICEHR) at Memorial University of Newfoundland in Canada. Potentially eligible participants were informed of the study through advertisements at the partnering non-profit. Those youths interested in the study were given appointment times to meet with the researcher. Participants were informed that their involvement would have no impact on their access to programming, nor would staff at the non-profit have access to their information. The general purpose of the research was explained to each youth[16]. To address possible literacy issues, all measures and the consent form were presented orally to participants. To ensure privacy of responses and reduce social desirability, each participant endorsed items on a separate form, outside of the researcher's field of vision. All participants received a $10 gift certificate for a local coffee shop for their time. Neither sample in the dataset contains participant identifiers. Each YIS sample was administered a sociodemographic questionnaire and several validated scales in a random order by a PsyD graduate student. Ethics approval was obtained from ICEHR for secondary use of data (see Appendix A).

Measures

The two samples of YIS combined in the present dataset did not use the exact same measures for all variables. Both samples completed the same sociodemographic questionnaire and the same measure of attachment. Both samples also completed related measures of psychopathology, the second measure being a short form of the first, allowing for a straightforward conversion. However, only one of

[16] In the first study (conducted in the Summer of 2012 by Heather M. Patterson) the purpose of the research was to examine the relationship between attachment, psychological functioning, resilience, and help-seeking behaviors. In the second study (conducted in the Fall of 2013 by Heather M. Quinlan) the purpose of the research was to examine the relationship between attachment, psychological distress, childhood maltreatment, and self-compassion.

the samples completed a validated measure of childhood maltreatment. How these issues were addressed are detailed in the subsequent 'childhood maltreatment' and 'psychopathology' sub-sections.

Sociodemographic information

Sociodemographic information was collected through the Youth Participant Profile (YPP), a 66 item semi-structured interview developed by a non-profit agency that supports street-involved youth in St. John's, NL, Canada. The interview was comprised of open and close ended questions exploring the participant's demographic characteristics, living situation and housing history, family of origin, education level, health and wellness, employment history, criminal justice and child protective services involvement, and perceived strengths (see Appendix B).

Attachment orientation

The Experiences in Close Relationships Scale-Revised (ECR-R; Fraley et al., 2000b) is a 36 item self-report measure utilizing a 7-point Likert scale, designed to assess the attachment dimensions of anxiety and avoidance (see Appendix C). Norms are provided based on people who took the ECR-R online in the early 2000's (M_{age} = 27*, SD* = 10). The ECR-R has been shown to have both high test-retest reliability, *r* = .86 (Sibley et al., 2005), and internal consistency, α_{anx} = .90, α_{avo} = .94 (Brennan et al., 1998). The present study showed excellent internal consistency for the ECR-R scale (α_{anx} = .95; α_{avo} = .92).

Childhood Maltreatment

In the first sample childhood maltreatment was measured using the Childhood Trauma Questionnaire Short Form (CTQ-SF; Bernstein et al., 2003), a 28-item retrospective self-report questionnaire that is scaled across the five abuse domains of emotional abuse, physical abuse, emotional neglect, physical neglect, and sexual abuse (see Appendix D). Participants rate each item on a

five-point Likert-type scale from “never true” to “very often true”. The CTQSF has good test-retest reliability (Bernstein, 1994; Bernstein et al., 2003; Lipschitz et al., 1999) and excellent internal consistency (α =.91).

As the second sample did not have a measure of childhood maltreatment, the childhood trauma composite measure (CT-CM) was created for use in this study based on items from the YPP, so that childhood maltreatment could be assessed in the same manner across both samples. The first step involved converting each CTQ-SF item in the first sample from a five-point scale to binary (“Never” = 0, all other responses = 1). This yielded five binary items for each abuse domain[17]. Two binary items from the YPP were appropriately matched to each abuse domain of the CTQ-SF (see Appendix E). Scores on the binary CTQ-SF abuse domains were correlated with the matched items from the YPP (r = .566 to .870, p < .001) to establish the relational validity of the item pairings. The total CT-CM score was calculated for each participant in both samples and then the samples were compared using an independent samples t-test, $t(106) = 0.856$, p = .394. This non-significant difference was expected between the two samples given they are drawn from the same YIS population. This provided support for the reliability of the CT-CM as a reasonable measure of childhood maltreatment in the combined dataset. A more detailed explanation of the development and validation of the CT-CM can be found in Appendix E.

Psychopathology

[17] Converting each of the CTQ-SF items from a five-point scale to binary results in some loss of sensitivity in the measurement of childhood maltreatment. However, this approach is not without precedent (Beamish, 2004; Grimbeek et al., 2005). According to Beamish (2004) a fundamental issue with Likert-type scales is the problematic measurement properties of multi-choice response categories per item, such that the interval between levels may remain uncertain and unquantifiable. When this is the case, collapsing response categories may improve the intelligibility of the outcomes of analysis. In line with this Grimbeek et al., (2005) advocates for collapsing across response categories when the range of response categories can obscure rather than clarify the intent of the respondent.

In the second sample psychopathology was measured using the Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1994), a 90 item self-report scale utilizing a 5-point Likert-type scale from "not at all" to "extremely", measuring a broad range of psychological problems. The instrument is designed for use on individuals aged 13 and older, is written at a sixth-grade reading level, and takes 12-15 minutes to complete. The test contains nine symptom scales: somatization, obsessive-compulsive, interpersonal sensitivity[18], depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism; as well as three global indices: global severity index (GSI), positive symptom distress index (PSDI), and positive symptom total (PST). Therefore, the SCL-90-R can be interpreted at the level of individual symptoms, symptom dimensions, and/or overall psychopathological status. As recommended by Derogatis (1994) the GSI was used in the present study as a general measure of psychopathology, with higher scores indicative of greater number and/or severity of symptoms. The SCL-90-R has consistently demonstrated sound levels of reliability in addition to content, concurrent, and discriminant validity (Groth-Marnat, 2009).

In the first sample psychopathology was measured using the Brief Symptom Inventory (BSI; Derogatis, 1993), a 53-item measure indexing the degree to which the participant has experienced a specific symptom during the past week. The BSI is a shortened version of the SCL-90-R, using the same 5-point Likert type scale. The measure contains the same nine symptom scales and three global indices as the SCL-90-R. As the 53-items in the BSI are pulled directly from the SCL-90-R, both samples completed the same 53-items. Thus, a BSI total score, as well as BSI scores for the nine symptom dimensions and three global indices were calculated for all participants. The BSI has been shown to have

[18] This naming of this dimension may be a bit misleading. To clarify, what Derogatis (1994) means by interpersonal sensitivity is feelings of personal inadequacy and inferiority, particularly in comparison with others. This tends to manifest in the form of self-deprecation, self-doubt, and discomfort during interpersonal interactions.

good concurrent validity with the SCL-90-R, and good internal consistency (α =.71 to .85). In the present study, the internal consistency of the BSI total score was high (α =.90).

Data Analysis

Univariate Assumption Checks

Jamovi 1.6.23 was used to screen the combined dataset for missing values and assess the primary variables for the presence of outliers, normality, skewness, and kurtosis (The jamovi project, 2021). There were no missing values (as all questions were read aloud to participants by the principal investigator of each study) or outliers more than three standard deviations from the mean. Boy YIS nearly violated the assumption of normality on attachment anxiety (Shapiro-Wilk W = .967, p = .070) and childhood maltreatment (W = .968, p = .086), and did violate the assumption of normality on psychopathology (W = .932, p = .001). Girl YIS nearly violated the assumption of normality on attachment anxiety (W = .949, p = .067) and childhood maltreatment (W = .946, p = .050), and did violate the assumption of normality on psychopathology (W = .923, p = .009). Boy YIS were significantly positively skewed on psychopathology, $t(66) = 2.30$, p = .025. There was no statistically significant kurtosis of any variables for girl or boy YIS.

Bivariate & Multivariate Assumption Checks

R 4.0.5 (R Core Team, 2021) was used to test for regression outliers, leverage points[19], heteroscedasticity, curvature, and to compare parametric, additive, and non-parametric fit using the package 'Rallfun-v38' (Wilcox, 2021). The Rousseeuw and Van Zomeren (1990) method was employed to detect bivariate regression outliers and leverage points between the primary study variables grouped by

[19] A leverage point is an outlying x value that can have an inordinate influence on the estimated slope and intercept in ordinary least squares regression. Leverage points can be good or bad. Good leverage points are those that are not regression outliers and will often reduce the standard error of the estimator. Bad leverage points are regression outliers and can result in a poor fit to the bulk of the data.

gender. No bad leverage points were detected for the bivariate regressions of the primary study variables for boy YIS. One bad leverage point (y_{18}, x_{18}) was detected for the bivariate regression of attachment anxiety on avoidance for girl YIS and was removed from analyses involving this comparison. Heteroscedasticity was assessed using the Wilcox and Keselman (2006) quantile regression method (H_0: $\beta_{0.2} = \beta_{0.8}$). Significant heteroscedasticity was detected for the bivariate regression of attachment avoidance on anxiety for girl YIS ($p < .05$) and for childhood trauma on psychopathology for boy YIS ($p < .01$). Heteroscedasticity just above the threshold of significance was detected for the bivariate regression of attachment anxiety on psychopathology for both boy ($p = .05$) and girl ($p = .08$) YIS.

Curvature of the bivariate relationship between the primary study variables was assessed by calculating the half-slope ratio ($H = \hat{\beta}_R / \hat{\beta}_L$) for each relationship grouped by gender, where $H \approx 1$ indicates a linear relationship. For the bivariate relationship between attachment anxiety and avoidance in boy YIS, highly significant curvature was detected, $H = 33.6$. However, according to Wilcox (2017) the half-slope ratio can be misleading when slope parameters are close to zero, which based on visual analysis of the plot appears to be the case for the relationship between attachment anxiety and avoidance in boy YIS. More credible indicators of curvature were detected for the relationship between: (a) attachment anxiety and psychopathology in boy YIS ($H = 4.5$); (b) childhood maltreatment and attachment anxiety in girl YIS ($H = 3.3$); (c) childhood maltreatment and psychopathology in boy YIS ($H = 9.0$); and (d) attachment anxiety and psychopathology in girl YIS ($H = 5.7$).

The fit of parametric, additive, and nonparametric models for the prediction of psychopathology as a function of childhood maltreatment, attachment anxiety, and attachment avoidance, by gender were compared. The R function 'reg.vs.rplot' was used to graph the predicted values using the parametric Theil-Sen estimator (Sen, 1968; Theil, 1950) against the nonparametric running-interval

smooth[20] (Wilcox, 1995). The R function 'adpchk' was used to graph the predicted values using the generalized additive model (Hastie & Tibshirani, 1986) against the running-interval smooth. Both the Theil-Sen estimator and the generalized additive model provided a poor fit to the data compared to the running-interval smooth.

Descriptive and Inferential Analyses

Given the unequal sample size between girl (n = 41) and boy (n = 67) YIS and the violation of several univariate (i.e., normality and skew), bivariate (i.e., leverage points, heteroscedasticity, and curvature), and multivariate (i.e., parametric and additive fit) assumptions, robust non-parametric statistical methods were used (Wilcox, 2017)[21]. Descriptive analysis of demographics and study variables were conducted using Jamovi 1.6.23 (The jamovi project, 2021). The 'walrus' module (Love & Mair, 2018) in Jamovi was used to calculate 20% trimmed means (M_t) for each variable grouped by gender. Analyses that could not be conducted in Jamovi were conducted in R 4.0.5 (R Core Team, 2021). The zero-order bivariate association between each variable and gender was investigated with the package 'WRS2' (Mair & Wilcox, 2020) by calculating percentage bend correlations (ρ_{pb}).

A one-way multivariate analysis of variance (MANOVA) employing the Yanagihara-Yuan (2005) method extended to 20% trimmed means was used to infer whether girl and boy YIS differ significantly on the primary study variables taken together (i.e., attachment, childhood maltreatment, psychopathology) when the correlations amongst these variables are accounted for. A second MANOVA was used to infer whether girl and boy YIS differ with respect to the nine symptom dimensions of the

[20] Smoothing techniques are a method for estimating a conditional measure of location associated with y, given p predictors when the function specifying the relationship between p and y is unknown (i.e., nonparametric).
[21] The book *Introduction to Robust Estimation and Hypothesis Testing* by Rand Wilcox (2017) is recommended for a detailed discussion of the shortcomings of standard statistical methods and how modern robust methods can be used to provide a more accurate and nuanced understanding of data.

BSI-53 taken together, when the correlations amongst the symptom dimensions are accounted for. Independent samples *t* tests using Yuen's (1974) method with a 20% trim were used to test which variables girl and boy YIS significantly differ on. Hochberg's (1988) method was used to control the familywise error rate of these separate tests. The 0.632 bootstrap method[22] (Efron & Tibshirani, 1994; Shao, 1996; Wilcox, 2017) was used to determine which variable or combination of variables best predicts psychopathology by gender.

Multiple non-parametric regressions using a running-interval smooth (Wilcox, 1995) were employed to explore the relationship between the following predictor and outcome variables, with gender as a factor: (a) childhood maltreatment → attachment anxiety; (b) childhood maltreatment → attachment avoidance; (c) attachment anxiety → attachment avoidance; (d) attachment avoidance → attachment anxiety; (e) childhood maltreatment → psychopathology; (f) attachment anxiety → psychopathology; and (g) attachment avoidance → psychopathology. As a running-interval smooth does not provide an explicit regression equation for predicting *y* given *x*, each relationship was quantified in terms of explanatory power[23] (η^2) and explanatory strength of association[24] (η) as first proposed by Doksum and Samarov (1995). There is no explicit cut-off for η and η^2 with respect to statistical significance. The running-interval smooths were not utilized for null hypothesis statistical testing; as such, the control of familywise error is not applicable.

[22] A robust alternative to approaches such as stepwise regression, R^2 approaches, and the *F* statistic; all of which are used to determine and rank which predictor or combination of predictors are best in predicting an outcome. Uses the R function 'regpre' and is based on the notion of prediction error (ϵ_P). Prediction error refers to the discrepancy between the predicted value and actual value of y.

[23] Explanatory power $\eta^2 = \frac{\sigma^2(\hat{y})}{\sigma^2(y)}$ is the usual variance of the predicted values divided by the variance of the observed values; with only one predictor using least squares regression this reduces to R^2, the coefficient of determination. A robust generalization $\eta^2 = \frac{\hat{\tau}^2(\hat{y})}{\hat{\tau}^2(y)}$ is used where the usual variance σ^2 is replaced by the percentage bend midvariance τ^2, and y is estimated using a running-interval smooth.

[24] The explanatory strength of association η is the positive square root of explanatory power η^2.

Power Analysis

A sensitivity power analysis was conducted using G*Power 3.1.9.4 (Faul et al., 2009) for each test that was used. Conventional power analysis software is not designed to test many of the robust statistical methods employed in this study, but the closest options available were selected. In most cases the use of robust estimators and non-parametric regression will achieve higher power than analyses based on the closest conventional methods suggest. A MANOVA global effects test ($\alpha = .05$, $1-\beta = .8$, $N = 108$, 2 groups, 4 variables) was conducted yielding a minimum detectable effect size of $f^2 = 0.12$, a medium effect. A two tailed Wilcoxon-Mann-Whitney *t* test of the difference between two independent means ($\alpha = .05$, $1-\beta = .8$, $n_1 = 67$, $n_2 = 41$) was conducted yielding a minimum detectable effect size of $d = 0.57$, a medium effect based on Cohen's (1992) criteria. A linear multiple regression test (fixed model, R^2 deviation from zero) with two predictors ($\alpha = .05$, $1-\beta = .8$, $N = 108$) was conducted yielding a minimum detectable effect size of $f^2 = 0.09$, a medium effect.

Results

Sociodemographics

Data from 108 YIS (41 girls, 67 boys) were included in the primary analysis. The sociodemographic characteristics of the participants can be found in Table 1. The participants identified primarily as boys (62.0%) and Caucasian (95.4%). Most participants reported having dropped out of school at least once (69.2%), and only 23.1% finished high school. One-quarter of participants reported a learning disability (26.2%); however, there was a substantial difference between boy (17.8%) and girl (8.4%) YIS. Nearly two-thirds of participants reported a disrupted connection with their family of origin (60.2%), and half reported previous involvement with Child and Youth Family Services (47.7%). Approximately two-thirds of participants reported making use of emergency shelters (63.6%), with boy YIS reporting significantly greater use (73.1%) than girl YIS (46.3%). Over half of participants reported

some involvement with the criminal justice system (55.6%), with boy YIS (41.7%) approximately twice as likely as girl YIS (13.9%) to have been involved past or present. Nearly three-quarters of participants (70.4%) reported a history of at least one form of physical, emotional, or sexual abuse; however, there was a substantial difference between boy (61.2%) and girl (85.4%) YIS. Two-thirds of participants reported having used non-prescription drugs recreationally (63.0%), and over three-quarters reported being formally diagnosed with at least one mental health disorder (76.9%).

Descriptive Statistics and Correlations

Trimmed means and standard errors for the primary study variables can be found in Table 2. Correlations between primary study variables and BSI-53 symptom dimensions were calculated using the percentage bend correlation (ρ_{pb}). Differences in the magnitude of the correlation between key variables and gender are noted for descriptive purposes. As can be seen in Table 3, girl YIS reported significantly higher levels of both attachment anxiety and childhood trauma ($\rho_{pb} = .29$, $p < .01$) compared to boy YIS. There was no significant difference between girl and boy YIS with respect to attachment avoidance ($\rho_{pb} = .09$, $p > .05$). The difference between girl and boy YIS on overall psychopathology showed a trend ($\rho_{pb} = .18$, $p = .06$); however, looking at the individual symptom dimensions girls scored significantly higher on interpersonal sensitivity ($\rho_{pb} = .29$, $p < .01$), depression ($\rho_{pb} = .30$, $p < .01$), and phobic anxiety ($\rho_{pb} = .26$, $p < .01$). Belying their formulation as truly orthogonal constructs in attachment theory, attachment anxiety was significantly associated with attachment avoidance ($\rho_{pb} = .20$, $p < .05$) in YIS. As expected, attachment anxiety was significantly correlated with both childhood trauma ($\rho_{pb} = .58$, $p < .001$) and psychopathology ($\rho_{pb} = .61$, $p < .001$). The correlation between attachment avoidance and childhood trauma was also significant ($\rho_{pb} = .21$, $p < .05$), though considerably lower than that between attachment anxiety and childhood trauma. The correlation between attachment avoidance and psychopathology was not significant ($\rho_{pb} = .12$, $p > .05$). Not surprisingly, there was a strong correlation between childhood trauma and psychopathology ($\rho_{pb} = .48$, $p < .001$).

Gender Differences on Primary Study Variables

A MANOVA revealed that girl and boy YIS differ significantly with respect to attachment, childhood maltreatment, and psychopathology together when the correlations amongst these primary study variables are accounted for, T_f (4, ~103) = 3.24, $p < .05$ (see Table 4). Independent samples t tests revealed that compared to boy YIS, girl YIS scored significantly higher on attachment anxiety, t(59.54) = 3.37, $p < .01$, ξ = 0.45, 95% CI [0.23, 0.64] and childhood trauma, t(48.80) = 3.04, $p < .05$, ξ = 0.45, 95% CI [0.21, 0.65]; a medium-large effect size. The difference between girl and boy YIS was not statistically significant with respect to attachment avoidance, t(46.78) = 1.00, $p > .05$, ξ = 0.15, 95% CI [0.00, 0.38] and overall psychopathology, t(41.02) = 1.62, $p > .05$, ξ = 0.25, 95% CI [0.00, 0.48]; but still showed a small to small-medium effect size.

Digging deeper a second MANOVA revealed that girl and boy YIS significantly differ on psychopathology when the inter-correlations amongst the nine symptom dimensions of the BSI-53 are accounted for, T_f (9, ~98) = 3.87, $p < .01$ (see Table 4). Independent samples t tests revealed that compared to boy YIS, girl YIS scored significantly higher on interpersonal sensitivity, t(43.72) = 2.98, $p < .05$, ξ = 0.42, 95% CI [0.20, 0.61] and depression, t(40.87) = 2.97, $p < .05$, ξ = 0.44, 95% CI [0.20, 0.64]; both medium-large effects. Though not statistically significant, compared to boy YIS, girl YIS also scored higher on phobic anxiety, t(34.72) = 2.65, $p < .10$, ξ = 0.38, 95% CI [0.13, 0.58]; a medium effect.

Predictors of Psychopathology by Gender

The 0.632 bootstrap method was used to rank which primary variable, or combination of primary variables best predicts psychopathology by gender (see Table 5). For both girl and boy YIS, scores on attachment anxiety and childhood trauma together yielded the lowest prediction error, ϵ_p = .545 and .762, respectively. This was followed by scores on attachment anxiety alone for both boy (ϵ_p = .561) and girl (ϵ_p = .767) YIS. For boy YIS 'no predictor' yielded the highest prediction error (ϵ_p = .716);

however, for girl YIS attachment avoidance yielded the highest prediction error (ϵ_p = .908). Counterintuitively this suggests that for girl YIS at least, scores on attachment avoidance may lead to less accurate prediction of their levels of psychopathology than having no predictor at all.

Differing Bivariate Relationships by Gender

Running-interval smooths of the primary variables split by gender are shown in Figures 2 to 6. Of particular interest are cases where a non-linear relationship[25] is coupled with an explanatory strength of association that is substantially greater than zero, and/or the nature of the relationship differs significantly by gender. Figure 2 shows that although the level of attachment anxiety does not predict the level of attachment avoidance in boy YIS (η = .000), there is a strong, inverse U, curvilinear, non-monotonic relationship in girl YIS (η = .521). That is, as attachment anxiety increases from 1 to 5 so too does attachment avoidance; however, as attachment anxiety increases further from 5 to 7, levels of attachment avoidance decrease.

Figure 3 shows that for both boy (η = .602) and girl (η = .556) YIS there is a strong positive curvilinear monotonic association between the prediction of psychopathology by childhood maltreatment. This suggests that as levels of reported childhood maltreatment exceed a 4 or 5 there is an apparent increase in the rate at which further levels of childhood maltreatment are associated with greater psychopathology. A strong positive curvilinear monotonic association between the prediction of psychopathology by attachment anxiety was also found for both boy (η = .692) and girl (η = .664) YIS. This suggests that as levels of attachment anxiety exceed a 5, there is an apparent increase in the rate at which further levels of attachment anxiety are associated with greater psychopathology.

[25] The relationship between the prediction of *y* by *x* will be quantified in terms of the explanatory strength of association (i.e., no, weak, or strong association), directionality (e.g., positive, negative, U-shaped, inverse U), linearity (i.e., linear, or curvilinear), and monotonicity (i.e., monotonic, or non-monotonic).

Figure 4 shows that although symptoms of somatization (i.e., distress arising from perceptions of bodily dysfunction) do not predict levels of attachment anxiety in boy YIS (η = .000), there is a strong positive curvilinear monotonic relationship in girl YIS (η = .516). This suggests that as levels of somatization in girl YIS exceed a 1.5 there is an apparent increase in the rate at which further levels of somatization are associated with greater attachment anxiety. In both boy (η = .461) and girl (η = .462) YIS obsessive-compulsive symptoms strongly predict levels of attachment anxiety; however, in boys the relationship is positive and linear (thus also monotonic), while in girls it is U-shaped (thus also curvilinear and non-monotonic). This suggests that in girl YIS the relationship between the prediction of attachment anxiety by obsessive-compulsive symptoms may be more complex. In girl YIS (η = .000) there is no association between the prediction of attachment anxiety by levels of hostility, whereas in boy YIS there is a strong positive curvilinear monotonic relationship (η = .467). This suggests that as levels of hostility in boy YIS exceed a 1.5 there is an apparent increase in the rate at which further levels of hostility are associated with greater attachment anxiety.

Figure 5 shows that although symptoms of somatization do not predict levels of attachment avoidance in boy YIS (η = .000), in girl YIS there is a strong, negative, mildly curvilinear, monotonic relationship (η = .403). This suggests that as levels of somatization in girl YIS increase from 0 to 2 there is an apparent decrease in the rate at which further levels of somatization are associated with less attachment avoidance. Although there is no association between the prediction of attachment avoidance by level of hostility in boy YIS (η = .000), in girl YIS there is a strong, inverse U, curvilinear, non-monotonic relationship (η = .640). This suggests that as levels of hostility increase from 0 to 1.5, there is an apparent increase in levels of attachment avoidance; however, further increases in hostility are associated with a decrease in attachment avoidance. These gender differences may in part explain why the percentage bend correlations between attachment avoidance and somatization (ρ_{pb} = −.05, p >

.05) and attachment avoidance and hostility (ρ_{pb} = .08, p > .05) were not significant given that boy and girl YIS were lumped together (see Table 3).

Figure 6 shows that for both boy and girl YIS respectively, there is a strong, positive, mildly to moderately curvilinear, monotonic relationship between: (a) the prediction of childhood maltreatment by symptoms of somatization (η = .362, η = .537); (b) the prediction of childhood maltreatment by obsessive-compulsive symptoms (η = .665, η = .242); (c) the prediction of childhood maltreatment by interpersonal sensitivity (η = .561, η = .478); (d) the prediction of childhood maltreatment by level of hostility (η = .522, η = .631); and (e) the prediction of childhood maltreatment by symptoms of paranoid ideation (η = .580, η = .298). This suggests that as the level of these symptoms in both boy and girl YIS increases there is an apparent increase in the rate at which these symptoms are associated with greater childhood maltreatment. This was also the case in boy YIS for depression (η = .724) and anxiety (η = .521); however, for girl YIS childhood maltreatment was not predicted by levels of depression (η = .000) or anxiety (η = .000). It is unclear whether this reflects a real gender difference in the relationship between childhood maltreatment, depression, and anxiety or whether it may stem from the smaller sample size of girls and/or higher average levels of childhood maltreatment in girl as compared to boy YIS. In gilr YIS there is a strong positive curvilinear monotonic relationship between the prediction of childhood maltreatment by both phobic anxiety (η = .334) and psychoticism (η = .345); however, in boy YIS there is no association between childhood maltreatment and phobic anxiety (η = .000), and only a linear relationship between psychoticism (η = .408) and childhood maltreatment. This suggests that a gender difference with respect to the prediction of childhood maltreatment by symptoms of phobic anxiety and psychoticism may exist.

Discussion

The purpose of the current study was to address the gender gap in attachment research by exploring the relationship between gender, attachment orientation, childhood maltreatment, psychopathology, and demographic variables in a sample of YIS from St. John's, NL, Canada. In terms of sociodemographic characteristics, the current sample was comparable in most respects to YIS throughout the rest of the country based on results from the National Youth Homelessness Survey (Gaetz, O'Grady, et al., 2016), with a few notable exceptions. Only 4.6% of the sample identified as a visible minority compared to the national YIS average of 28.2%; however, this limited ethnic diversity is consistent with the current ethnic profile of St. John's, NL. The sample reported higher levels of childhood abuse for both boy (61.2%) and girl (85.4%) YIS compared to the national YIS averages of 53.6% and 73.5%, respectively. The rate of high school non-completion was also higher in the sample (76.9%) relative to the national YIS average of 65%. Over three quarters (76.9%) of YIS reported having at least one diagnosed mental disorder, which was significantly higher than the rate of approximately 33% found by McCay et al. (2010) in a sample of 70 homeless youth in Toronto, ON. However, this may merely indicate that the McCay et al. (2010) sample was under-diagnosed rather than that the current sample of YIS suffers from higher rates of mental disorder. These differences suggest that compared to the 'average' YIS in the rest of Canada, the YIS in St. John's are less ethnically diverse, have reported higher rates of childhood abuse, and are less likely to have finished high school. These may be important differences to consider when generalizing any findings to other populations of YIS. Bearing in mind, however, the caveat that accurately measuring the sociodemographic characteristics of YIS nationwide is inherently difficult.

Gender Differences on Primary Study Variables

The first exploratory question was whether YIS significantly differ by gender with respect to attachment, childhood maltreatment, and psychopathology together when the intercorrelations amongst these variables are accounted for. This was found to be the case for both the primary study

variables and the BSI-53 symptom dimensions and was important as an initial analytical step to determine if further analyses were warranted. Results indicated that girls in this sample reported significantly higher rates of childhood maltreatment than boys, which accords with gender-based differences found in other YIS populations (Gaetz, O'Grady, et al., 2016), but differs from findings in the general Canadian population (Statistics Canada, 2015) where boys report slightly higher rates of childhood maltreatment. It is not entirely surprising that girls scored higher than boys on the overall measure of childhood maltreatment given that almost everyone in this high-risk sample reported at least one form of maltreatment. Since girls are far more likely to report childhood sexual abuse than boys (Statistics Canada, 2015), this may have led to a higher average score on the CT-CM for girls.

Girls in this sample also reported significantly higher rates of attachment anxiety than boys, mirroring findings in normative populations (Schmitt, 2003). There are several potential explanations for girl YIS reporting higher rates of attachment anxiety as compared to boy YIS. According to GSST (Kohlberg, 1969; Martin et al., 2002), YIS being part of the broader culture would be susceptible to gender stereotypes as much as other youth, which could explain why girls in this sample expressed more attachment anxiety than boys. However, this finding is also consistent with a prediction of LHT (Del Giudice, 2009; Hill, 1993) that under conditions of increasing environmental adversity levels of attachment anxiety should rise in cisgender girls (up to a point) in order to maximize continued investment from sexual partners. It is also possible that higher rates of childhood maltreatment in the girl YIS could mediate the relationship between gender and attachment anxiety. It is also worth noting that despite girl YIS having significantly higher levels of attachment anxiety than boy YIS, boy YIS still scored objectively higher on attachment anxiety than girls drawn from a normative population (Fraley, 2012). So compared to normative youth and young adult populations, both girl and boy YIS have high levels of attachment anxiety.

Of theoretical interest was the finding that there was no significant difference between the girl and boy YIS in this sample with respect to levels of attachment avoidance, counter to findings in normative youth populations (Del Giudice, 2011; Schmitt, 2003). It is also worth noting that relative to normative samples (Fraley, 2012), both girl and boy YIS showed higher levels of attachment avoidance. This appears to accord with one of the predictions of LHT (Del Giudice, 2009, 2019), namely that under conditions of very high adversity the attachment avoidance gender gap should disappear. The premise behind the aforementioned prediction is that cisgender women in such an environment may express an increase in attachment avoidance as part of a reproductive suppression strategy (Del Giudice, 2011). An alternative explanation for this finding from the perspective of GSST could be that girl YIS differ in terms of their gender contentedness and felt pressure for gender conformity compared to normative girls. Unfortunately, without a measure of gender contentedness and felt pressure for gender conformity, it is unknown to what degree this may or may not be the case. It is important to recognize that LHT and GSST may not be antagonistic, as both ecological stress and gender-role norms likely play a role (Pauletti et al., 2016). Another potential non-mutually exclusive explanation relates to the relatively higher levels of childhood maltreatment in girl YIS compared to boy YIS. It is possible that as a result of their relatively higher rates of childhood trauma, girl YIS had to adopt more avoidant deactivating strategies (Muller, 2010) than normative girls in order to cope, bringing their average level of attachment avoidance closer to that of boy YIS.

It is also of interest that girl and boy YIS were found not to differ significantly on an overall measure of psychopathology counter to both normative populations (Derogatis, 1993; Urbán et al., 2014) and psychiatric in-patients (Rytilä-Manninen et al., 2016) where girls and women routinely report more psychological symptoms than men. One possible reason girl and boy YIS did not differ significantly on the overall measure of psychopathology relates to higher levels of attachment avoidance in girl YIS relative to normative girls. As avoidantly attached individuals tend to minimize past trauma, deny

existing trauma, and see themselves as strong, individuals high in attachment avoidance often under-report symptoms on self-report measures (Muller, 2010). This may have brought the scores of girl YIS close enough to those of boy YIS on enough dimensions to significantly lower the difference between the two on average GSI scores. However, when the intercorrelations amongst the nine symptom dimensions were accounted for, girl YIS *did* score significantly higher than boy YIS on interpersonal sensitivity, depression, and phobic anxiety[26]. These are potentially important gender differences that are obscured when only an overall measure of psychopathology is used. This gender difference on symptom dimensions has also been found in normative populations (Derogatis, 1993; Urbán et al., 2014); however, in these populations girls also scored significantly higher than boys on symptoms of somatization, obsession-compulsion, and anxiety. This difference may be partially explained by the fact that boys in the present sample reported much higher levels of somatization, obsession-compulsion, and anxiety than is found in normative populations (Derogatis, 1993), bringing their scores much closer to that of girl YIS. Put another way girl and boy YIS's scores converged to some degree on the dimensions of somatization, obsession-compulsion, and anxiety.

Predictors of Psychopathology by Gender

The second exploratory question was which key variables individually or in combination best predict symptoms of psychopathology by gender. This question is of practical significance for clinicians and policy makers in that it can be useful for triaging those who are at the greatest risk for psychopathology and aid in the determination of where interventions should be targeted for best effect. In this population of YIS, the best predictor of psychopathology in both girls and boys are a combination of the attachment anxiety and childhood maltreatment scores. So even though girl YIS on average have

[26] The symptom dimensions of interpersonal sensitivity, depression, and phobic anxiety are all highly correlated. Concerns about the differential validity of the BSI-53 symptom dimensions aside, the key take-away is that male and female YIS differ significantly on at least one latent variable of psychopathological symptomatology.

significantly higher levels of attachment anxiety and childhood maltreatment than boys, these two variables remain very important in predicting and understanding the incidence of psychopathology in both genders. The CT-CM only provides a total score and does not allow us to differentiate between different types of childhood maltreatment, but it would be interesting to know if different types of childhood maltreatment (e.g., verbal abuse vs sexual abuse) differentially predict psychopathology by gender.

Of theoretical and practical interest is the finding that levels of attachment avoidance provide almost no benefit in predicting levels of psychopathology in boy YIS, and in girl YIS may lead to a poorer prediction of the level of psychopathology than using no predictor at all. This finding runs counter to results from a meta-analysis by Groh et al. (2017) who found attachment avoidance to be more strongly associated with psychopathology than attachment anxiety, in both girls and boys. However, the studies in Groh's meta-analysis all assessed early attachment through observation. Conversely, meta-analyses of studies using self-report measures of attachment and psychopathology (Brumariu & Kerns, 2010; Colonnesi et al., 2011) align with the findings in this population of YIS. Perhaps this finding is not entirely surprising given the theory that the deactivating strategies used to avoid negative emotional states by the avoidantly attached obscure many of the symptoms of psychopathology (Muller, 2010). It is only when these deactivating coping strategies break down that many of the overt symptoms of psychopathology become readily apparent to both the youth and the clinician (Muller, 2009). So, from this perspective YIS scoring high on attachment avoidance may be at that point in time successfully suppressing any emotional distress they may be feeling, and thus would score relatively low on self-report measures of psychopathological symptomatology. This may point to issues with the differential validity of self-report measures of psychopathology when used with those high in avoidant attachment versus those high in anxious attachment.

Differing Bivariate Relationships by Gender

Childhood Maltreatment and Attachment × Gender

The third exploratory question was whether the nature of the relationship between different variables (i.e., attachment anxiety, attachment avoidance, childhood trauma, and psychopathology) differs by gender; namely is there a gender × variable interaction. Although there was no gender × variable interaction with respect to the prediction of attachment anxiety by childhood maltreatment (see Figure 2), this remains an interesting finding as it is at odds with a prediction of LHT. According to LHT, childhood maltreatment (as a marker of the degree of adversity a child has experienced growing up) should predict increased levels of attachment anxiety in girls, but not in boys. In this sense it is interesting that both girl and boy YIS who reported higher levels of childhood maltreatment showed a comparable increase in attachment anxiety, demonstrating no gender difference in the relationship between childhood maltreatment and attachment anxiety where one might be expected. One possible explanation for this finding is that despite a desire not to show vulnerability (due to its association with femininity), boy YIS with higher rates of childhood maltreatment experience a breakdown of their avoidant defenses (aka deactivating strategies) resulting in a breakthrough of their latent attachment anxiety (Muller, 2010).

The finding that one's level of childhood maltreatment predicts attachment avoidance in girl YIS, but not boy YIS is also of interest. On the face of it this finding appears to be at odds with the prediction of LHT that higher childhood maltreatment scores should predict increased levels of attachment avoidance in boys. One possible explanation is that with respect to adversity, YIS as a population represent a restricted range. Even YIS who scored a 0 on the CT-CM likely experience a high baseline level of adversity compared to normative youth. It is possible that with a community sample of youth spanning the wider population, we would see the LHT predicted relationship between adversity and attachment avoidance in boys. However, it is also possible that boy YIS have a higher baseline level of

attachment avoidance due to a desire to emulate same gender stereotypes somewhat independent of level of childhood maltreatment, in line with GSST.

Of interest is the discrepancy in the relationship between attachment anxiety and attachment avoidance in girl and boy YIS. As expected, based on attachment theory, levels of attachment anxiety in boy YIS do not predict levels of attachment avoidance, lending support to the notion of attachment anxiety and avoidance as orthogonal constructs (Bartholomew & Horowitz, 1991). However, this is not the case in girl YIS where there is a strong inverse-U association between attachment anxiety and avoidance. It appears that girl YIS who have moderate levels of attachment anxiety are likely to be moderately high in attachment avoidance as well, whereas girl YIS who are low or high in attachment anxiety are less likely to have high levels of attachment avoidance. Interestingly then, in girl YIS, moderately high levels of attachment avoidance rarely occur in cases where there isn't also a moderate amount of attachment anxiety; a finding that does not apply to boy YIS. If valid, this curvilinear relationship between attachment anxiety and avoidance in girl YIS could have important implications for the gender-neutral approach to attachment theory, and the conceptual relationship of attachment anxiety to attachment avoidance. One potential explanation for this gender differentiated relationship is that boy YIS may feel more social pressure (based on gender stereotypes &/or masculine socialization) to maintain their avoidant defenses, even as their levels of attachment anxiety rise (Real, 1997). This perspective may explain both why levels of attachment avoidance in boy YIS are generally high to start, and why they do not appear to drop off with increased attachment anxiety as they do in girl YIS. One worrying implication of this finding is that boy YIS even when experiencing high levels of attachment anxiety may be less likely to seek help due to sustained levels of attachment avoidance. A possible explanation for the curvilinear relationship in girl YIS is that as attachment anxiety rises levels of attachment avoidance also rise as a self-defense mechanism on the streets (i.e., as a means not to show vulnerability). However, past a certain level of attachment anxiety avoidant defense mechanisms may

provide diminishing returns, and with less felt social pressure to maintain them are allowed to drop off. More work will need to be done to determine whether this relationship holds in other populations, and if so, why.

BSI-53 Symptom Dimensions and Attachment × Gender

Several gender × variable interactions were found with respect to the prediction of attachment by psychopathology symptom dimension (see Figures 4 to 5). Interestingly, levels of somatization were not predictive of attachment anxiety or attachment avoidance in boy YIS but were strongly predictive in girls. Specifically, for girl YIS, increased somatization was positively associated with attachment anxiety and negatively associated with attachment avoidance. Whether this reflects a true gender difference or a tendency for girls to feel more comfortable disclosing physical discomfort due to gender norms is unclear.

Obsessive-compulsive symptoms strongly predicted levels of attachment anxiety in both girl and boy YIS as would be expected since obsessive-compulsive disorder (OCD) is classified as a type of anxiety disorder. However, in boy YIS the relationship was consistent while in girl YIS the relationship was only present at higher levels of obsessive-compulsive symptomatology. This may reflect a range restriction on the part of girl YIS, given that there were very few data points for girls who were low on attachment anxiety. Alternatively, in girl YIS, given their already high baseline levels of attachment anxiety, perhaps only more severe levels of obsessive-compulsive symptomatology were sufficient to add predictive power. Further research with a larger sample size would be needed to confirm whether there is a true gender difference in this relationship and to assess its practical significance if any.

It was interesting that increased hostility[27] was strongly predictive of increased attachment anxiety in boy YIS, but not at all predictive for girl YIS. This may be related to the higher baseline levels of attachment anxiety in girl YIS, which could result in hostility providing less predictive power for level of attachment anxiety in girl as compared to boy YIS (who have a wider range of attachment anxiety scores). Alternatively, higher levels of attachment anxiety in boy YIS may suggest that their avoidant defenses are not working to suppress their emotions as much, leading to a comparable increase in self-reports of anger. It may also be the case that because childhood maltreatment is positively correlated with attachment anxiety, boy YIS high in attachment anxiety just have more in their past to feel angry about.

It was interesting that increased hostility was strongly predictive of attachment avoidance in girl YIS in an inverse-U manner, but not at all predictive in boy YIS. Girl YIS high in avoidance tend to be significantly higher in attachment anxiety than boy YIS, which may counter-act the avoidant tendency to under-report emotions. This may be related to the non-orthogonal relationship between attachment anxiety and avoidance in girl YIS. Alternatively, higher levels of attachment avoidance may be non-conducive to the accurate self-reporting of negative affect, so in girl YIS a point is reached where mid to high self-reports of hostility are predictive of decreasing levels of attachment avoidance. These findings may also be related to gender differences in the socialization of anger. According to Evers et al. (2011) gender differences are relevant to the expression of anger, but only in interaction with the social context. This distinction is important given the commonly held belief that women have difficulty feeling

[27] Derogatis (1993) defines the hostility dimension in terms of "thoughts, feelings, or actions that are characteristic of the negative affect state of anger" (p.8). This is important to note as the hostility dimension combines items that address feelings of anger with items that address the expression of anger. Thus, internal feeling and outward expression, which should be seen as distinct are nevertheless conflated. Another concern is that retrospective reports on emotions are vulnerable to the effect of gender stereotypes (Evers et al., 2011). This reduces the utility of this symptom dimension vis a vis understanding any true gender differences in hostility.

and expressing anger, while in men anger is the one emotion that they *are* comfortable feeling and expressing (Sharkin, 1993). According to Sharkin (1993) this belief lacks clear empirical support and may say more about commonly held gender stereotypes around anger, than it does about true gender differences in how anger is felt and expressed. For example, Evers et al. (2011) in a review of the literature on gender and anger found no consistent evidence for men and women differing in their experience of, or physiological response to, anger. However, Evers et al. (2011) did find evidence to suggest that men generally engage in more direct expressions of anger (e.g., physical or verbal aggression), while women generally engage in more indirect expressions of anger (e.g., gossiping, ignoring, stonewalling); but this is not the case in all social contexts (e.g., heterosexual couples in egalitarian relationships). Being a YIS is a very specific and demanding social context to be in, and here we see that girl and boy YIS do not differ on their hostility scores. The gender difference we see is with respect to how those hostility scores relate to levels of attachment anxiety and avoidance.

Although the nature of the relationship between childhood maltreatment and psychopathology, attachment anxiety and psychopathology, and paranoid ideation and childhood maltreatment did not differ between genders, these relationships were found to be significantly curvilinear for both girl and boy YIS. What this suggests is that the consequences of childhood maltreatment, attachment insecurity, and psychopathology are compounding such that higher levels of each result in increasingly severe outcomes, in both girl and boy YIS.

Potential Implications for Gender Differentiated Theories of Attachment

Although LHT and GSST may provide partial explanations for some of the findings, neither seems sufficient alone or in combination to fully account for the results. Given the overly reductionist nature of both LHT and GSST, what we need is another perspective that can integrate the sound elements of each theory and account for the varied relationships amongst the key variables. Incorporating gender-based

differences into a psychodynamic model may provide a framework to understand how the differing motives of girl and boy YIS influence how their attachment insecurity is manifested. In particular, the psychoanalytic concept of compromise formation can be viewed as the mechanism by which girl and boy YIS resolve intrapsychic conflicts and competing drives in determining, largely unconsciously, whether proximity-seeking is a viable option. The youth's motivation for proximity is weighed against their fear of feeling and/or being perceived to be vulnerable. It is hypothesized that gender differentiated sociocultural norms (e.g., traditional notions of masculinity and femininity), evolutionary trade-offs (e.g., mating effort versus parenting effort), and other yet to be elucidated gender-differentiated variables inform the relative weighting of competing motivations during the process of compromise formation. Gender differentiated consequences of perceived or actual threats, particularly under adverse conditions like youth homelessness, are also expected to heavily inform this process given the well-established gender-based nature of sexual violence (Statistics Canada, 2019). The outcome of the adaptive resolution of the conflict between desire for proximity and fear of vulnerability informs whether youth engage in hyperactivating or deactivating strategies in the face of an actual or perceived threat. A proposed modification to the 'Model of Attachment-system Activation and Functioning in Adulthood' (Shaver & Mikulincer, 2002) that incorporates gender/sex differentiated compromise formations is presented in Figure 7. The modification is a minor one but makes gender differentiated compromise formation explicit, thereby elucidating how all else being equal a YIS may utilize a different attachment strategy to manage their distress based on where on the gender identity continuum they fall.

If validated in future research the proposed modifications incorporating the psychoanalytic concept of compromise formation in a gender differentiated manner to the 'Model of Attachment-system Activation and Functioning in Adulthood' (Shaver & Mikulincer, 2002) may offer considerable utility in understanding and supporting YIS by informing social policy and clinical intervention.

Implications for Understanding and Supporting YIS

A psychodynamic understanding of how distress drives the attachment behaviors of YIS makes it easier to be compassionate towards them, even when their hyperactivating or deactivating strategies may make them harder to support. This understanding is particularly important when dealing with YIS who tend to be high in avoidance, as their behaviors are often mistakenly seen as a sign that they are coping well compared to YIS higher in anxiety. YIS high in avoidance are often difficult to engage as they tend to minimize and deny their trauma (Muller, 2010). Understanding that girl and boy YIS differ in how they express avoidance is important for outreach organizations and clinicians to know. When things are especially bad for girl YIS (i.e., their distress is high) they tend to drop their avoidant defenses somewhat and so may be more likely to self-identify as needing support. Boy YIS on the other hand tend to keep their avoidant defenses up even when things are especially bad, so are less likely to seek out the support they need. The implication for outreach organizations is that they will often have to work harder to engage boy YIS who would benefit from their services. It is also helpful for outreach organizations and mental health professionals to know that an over-reliance on self-report measures of distress may not provide a good indication of the 'true' level of distress a YIS high in attachment avoidance is experiencing due to their tendency to minimize distress (Real, 1997).

It is important to recognize that attachment anxiety rises in boy YIS as a function of increased childhood maltreatment in the same way it does for girl YIS, even though girl YIS experience higher levels of childhood maltreatment overall. This difference likely relates to the much higher incidence of sexual abuse experienced by girls as compared to boys (Statistics Canada, 2015; Turner et al., 2019). It may be helpful for mental health professionals to know that the best predictor of symptoms of psychopathology in both girl and boy YIS is a combination of their reported childhood maltreatment and attachment anxiety. The high levels of childhood maltreatment in both girl and boy YIS point to the need for a greater emphasis on supporting at-risk families, as well as the need for reforms to the child welfare

system. Increased reports of childhood maltreatment predict both increased attachment anxiety and increased psychopathology in YIS; and these effects appear to compound each other as time goes on. By investing more resources to the upstream problem of childhood maltreatment and its antecedents, many youths could be saved from the crippling distress and compromised mental health that results when society ignores these problems. However, resources alone will not be enough as engaging the parents of these youth can be very difficult. Often due to their own history of abuse and psychopathologies they may not recognise that there is a problem in need of fixing. Engaging with these families when help is unwanted due to denial or distrust will remain an ongoing challenge.

The high incidence of fearful-avoidant attachment in girl and boy YIS highlights how these youth have been placed in situations where neither hyperactivating nor deactivating attachment strategies were able to alleviate their distress. As Van Der Kolk (2014) aptly puts it, these youth are experiencing 'fright without solution'. This echoes work of Kidd (2004) who found that the dominant feeling amongst YIS is that of feeling trapped, hopeless, worthless, and alone. It is important for society to acknowledge that these youth matter, and for public policy to provide these youth a path forward. While acknowledging that most of these youths have not been completely abandoned by Canadian society as programs and supports do exist, there is also room for improvement. For example, specialized treatment programs with qualified providers should be embedded in community non-profits supporting YIS. Such a policy would promote changes to support the healing and development of those youth.

Limitations, Strengths, and Future Directions

Although the current study offers new insights into the association between gender, attachment orientation, childhood maltreatment, and psychopathology in YIS, there are several limitations. First, the current study used a cross-sectional design in which inferences about the direction of observed relationship and causality are unknown. Second, the sample is relatively small providing enough power

to detect medium to large effects, but not small effects. Third, the participants consisted of two convenience samples collected via recruitment from a single community non-profit organization at two different time points, the summer of 2012, and the fall of 2013. Thus, selection threats to the internal validity of the research design, such as volunteer bias cannot be wholly ruled out. It is possible that YIS who did not avail themselves of this community non-profits' programs and/or who did not volunteer to participate in the study differ in some important ways from those who did. It is also possible that the first and second samples may not be equally representative of the population of interest. However, the two samples did not differ significantly in their sociodemographic characteristics, or on their scores on the variables of interest, suggesting that this is not a concern. Fourth, gender was measured in a categorical manner, forcing participants to choose between one of several options, rather than providing a continuous measure of gender identity, gender role adoption, and contextually contingent measures of gendered behavior. This made it impossible to properly test GSST in this population of YIS. Fifth, the large number of tests conducted could increase the likelihood of a type I error; however, the familywise error rate of the multiple independent samples t tests was controlled for, and the running-interval smooths were exploratory. Regardless, any significant and/or unexpected results as well as proposed modifications to theory will need to be followed up and tested in future research.

Regarding precision of measurement, all scales used have shown high internal consistency, and other than the CT-CM which has only been used in this study, good test-retest reliability. The CT-CM showed good relational validity with the CTQ-SF and demonstrates reasonable content validity. However, one limitation is that there was some loss of sensitivity when converting the CTQ-SF scores from the first sample from a 5-pt scale to a binary scale. Also, as Ito et al. (1998) has observed, lumping different forms of childhood maltreatment together may be misleading because boys and girls may be differentially affected by different forms of childhood maltreatment which may influence gender differences in insecure attachment. In the present sample three times as many girl YIS (43.9%) reported

experiencing sexual abuse as compared to boy YIS (16.4%). Different forms of abuse were given equal weight in the CT-CM, but an argument could be made for differential weighting. More research would be needed to identify what an optimal weighting scheme might look like.

The ECR-R, CTQ-SQ, and BSI-53 all have a solid track record of construct validity. Despite this, the current study points to potential issues with the structural and differential validity of the ECR-R. Specifically, the finding of a strong U-shaped relationship between attachment anxiety and avoidance in girl YIS suggests that attachment may not be orthogonal in girl YIS. This suggests that caution is warranted when generalizing results from the ECR-R across genders, at least in YIS. More research is needed to assess the nature and scope of how the constructs of attachment anxiety and attachment avoidance take different forms in girl and boy YIS, and whether this generalizes to normative youth.

Regarding the overall generalizability of the findings to other YIS, caution should be taken given some of the sociodemographic differences (e.g., low percentage of visible minorities) between the YIS in this sample and YIS throughout the rest of Canada, and globally. Research employing similar methodologies will be needed to determine to what degree these findings may generalize to other populations of YIS. As a final caution, as Zuur et al. (2010) reminds us, exploratory research "can provide guidance for future work, but the results should be viewed very cautiously and inferences about the broader population avoided" (p. 4). Limitations notwithstanding, the present study utilized modern methods for estimation and hypothesis testing that are robust to assumption violations and can detect and characterize the nature of curvilinear relationship; something that is frequently overlooked in this kind of research. As a result of utilizing these novel methods, several interesting and unexpected relationships have been identified which could have theoretical and practical significance if confirmed in future research. Future research should look to apply these robust statistical methods to larger and more diverse samples of YIS. Further validation of gender differences with respect to attachment orientation, childhood maltreatment, and psychopathology should prompt a reassessment of the

differential and structural validity of many of the scales used in this kind of research. Future research on YIS should attempt to engage YIS who would not normally volunteer to minimize volunteer bias as a selection threat to the internal validity of future research. It is also imperative that future research on YIS include measures that assess gender in a non-categorical and non-binary manner, to ensure that the full range of gender expression is captured. This would counter the limitation of only being able to interpret results by gender in a categorical and/or binary manner, providing a more nuanced interpretation of gender's relationship to other variables of interest in YIS. There is also a need to determine to what degree gender stereotyped behavior falls in line with self-reported gender in YIS. Making such efforts in future attachment research on YIS will help to fill the gender-gap in what is otherwise a very well established and respected theory of human relational behavior.

Conclusion

The current study provides an important step in addressing the gender gap in attachment theory and exploring the associations between gender, attachment orientation, childhood maltreatment, and psychopathology in the YIS population. Girl and boy YIS differ in important ways in how they utilize secondary attachment strategies to manage distress. They also differ in the manner and degree to which they suffer childhood maltreatment and experience symptoms of psychopathology. Understanding how and why they differ can offer valuable insights to researchers, clinicians, and outreach organizations. To build upon and verify the exploratory findings from this study researchers are encouraged to utilize non-linear robust statistical methods with larger and more diverse samples of YIS. Civil society must remain accountable to these youth and recognize its responsibility to support at-risk families to reduce the number of youths who must make the difficult choice between life at home and life on the street. Ensuring that community non-profits servicing YIS have qualified mental health treatment providers onsite would go a long way to supporting youth who do find themselves in these difficult circumstances.

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Table 1

Sociodemographic Characteristics of Participants

Variable	Boy YIS		Girl YIS		Total	
	n	%	*n*	%	*N*	%
Gender	67	62.0	41	38.0	108	100
Visible minority	3	4.5	2	4.9	5	4.6
Sexual orientation						
Heterosexual	58	86.6	24	58.5	82	75.9
Bisexual	4	6.0	11	26.8	15	13.9
Gay or Lesbian	3	4.5	3	7.3	6	5.6
Other	2	3.0	3	7.3	5	4.6
Education [a]						
Diagnosed Learning Disability	19	17.8	9	8.4	28	26.2
Currently attending school	11	16.4	11	26.8	22	20.4
Dropped out at least once	46	68.7	28	68.3	74	69.2
Finished High School	19	28.4	6	14.6	25	23.1
Family context [a]						
Disrupted connection	40	59.7	25	61.0	65	60.2
Early family breakup	33	49.3	23	56.1	56	51.9
Single parent family	30	44.8	12	29.3	42	38.9
Chaotic home environment	36	53.7	31	75.6	67	62.0
Witnessing violence in the familial home	37	55.2	25	61.0	62	57.4
History of one or both parents offending	29	43.3	14	34.1	43	39.8
One+ parents engaged in substance abuse	35	52.2	22	53.7	57	52.8
Previous involvement with CYFS	35	52.2	16	39.0	51	47.7
Housing history [a]						
Inconsistent family housing	22	32.8	20	48.8	42	38.9
Staffed home placement	21	31.3	8	19.5	29	26.9
Foster care placement	24	35.8	14	34.1	38	35.2
Group home placement	24	35.8	12	29.3	36	33.3
Emergency shelter	49	73.1	19	46.3	68	63.6
Criminal justice system involvement [a]						
Any involvement past or present	45	41.7	15	13.9	60	55.6
Previous incarceration	32	47.8	8	19.5	40	37.0
Previous parole/probation	40	59.7	11	26.8	51	47.2
Current parole/probation	13	19.4	4	9.8	17	15.7
Current involvement with police	23	34.3	10	24.4	33	30.6
Trauma or abuse history [a]						
Trauma	30	44.8	29	70.7	59	54.6
Any abuse	41	61.2	35	85.4	76	70.4
Physical abuse	30	44.8	26	63.4	56	51.9
Emotional abuse	34	50.7	33	80.5	67	62.0
Sexual abuse	11	16.4	18	43.9	29	26.9
Have ever used non-prescription drugs	43	64.2	25	61.0	68	63.0
Formal diagnosis of one+ mental health disorders	52	77.6	31	75.6	83	76.9
Currently employed	23	34.3	12	29.3	35	32.4
Has some source of income	51	76.1	31	75.6	82	80.4
Involved with street culture [b]	38	56.7	24	58.5	62	57.4

Note. N = 108. CYFS = Child and Youth Family Services.

[a] Multiple answers under this heading permitted for each participant. [b] Defined as having 'family' ties on the street, understanding the homeless community, and/or engaging in the 'economy' of the street.

Table 2

Trimmed Means & Standard Errors for Primary Study Variables & BSI-53 Symptom Dimensions by Gender

	Boy YIS (n = 67)		Girl YIS (n = 41)	
Variable	M_t	*SE*	M_t	*SE*
ECR-R Anxiety total	3.72	0.21	4.70	0.21
ECR-R Avoidance total	3.86	0.18	4.15	0.25
CT-CM Trauma total	4.49	0.39	6.44	0.52
BSI-53 GSI total	1.13	0.13	1.52	0.21
BSI-53 Symptom Dimensions				
i. Somatization	1.08	0.15	1.39	0.23
ii. Obsessive-Compulsive	1.56	0.15	1.63	0.22
iii. Interpersonal Sensitivity	0.90	0.15	1.70	0.23
iv. Depression	0.97	0.14	1.77	0.23
v. Anxiety	1.07	0.15	1.48	0.28
vi. Hostility	1.24	0.18	1.25	0.16
vii. Phobic Anxiety	0.59	0.12	1.30	0.25
viii. Paranoid Ideation	1.40	0.16	1.54	0.23
ix. Psychoticism	0.77	0.15	1.10	0.22

Note. The trimmed mean (M_t) is a robust measure of location using a 20% trim. ECR-R = Experiences in Close Relationships Scale – Revised; CT-CM = Childhood Trauma – Composite Measure; BSI-53 = Brief Symptom Inventory; GSI = Global Severity Index.

Table 3

Percentage Bend Correlations for Primary Study Variables & BSI-53 Symptom Dimensions

Variable	1	2	3	4
1. Gender [a]	—			
2. ECR-R Anxiety total	.29**	—		
3. ECR-R Avoidance total	.09	.20*	—	
4. CT-CM Trauma total	.29**	.58***	.21*	—
5. BSI-53 GSI total	.18†	.61***	.12	.48***
BSI-53 Symptom Dimensions				
i. Somatization	.12	.31***	−.05	.34***
ii. Obsessive-Compulsive	.05	.47***	.14	.45***
iii. Interpersonal Sensitivity	.29**	.71***	.12	.50***
iv. Depression	.30**	.62***	.16	.46***
v. Anxiety	.13	.54***	.08	.42***
vi. Hostility	.02	.35***	.08	.31**
vii. Phobic Anxiety	.26**	.56***	−.01	.37***
viii. Paranoid Ideation	.05	.55***	.13	.34***
ix. Psychoticism	.14	.60***	.15	.40***

Note. The percentage bend correlation (ρ_{pb}) is a robust measure of the linear association between two random variables (Mair & Wilcox, 2020). ECR-R = Experiences in Close Relationships Scale – Revised; CT-CM = Childhood Trauma – Composite Measure; BSI-53 = Brief Symptom Inventory; GSI = Global Severity Index.

[a] Boy = 1, girl = 2.
†p = .06. *p < .05. **p < .01. ***p < .001.

Table 4

Trimmed Mean Comparison of Gender[a] on Primary Study Variables & BSI-53 Symptom Dimensions

	MANOVA[b]		Independent Samples t Test[c]			
Variable	T_f	*df*	*t*	*df*	ξ [d]	ξ 95% CI
1. Primary Study Variables	3.24*	4, ~103				
ECR-R Anxiety total			3.37**	59.54	0.45	[0.23, 0.64]
ECR-R Avoidance total			1.00	46.78	0.15	[0.00, 0.38]
CT-CM Trauma total			3.04*	48.80	0.45	[0.21, 0.65]
BSI-53 GSI total			1.62	41.02	0.25	[0.00, 0.48]
2. BSI-53 Symptom Dimensions	3.87**	9, ~98				
Somatization			1.12	42.52	0.16	[0.00, 0.41]
Obsessive-Compulsive			0.29	45.14	0.06	[0.00, 0.31]
Interpersonal Sensitivity			2.98*	43.72	0.42	[0.20, 0.61]
Depression			2.97*	40.87	0.44	[0.20, 0.64]
Anxiety			1.28	37.15	0.20	[0.00, 0.44]
Hostility			0.05	62.51	0.06	[0.00, 0.28]
Phobic Anxiety			2.65†	34.72	0.38	[0.13, 0.58]
Paranoid Ideation			0.52	46.68	0.09	[0.00, 0.31]
Psychoticism			1.27	44.72	0.19	[0.00, 0.43]

Note. CI = confidence interval. Hochberg's (1988) sequential method was used to control the familywise error rate of the first ($\alpha_k \leq .05$, $k = 1, \ldots, 4$) and second ($\alpha_k \leq .05$, $k = 1, \ldots, 9$) family of comparisons. ECR-R = Experiences in Close Relationships Scale – Revised; CT-CM = Childhood Trauma – Composite Measure; BSI-53 = Brief Symptom Inventory; GSI = Global Severity Index.

[a] Boy = 1, girl = 2.

[b] Calculated with Yanagihara and Yuan's (2005) method using the 20% trimmed mean. The test statistic (T_f) approximates an F distribution with *k* and $\hat{v}$ degrees of freedom (k, $\hat{v}$).

[c] Calculated with Yuen's (1974) robust method and 20% trim (no trim would equate to a Welch's t test).

[d] The explanatory measure of effect size (ξ), pronounced 'ksi', is calculated using the 20% trimmed mean and 20% Winsorized variance. Small, medium, & large effects correspond to ξ = 0.15, 0.35, and 0.50, respectively.

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

Table 5

Ranking of Predictors of Psychopathology by Gender

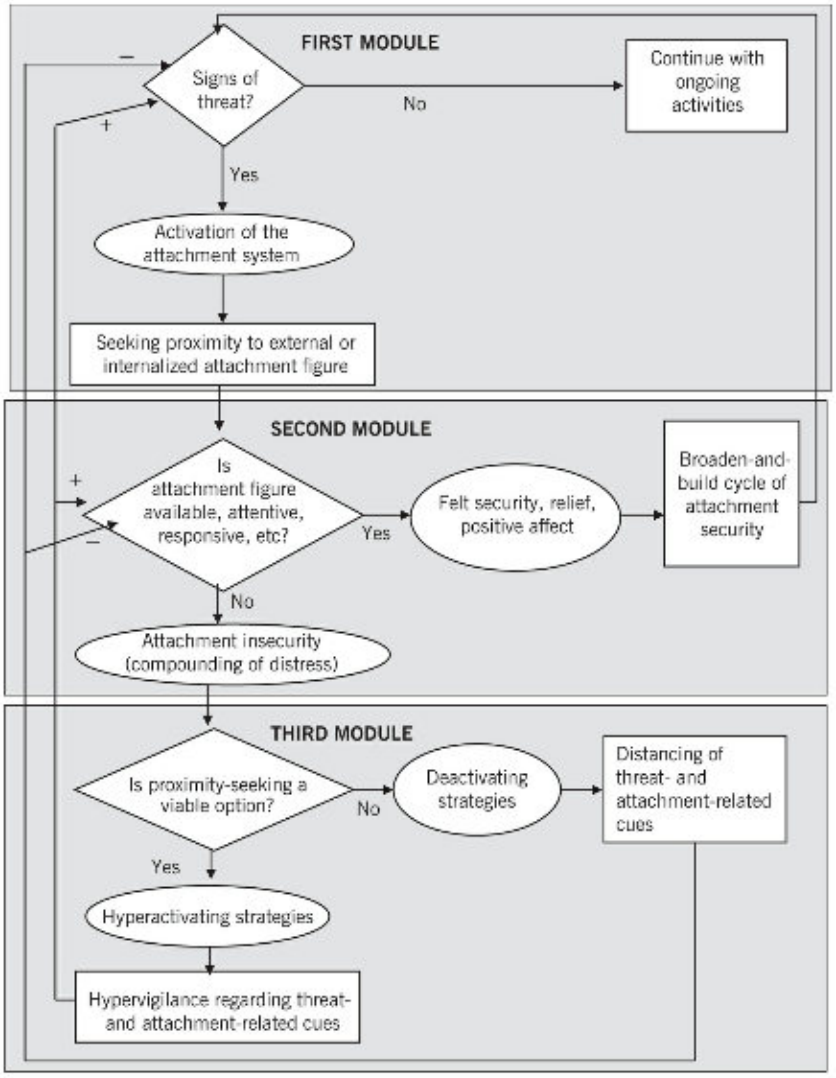
Predictor(s)	Boy YIS ($n = 67$)		Girl YIS ($n = 41$)	
	Rank	Prediction Error (ϵ_P)[a]	Rank	Prediction Error (ϵ_P)[a]
1. Attachment Anxiety	2	.561	2	.767
2. Attachment Avoidance	7	.699	8	.908
3. Childhood Maltreatment (CM)	5	.604	5	.831
12. Attachment Anxiety & Avoidance	4	.568	3	.789
13. Attachment Anxiety & CM	1	.545	1	.762
23. Attachment Avoidance & CM	6	.615	6	.851
123. Anxiety, Avoidance, & CM	3	.562	4	.797
0. No Predictor	8	.716	7	.856

Note. The 0.632 bootstrap method (Efron & Tibshirani, 1994; Shao, 1996; Wilcox, 2017) was used to calculate prediction error and rank which predictor variables or combination of predictors is best in predicting psychopathology (i.e., BSI-53 GSI total). It is a robust alternative to approaches such as stepwise regression, R^2 approaches, and the *F* statistic.

[a] Defined as the discrepancy between the predicted value and actual value of y. The reported prediction error is calculated using the 0.632 bootstrap method. Lower values indicate less prediction error. Female YIS have higher prediction error than male YIS in every case due to a smaller sample size.

Figure 1

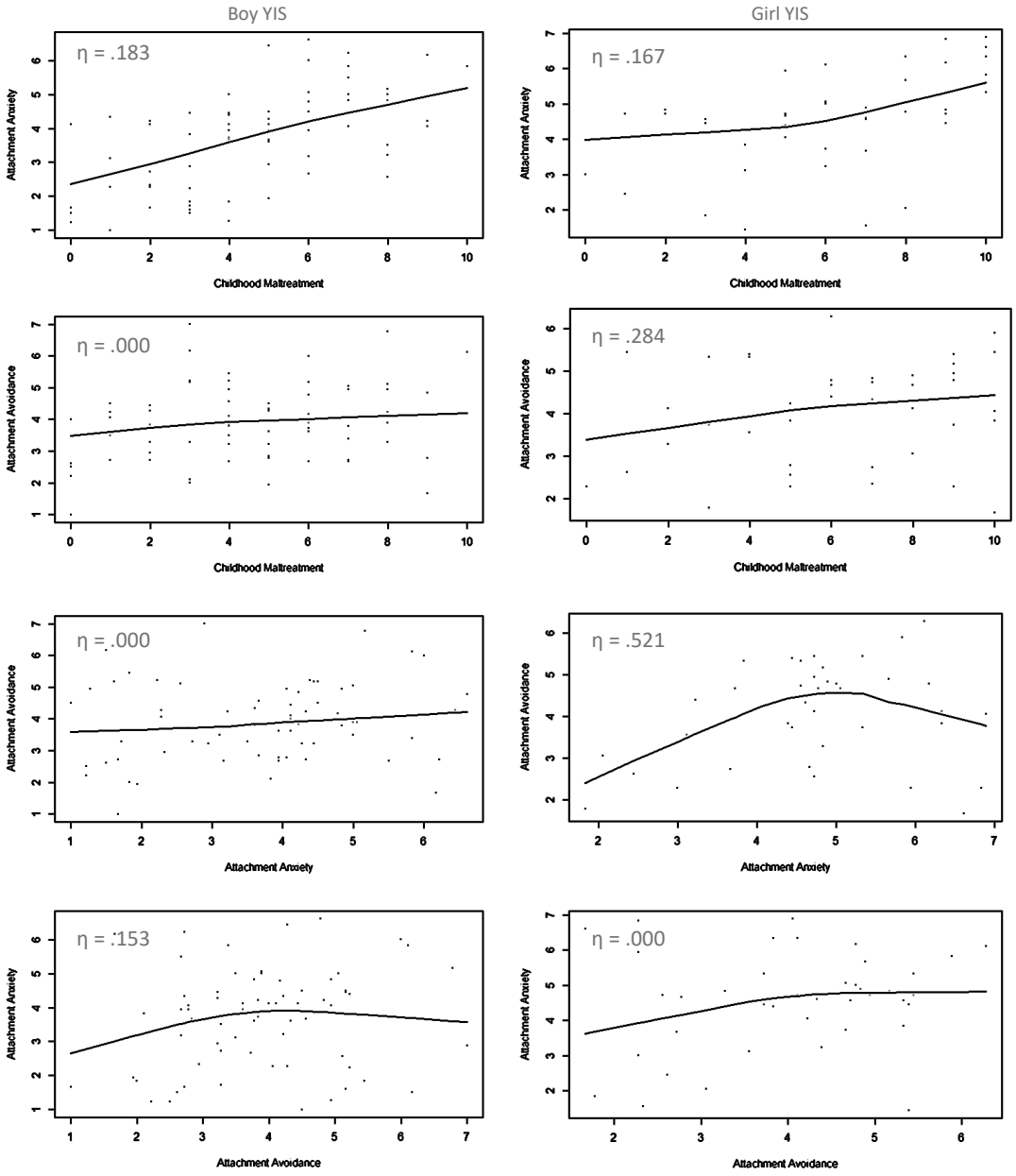
Model of Attachment-system Activation and Functioning in Adulthood



Note. Attachment system is activated when an actual or potential threat is perceived. The attachment strategy employed is contingent upon how responsive a given attachment figure is. If the attachment figure is available and responsive, a sense of security in one's attachment is reinforced. If the attachment figure is not responsive but proximity seeking is still possible a hyperactivating strategy may be employed, otherwise a deactivating strategy will be employed. The attachment strategy employed feeds back into how threat and attachment related cues are processed moving forward. From "Attachment-related psychodynamics" by P.R. Shaver, and M. Mikulincer, 2002, *Attachment & Human Development*, 4(2), p. 152 (https://doi.org/10.1080/14616730210154171). Copyright 2002 by Taylor & Francis Ltd.

Figure 2

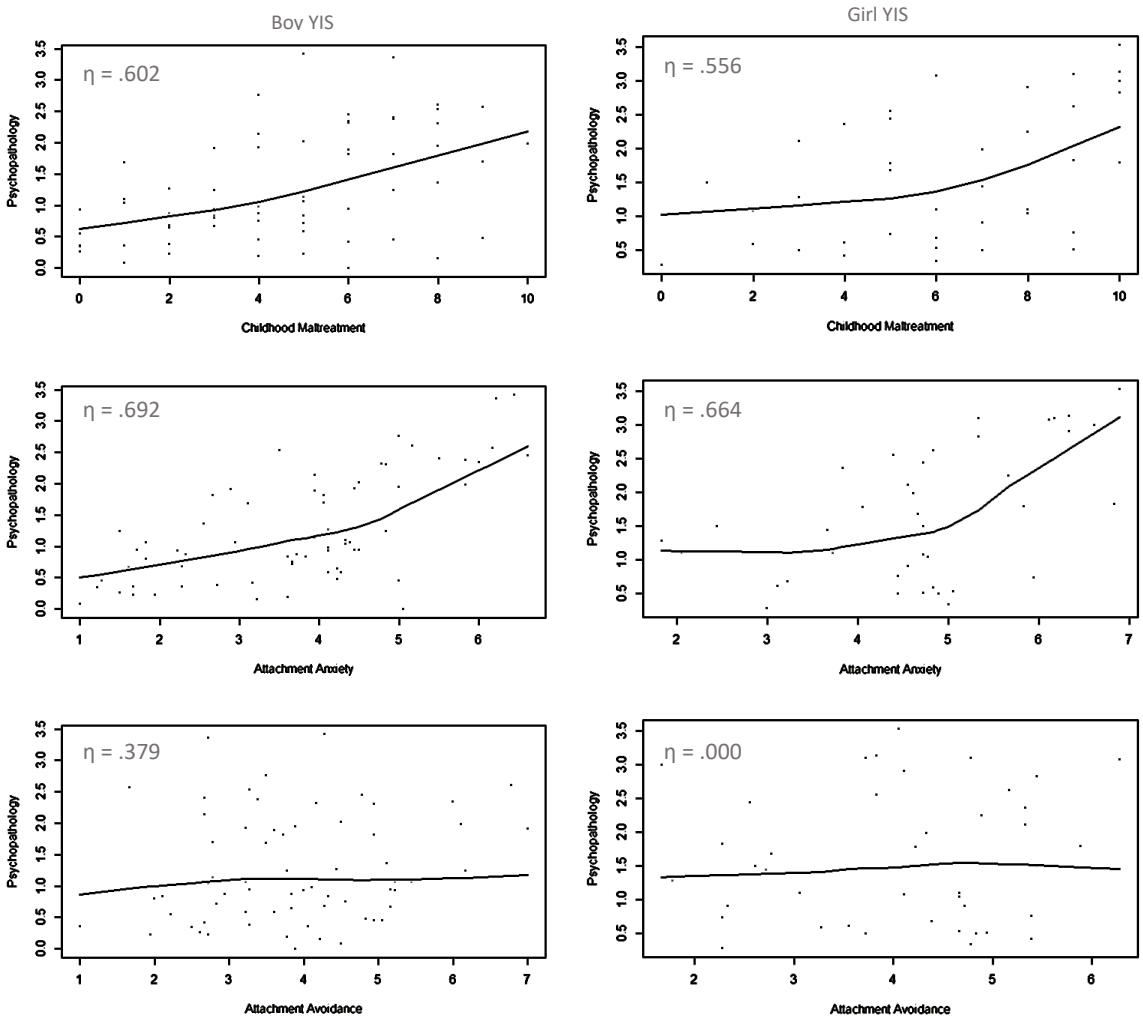
Running-Interval Smooths of Childhood Maltreatment and Attachment by Gender



Note. Plots for boy YIS are on the left and plots for girl YIS are on the right. The running interval smooth is a non-parametric regression method developed by Wilcox (1995). The explanatory strength of association η is the positive square root of explanatory power η^2. Explanatory power $\eta^2 = \frac{\sigma^2(\hat{y})}{\sigma^2(y)}$ is the usual variance of the predicted values divided by the variance of the observed values. A robust generalization $\eta^2 = \frac{\hat{\tau}^2(\hat{y})}{\hat{\tau}^2(y)}$ is used where the usual variance σ^2 is replaced by the percentage bend midvariance τ^2, and y is estimated using a running-interval smooth.

Figure 3

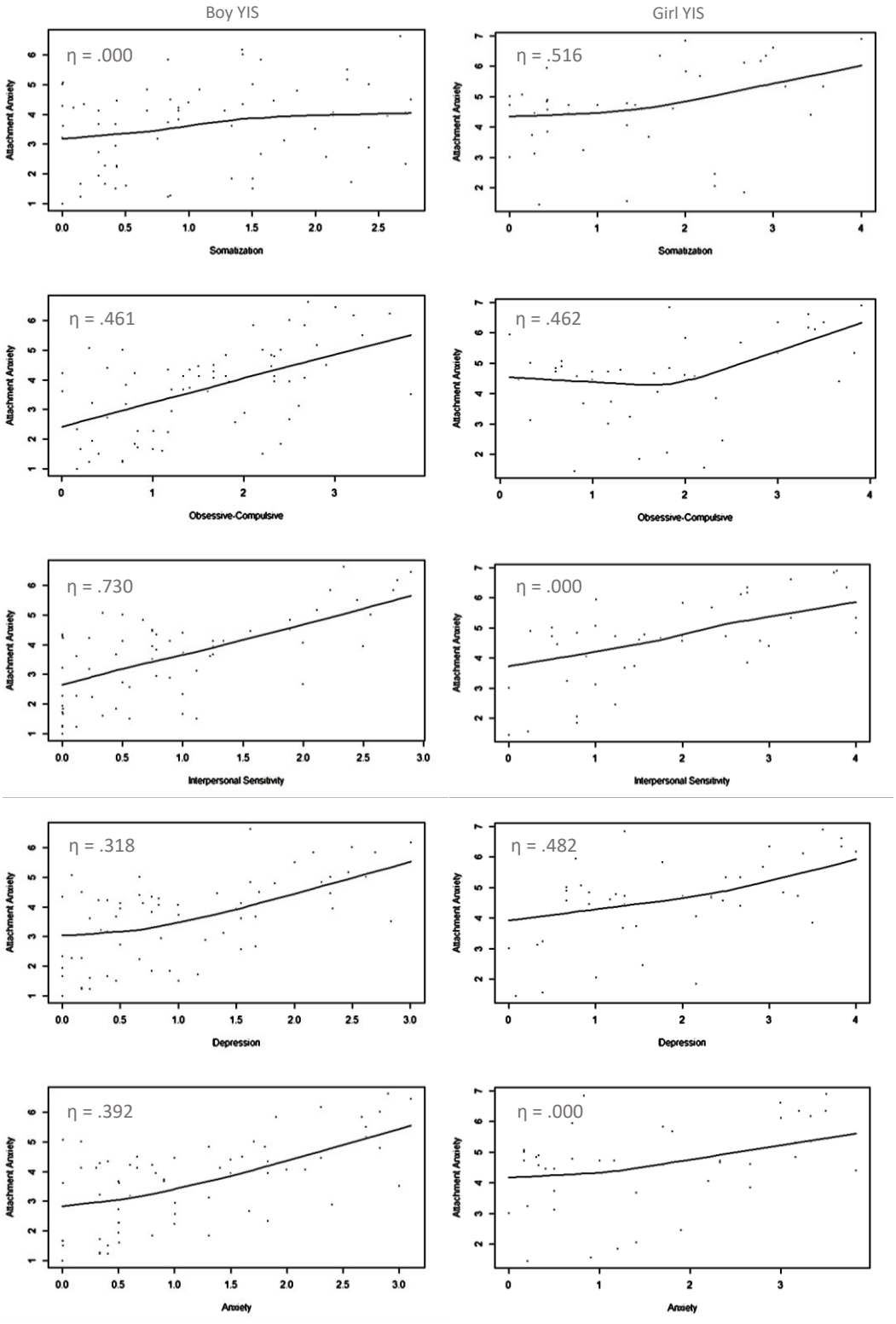
Running-Interval Smooths of Childhood Maltreatment, Attachment, and Psychopathology by Gender

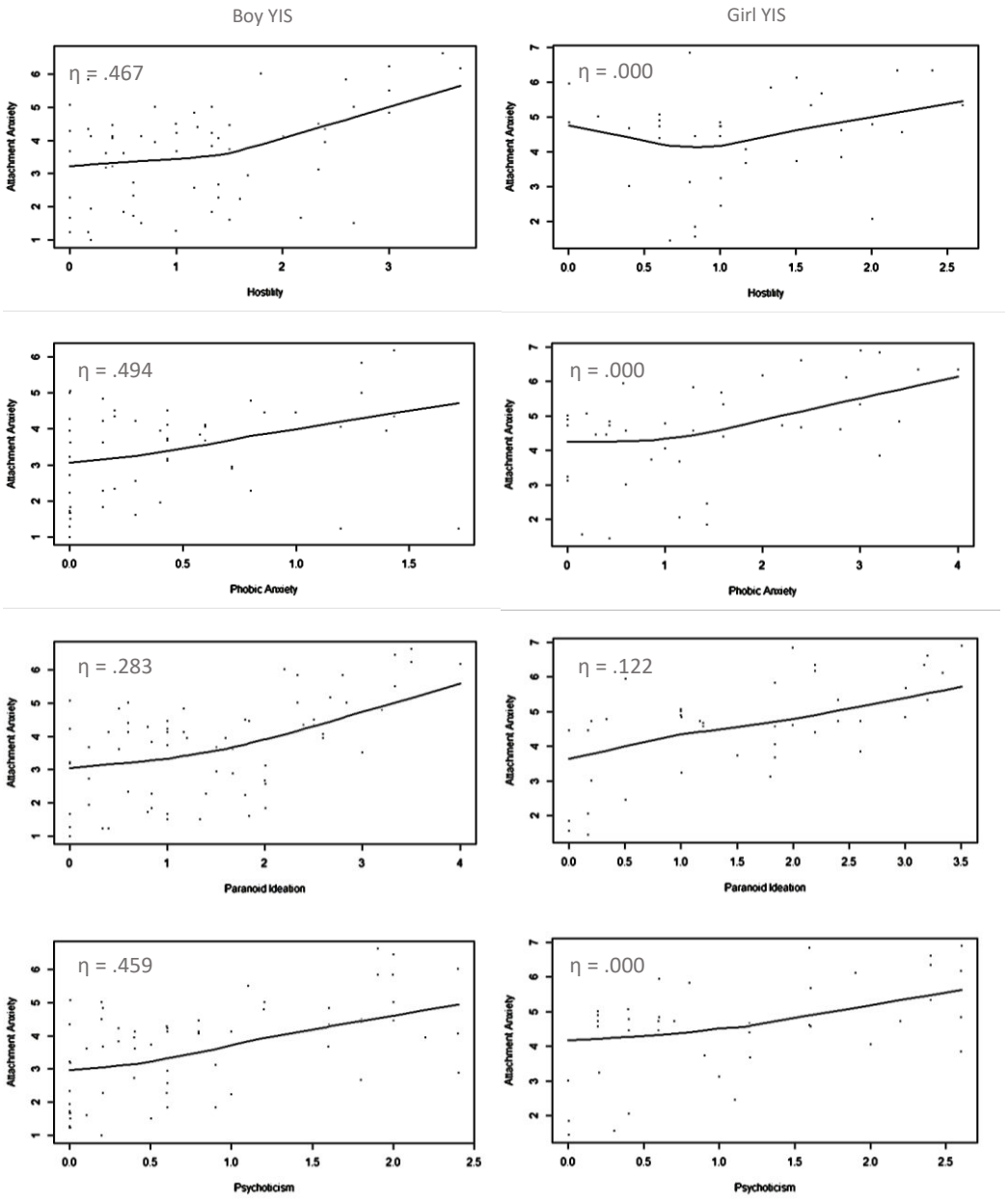


Note. Plots for boy YIS are on the left and plots for girl YIS are on the right. The running interval smooth is a non-parametric regression method developed by Wilcox (1995). The explanatory strength of association η is the positive square root of explanatory power η^2. Explanatory power $\eta^2 = \frac{\sigma^2(\hat{y})}{\sigma^2(y)}$ is the usual variance of the predicted values divided by the variance of the observed values. A robust generalization $\eta^2 = \frac{\hat{\tau}^2(\hat{y})}{\hat{\tau}^2(y)}$ is used where the usual variance σ^2 is replaced by the percentage bend midvariance τ^2, and y is estimated using a running-interval smooth.

Figure 4

Running-Interval Smooths of BSI-53 Symptom Dimensions and Attachment Anxiety by Gender

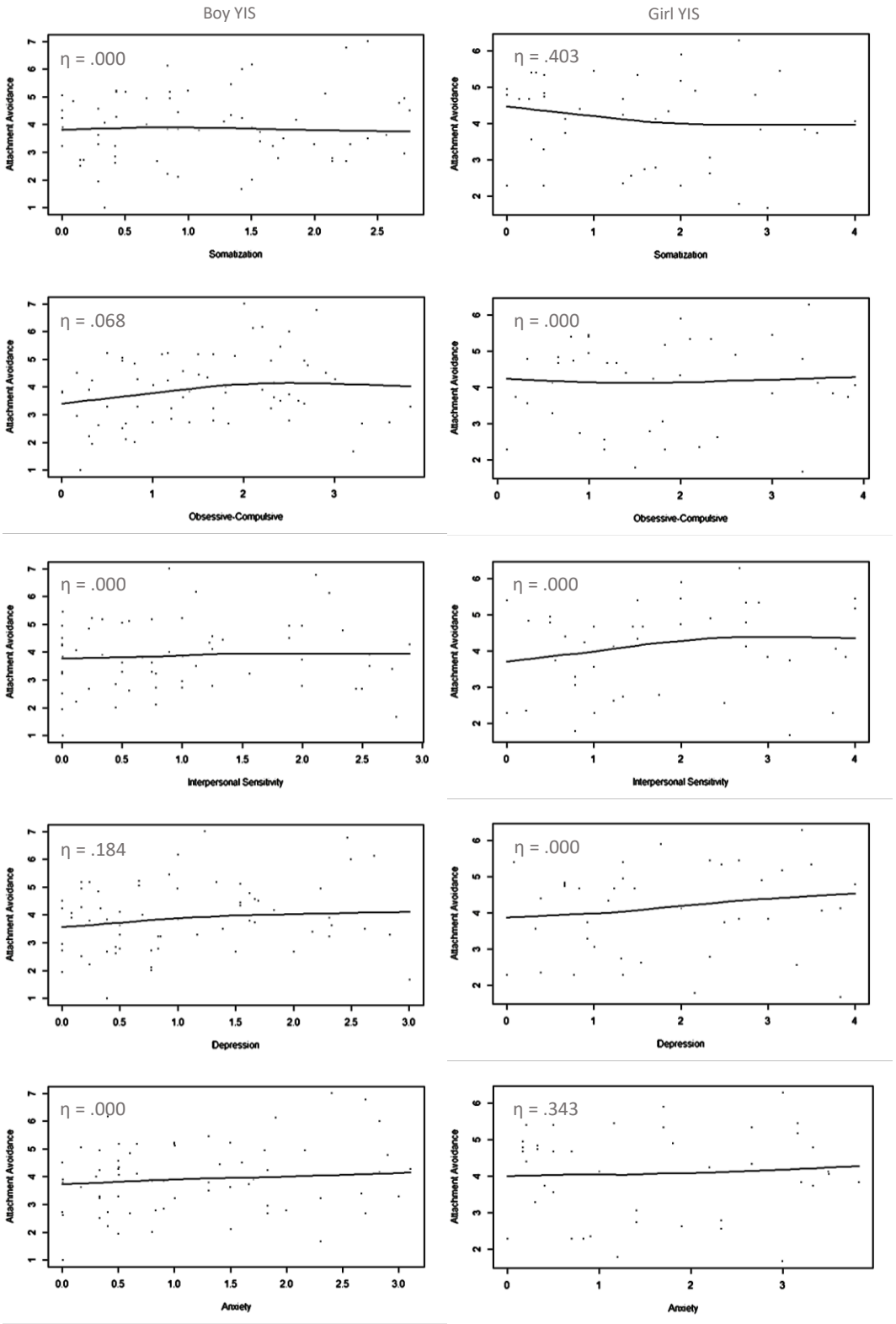


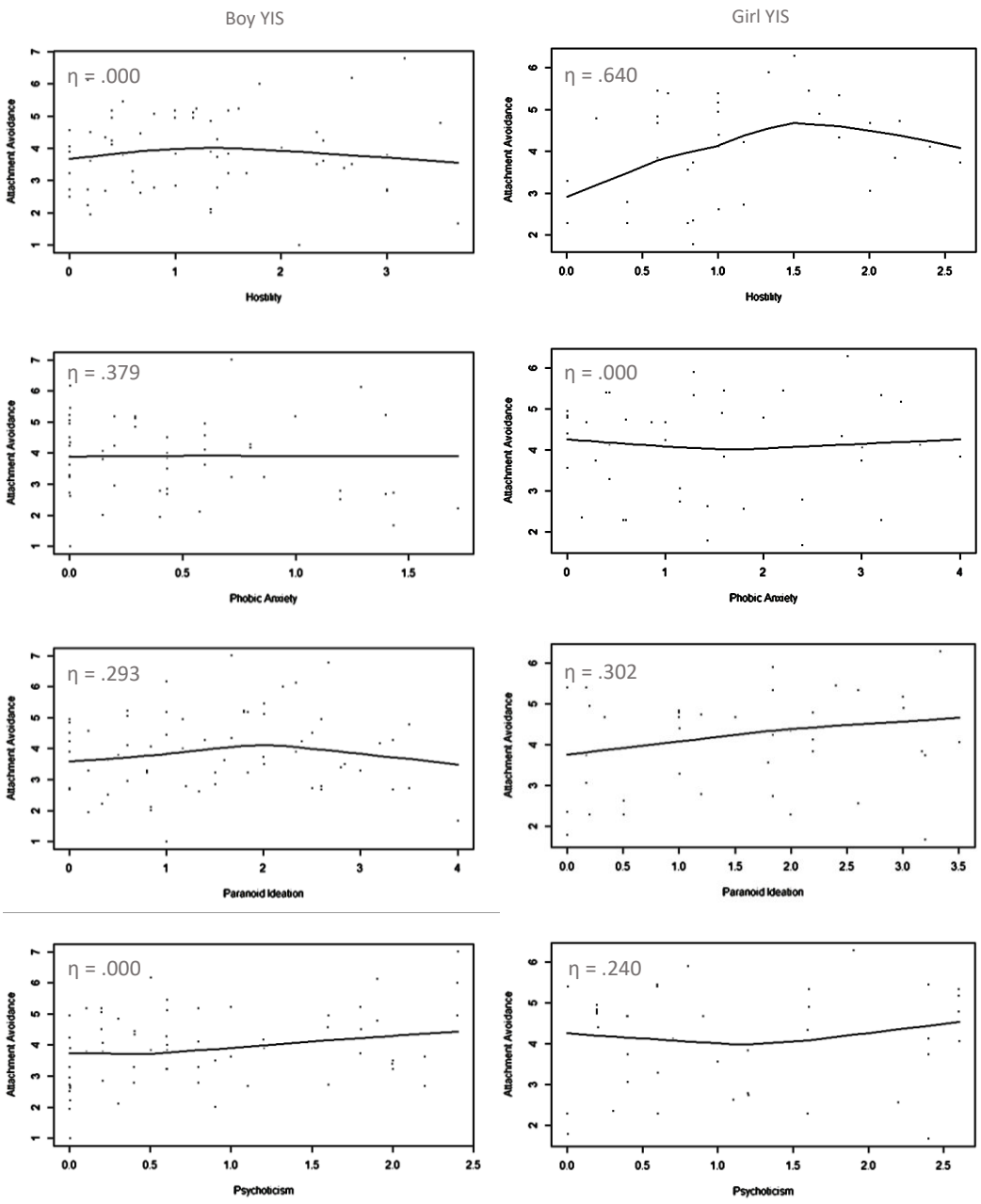


Note. Plots for boy YIS are on the left and plots for girl YIS are on the right. The running interval smooth is a non-parametric regression method developed by Wilcox (1995). The explanatory strength of association η is the positive square root of explanatory power η^2. Explanatory power $\eta^2 = \frac{\sigma^2(\hat{y})}{\sigma^2(y)}$ is the usual variance of the predicted values divided by the variance of the observed values. A robust generalization $\eta^2 = \frac{\hat{\tau}^2(\hat{y})}{\hat{\tau}^2(y)}$ is used where the usual variance σ^2 is replaced by the percentage bend midvariance τ^2, and y is estimated using a running-interval smooth.

Figure 5

Running-Interval Smooths of BSI-53 Symptom Dimensions and Attachment Avoidance by Gender

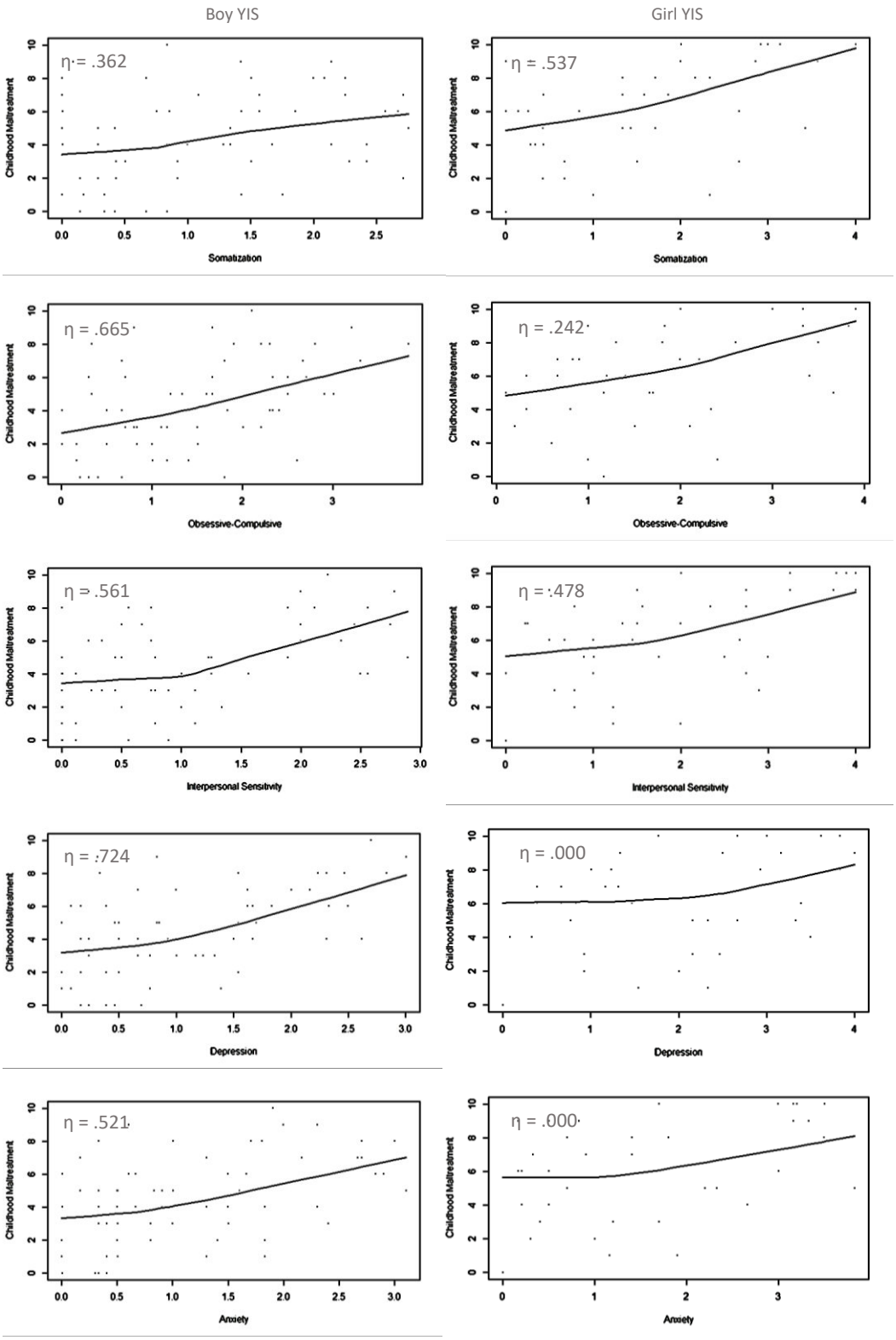


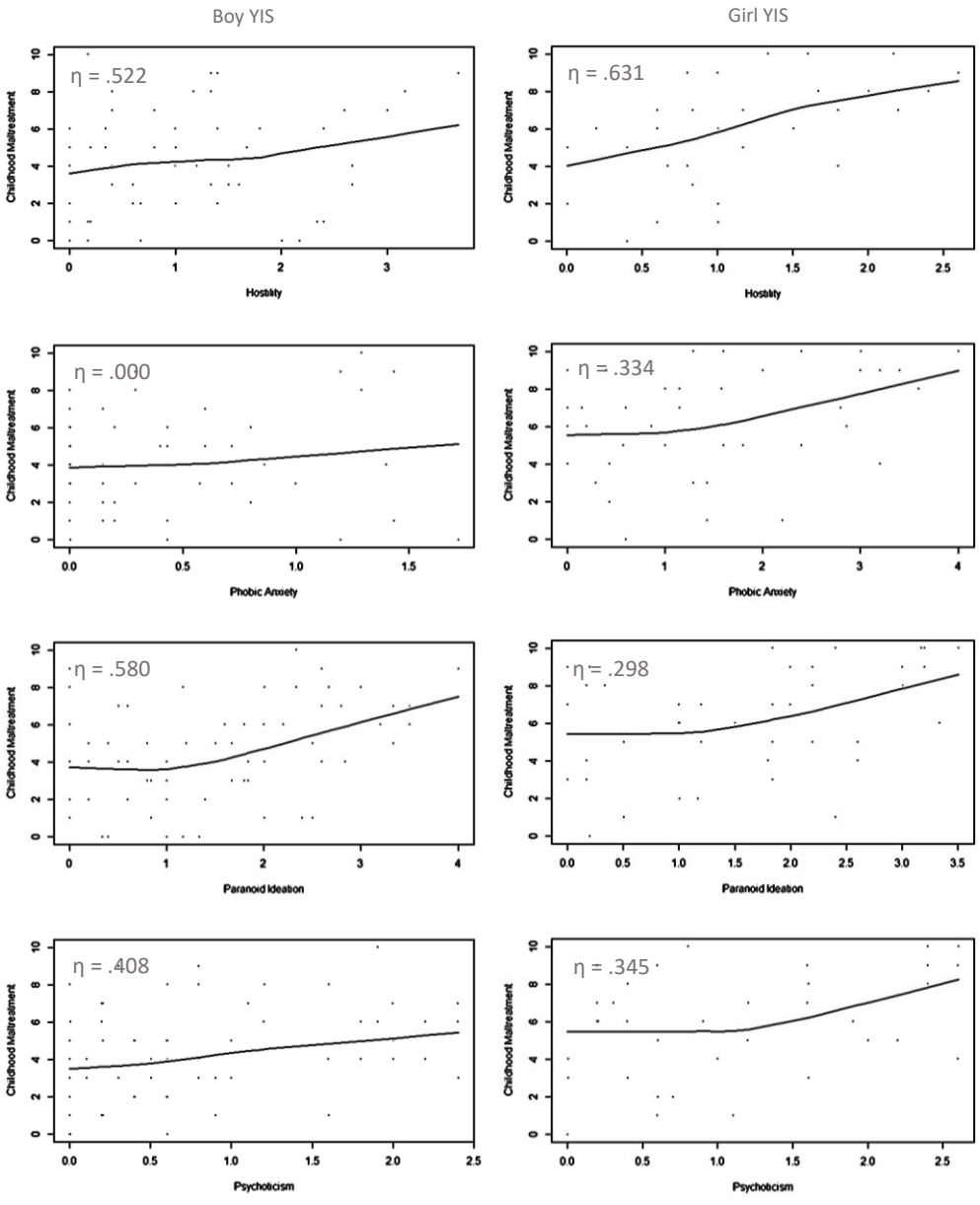


Note. Plots for boy YIS are on the left and plots for girl YIS are on the right. The running interval smooth is a non-parametric regression method developed by Wilcox (1995). The explanatory strength of association η is the positive square root of explanatory power η^2. Explanatory power $\eta^2 = \frac{\sigma^2(\hat{y})}{\sigma^2(y)}$ is the usual variance of the predicted values divided by the variance of the observed values. A robust generalization $\eta^2 = \frac{\hat{\tau}^2(\hat{y})}{\hat{\tau}^2(y)}$ is used where the usual variance σ^2 is replaced by the percentage bend midvariance τ^2, and y is estimated using a running-interval smooth.

Figure 6

Running-Interval Smooths of BSI-53 Symptom Dimensions and Childhood Maltreatment by Gender

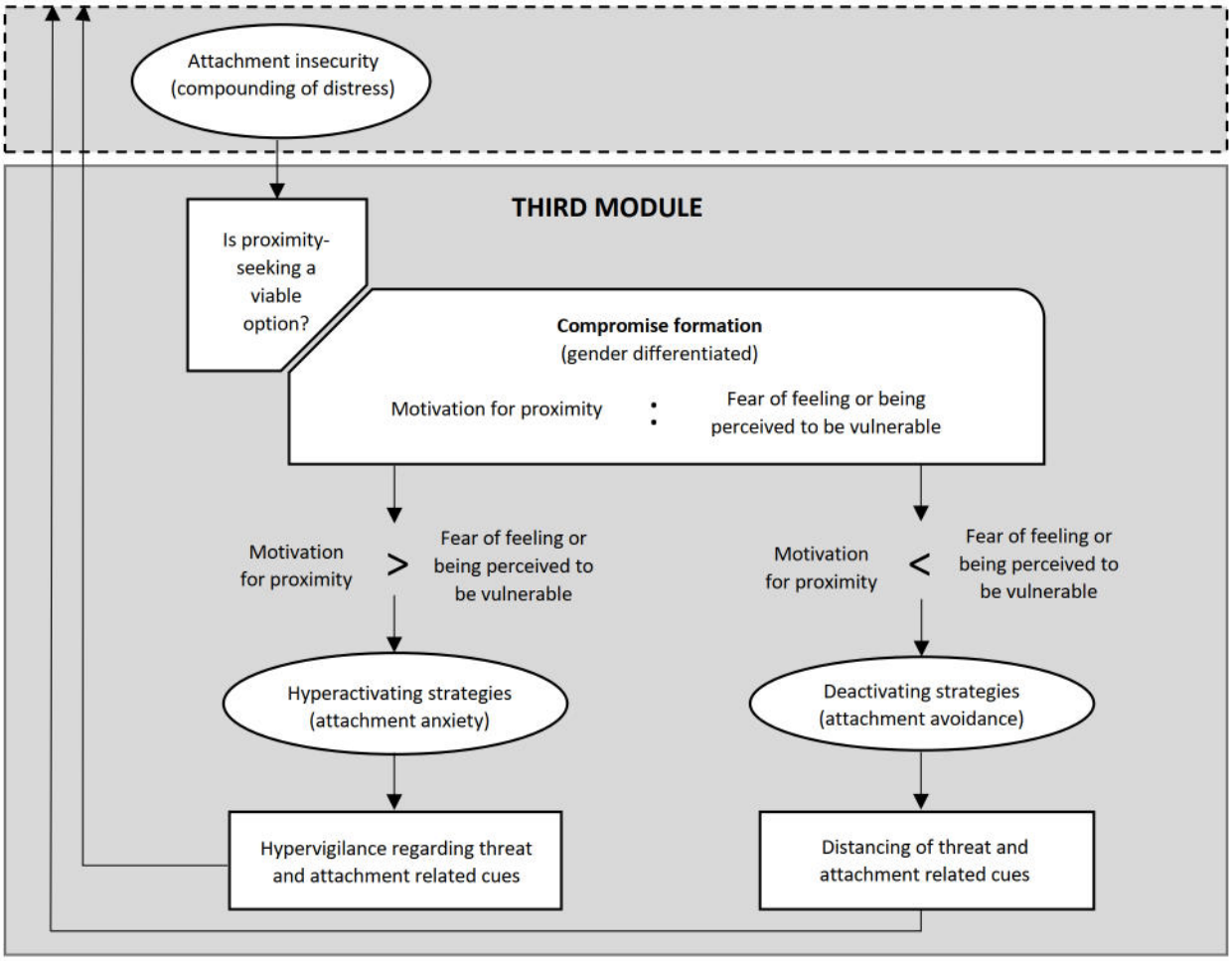




Note. Plots for boy YIS are on the left and plots for girl YIS are on the right. The running interval smooth is a non-parametric regression method developed by Wilcox (1995). The explanatory strength of association η is the positive square root of explanatory power η^2. Explanatory power $\eta^2 = \frac{\sigma^2(\hat{y})}{\sigma^2(y)}$ is the usual variance of the predicted values divided by the variance of the observed values. A robust generalization $\eta^2 = \frac{\hat{\tau}^2(\hat{y})}{\hat{\tau}^2(y)}$ is used where the usual variance σ^2 is replaced by the percentage bend midvariance τ^2, and y is estimated using a running-interval smooth.

Figure 7

Proposed Modifications to Model of Attachment-system Activation and Functioning in Adulthood



Note. Proposed modifications to the third module of Shaver and Mikulincer's (2002) 'Model of Attachment-system Activation and Functioning in Adulthood' to account for observed gender differences in YIS. It is hypothesized that gender differentiated sociocultural norms (e.g., traditional notions of masculinity and femininity), evolutionary trade-offs (e.g., mating effort versus parenting effort), and other yet to be elucidated gender-differentiated variables inform the relative weighting of competing motivations during the process of compromise formation. Gender differentiated consequences of perceived or actual threats, particularly under adverse conditions like youth homelessness, are also expected to heavily inform this process given the well-established gender-based nature of sexual violence (Statistics Canada, 2019). Adapted from "Attachment-related psychodynamics" by P.R. Shaver, and M. Mikulincer, 2002, *Attachment & Human Development*, 4(2), p. 152 (https://doi.org/10.1080/14616730210154171). Copyright 2002 by Taylor & Francis Ltd.

Appendix A

MEMORIAL UNIVERSITY

Interdisciplinary Committee on
Ethics in Human Research (ICEHR)

St. John's, NL Canada A1C 5S7
Tel: 709 864-2561 icehr@mun.ca
www.mun.ca/research/ethics/humans/icehr

ICEHR Number:	**20220572-SC**
Approval Period:	August 6, 2021 – August 31, 2022
Funding Source:	
Responsible Faculty:	Dr. Kellie Hadden, Department of Psychology
Title of Project:	*Gender Differences in Attachment in Youth Involved with the Street: An Exploratory Study*

August 6, 2021

David Storey
Department of Psychology, Faculty of Science
Memorial University of Newfoundland

Dear David Storey:

Thank you for your submission to the Interdisciplinary Committee on Ethics in Human Research (ICEHR), seeking ethical clearance for your research project. The Committee appreciates the care and diligence with which you prepared your application. The project is consistent with the guidelines of the *Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans* (TCPS2). *Full ethics clearance* is granted for **one year** from the date of this letter. ICEHR approval applies to the ethical acceptability of the research, as per Article 6.3 of the *TCPS2* (2018). Researchers are responsible for adherence to any other relevant University policies and/or funded or non-funded agreements that may be associated with the project. If funding is obtained subsequent to ethics approval, you must submit a Funding and/or Partner Change Request to ICEHR so that this ethics clearance can be linked to your award.

The *TCPS2* **requires** that you **strictly adhere to the protocol and documents as last reviewed** by ICEHR. If you need to make additions and/or modifications, you must submit an Amendment Request with a description of these changes, for the Committee's review of potential ethical issues, before they may be implemented. Submit a Personnel Change Form to add or remove project team members and/or research staff. Also, to inform ICEHR of any unanticipated occurrences, an Adverse Event Report must be submitted with an indication of how the unexpected event may affect the continuation of the project.

The *TCPS2* **requires** that you submit an Annual Update to ICEHR before **August 31, 2022**. If you plan to continue the project, you need to request renewal of your ethics clearance and include a brief summary on the progress of your research. When the project no longer involves contact with human participants, is completed and/or terminated, you are required to provide an annual update with a brief final summary and your file will be closed. All post-approval ICEHR event forms noted above must be submitted by selecting the ***Applications: Post-Review*** link on your Researcher Portal homepage. We wish you success with your research.

Yours sincerely,

Russell J. Adams, Ph.D.
Chair, Interdisciplinary Committee on
Ethics in Human Research

Appendix B

Youth Participant Profile

Ice-Breaking Questions:

1) What made you decide to visit choices? Please explain. _____

2) How did you hear about Choices? _____

    a. How long have you been involved with choices? _____

Demographic Information:

3) Gender: ___ Male ___ Female ___ Transgendered ___ Other (please specify)_____

4) Are you a visible minority? ___ Yes ___ No

5) Are you Aboriginal? ___ Yes ___ No

6) Age? _____ (Please specify in years) (D.O.B:_____)

Parenthood:

7) Do you have any children? ___ Yes ___ No (How many?_____)

8) If yes to the previous question, do you have full or partial custody of your child(ren)? ___ Full custody ___Partial Custody ___No Custody

9) If yes, do you receive parenting support from others? ___ Yes ___ No

    a. If so, by whom? ___ Spouse/Partner ___ Parents/Family ___Friends ___Other (Please specify)

10) What type of financial parenting support are you receiving?
___ Spousal Support ___ Parents/Family ___ HRLE ___CYFS
___ Other (Please explain) _____

Legal Status in Canada:

11) What is your legal status in Canada? ___Citizen ___Landed Immigrant ___Sponsored ___Immigrant ___Refugee Claimant

Living Situation:

12) What is your current living situation? ___Bed-sitter (alone) ___Bed-sitter (shared) ___Apartment (alone) ___Apartment (shared) ___Shelter ___Family ___Couch Surfing ___On the Street ___Other (Please explain) _____

13) Do you consider yourself to be participating in the "culture of the street" (i.e., developing "family" ties on the street, understanding the homeless community, engaging in the 'economy' of the street)? ___ Yes ___ No

    a. If so, please explain your involvement in street culture.
    _____

b. If so, for how long? ___Under 3 months ___3-6 months ___6 months-1 year
___1-2 years ___2-3 years ___3-4 years ___4-5 years ___More than 5 years

Family of Origin:

14) Please check all that apply: ___ Consistent Connection ___ Disrupted Connection
___ Early Family Break-up ___ Single Parent Family ___ Family Violence
___ Substance Abuse/Addiction in the Family ___ History of Offending in Family
___ Chaotic Home Environment ___ Low Income/Unemployment in Family
___ Death in Family ___ Other (Please Explain) _____

15) Were either of your parents in the care of CYFS? ___ Yes ___ No

a. If so, who? ___ Mother ___ Father ___Both Mother and Father

16) Prior to your contact with Choices for Youth, have you ever been in the care of CYFS?
___Yes ___No

Housing History:

17) Please check all that apply: ___Inconsistent family housing situation
___Staffed Home Placements (How many? ____ (number))
___Foster Care Placements (How many? ____ (number))
___Group Home Placements (How many? ____ (number))
___Emergency Shelter (Number of times ____)
___Difficulty maintaining housing
___Other (Please explain) _____

Education History:

18) Are you currently attending school? ___Yes ___No

a. If so, what level/grade? _____

19) If no, did you drop out? ___Yes ___No

a. If yes, when? _____

b. What was the last grade attended? _____

20) What is this highest level you have completed?
___ Grade School (Please name the specific grade _____)
___ Adult Basic Education (Please name institution attended _____)
___ Post-Secondary (Please name institution attended _____)
___ Other (Please specify _____)

21) While in school, did you receive any additional support? ___ Yes ___ No

a. If yes, what kind of support did you receive? ___ Special Education Classes
___ Individualized Education Program ___ Teachers Assistant/Aide
___ Other (Please Specify _____)

22) Do you have difficulty reading? ___Yes ___ No

23) Do you have difficulty in expressing yourself in writing? ___Yes ___No

24) Have you ever been diagnosed with a learning disability? ___Yes ___No

    a. If so, please specify type (if known) _____

25) Have you ever been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD)? ___Yes ___No

    a. If so, please specify type (if known)_____

Health and Wellness Issues:

26) Have you ever suffered from any of the following? (Please check all that apply): ___ Anxiety ___ Depression ___ Bipolar Disorder ___ Psychosis (i.e., schizophrenia) ___ ADHD ___ Suicidal Ideation ___ Suicidal Attempts ___ PTSD ___ Trauma ___ Physical Abuse ___ Emotional Abuse ___ Sexual Abuse ___ Rape ___ Eating Disorder ___ Substance Abuse __ Other (Please specify _____)

27) Were you formally diagnosed with any of the above by a health professional? ___Yes ___No

    a. If so, what is your diagnosis? _____

        i. Who diagnosed you? (Specify professional)_____

28) Are you currently on any medication? ___Yes ___No

    a. If yes, for what purpose (i.e., pain management, depression, anxiety)? _____

    b. If yes, what type of medication (if known)? _____

29) Have you ever used alcohol? ___Yes ___No

    a. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

    b. Do you currently use alcohol? ___Yes ___No

        i. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

30) Have you ever used Marijuana? ___Yes ___No

    a. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

    b. Do you currently use marijuana? ___Yes ___No

        i. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

31) Have you ever used prescription drugs recreationally? ___Yes ___No

    a. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

    b. Do you currently use prescription drugs recreationally? ___Yes ___No

i. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

32) Have you ever used non-prescription drugs? ___Yes ___No

a. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

b. Do you currently use non-prescription drugs? ___Yes ___No

i. If yes, how often? ___Daily ___ 5-6 times a week ___2-4 times a week ___ Weekly ___Monthly ___Less than Monthly

Sexuality/Sexual Orientation:

33) What do you consider your sexual orientation to be? ___ Heterosexual ___ Gay ___ Bisexual ___ Other (Please specify) _____

34) Have you ever felt discriminated against due to your sexual orientation?

a. If yes, where? _____

b. By whom? _____

35) Have you ever been bullied because of your sexual orientation?

a. If yes, where? _____

b. By whom? _____

36) How comfortable do you feel about your sexuality? ___ Very Uncomfortable ___ Uncomfortable ___ Sometimes Comfortable ___ Comfortable ___ Very Comfortable

Employment/Income History:

37) Are you employed? ___Yes ___No

a. If yes, what type of job do you currently have? Please Specify _____

38) What are your sources of income? Check all that apply. ___ HRLE ___ Youth Services ___ Employment Insurance ___ Employment ___ Other (Please specify_____)

39) Prior to coming to the agency, describe your employment history:
_____

40) Please describe the type of work you are interested in.
_____

41) Are you interested in pursuing employment? ___Yes ___No

Counselling History:

42) Have you ever had counselling? ___Yes ___No

a. If yes, where? _____

43) Are you currently in counselling? ___Yes ___No

    a. If yes, where? _____

44) If you have engaged/are currently engaged in counselling, what are the identified issues? Please specify. _____

45) Are you interested in seeking counselling? ___Yes ___No

Criminal Justice System:

46) Have you ever been incarcerated (in jail)? ___Yes ___No

47) Are you currently involved with the criminal justice system? ___Yes ___No

48) Have you ever been on parole or probation? ___Yes ___No

49) Are you currently on parole or probation? ___Yes ___No

Gender Trade/Sexual Exploitation:

50) Have you ever been involved in the gender trade or been sexually exploited? ___Yes ___No

    a. If yes, for how long? ___Less than one year ___2-5 years ___More than 5 years

51) Are you currently involved in the gender trade or been sexually exploited?

    a. If yes, for how long? ___Less than one year ___2-5 years ___More than 5 years

52) Have you ever been involved in survival gender (i.e., in exchange for food, drugs, or a place to stay)? ___Yes ___No

Anger/Impulse Control:

53) Has being angry ever caused you problems? ___Yes ___No

    a. If yes, in what areas of your life? ___Home ___School ___Work ___Relationships ___Legal ___Other (Please specify._____)

Social:

54) How comfortable do you feel in social settings? ___Extremely Uncomfortable ___Very Uncomfortable ___Sometimes Comfortable ___Very Comfortable ___Extremely Comfortable

55) How often do you go out socially? ___Less than once a week ___Once a week ___2-3 times a week ___4-5 times a week ___Daily

56) Do you have a friend you consider to be close? ___Yes ___No

    a. Please explain what you mean by close. _____

57) Do you ever feel lonely? ___Yes ___No

Other Issues:

58) Do you have a positive role model? ___Yes ___No

a. If yes, who? _____

59) How self-confident do you feel on a scale of 1 to 10, with 1 representing 'Extremely Unconfident' to 10 representing 'Extremely Confident'? _____

60) How good do you feel about yourself on a scale of 1 to 10, with 1 representing 'Not Very Good' to 10 representing 'Very Good'? _____

61) Do you feel you have healthy relationships with others? ___Yes ___No

a. How do you know they are healthy? Please explain.
_____

Closing Remarks:

62) What are the three top challenges, issues, or needs that would you like Choices for Youth to help you address?
1._____
2._____
3._____

63) How motivated are you to make changes in your life on a scale of 1 to 10, with 1 representing 'Extremely Unmotivated' to 10 representing 'Extremely Motivated'? _____

64) What are your strengths? _____

65) Is there anything you feel we missed during this interview?
_____

66) Final Comments:

_____

_____

_____

Appendix C

Experiences in Close Relationships Scale – Revised (Fraley et al., 2000a)

Instructions: The statements below concern how you feel in relationships and friendships with others. We are interested in how you *generally* experience relationships, not just in what is happening in a current relationship. Respond to each statement by marking a number to indicate how much you agree or disagree with the statement using the scale below:

Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

____1. I'm afraid that I will lose the love of others.

____2. I often worry that others will not want to stay with me.

____3. I often worry that others do not really love me.

____4. I worry that others won't care about me as much as I care about them.

____5. I often wish that others feelings for me were as strong as my feelings for them.

____6. I worry a lot about my relationships.

____7. When others are out of sight, I worry that they might become interested in someone else.

____8. When I show my feelings for others, I'm afraid they will not feel the same about me.

____9. I rarely worry about others leaving me.

____10. Others make me doubt myself.

____11. I do not often worry about being abandoned.

____12. I find that other people don't want to get as close as I would like.

____13. Sometimes other people change their feelings about me for no apparent reason.

____14. My desire to be very close sometimes scares people away.

____15. I'm afraid that once another person gets to know me, they won't like who I really am.

____16. It makes me mad that I don't get the affection and support I need from others.

____17. I worry that I won't measure up to other people.

____18. Others only seem to notice me when I’m angry.

____19. I prefer not to show another person how I feel deep down.

____20. I feel comfortable sharing my private thoughts and feelings with others.

____21. I find it difficult to allow myself to depend on others.

____22. I am very comfortable being close to others.

____23. I don't feel comfortable opening up to other.

____24. I prefer not to be too close to others.

____25. I get uncomfortable when others want to be very close.

____26. I find it relatively easy to get close to others.

____27. It's not difficult for me to get close to others.

____28. I usually discuss my problems and concerns with others.

____29. It helps to turn to others in times of need.

____30. I tell others just about everything.

____31. I talk things over with others.

____32. I am nervous when others get too close to me.

____33. I feel comfortable depending on others.

____34. I find it easy to depend on others.

____35. It's easy for me to be affectionate with others.

____36. Other people really understand me and my needs.

Appendix D

Childhood Trauma Questionnaire – Short Form (Bernstein et al., 2003)

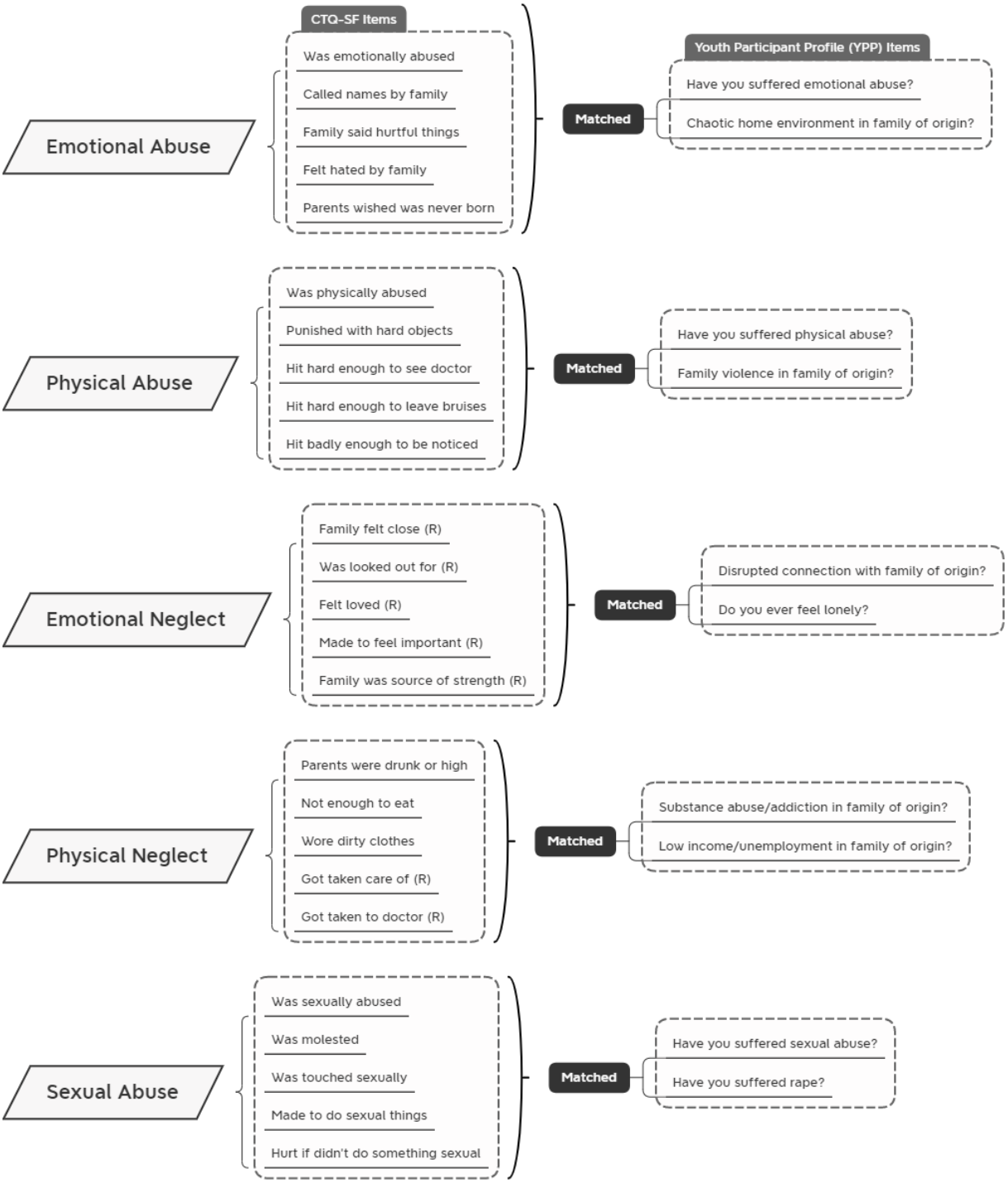
Instructions: These questions ask about some of your experiences growing up as a child and a teenager. Although these questions are of a personal nature, please try to answer as honestly as you can. For each question, circle the dot under the response that best describes how you feel. If you wish to change your response, put an X through it and circle your new choice.

When I was growing up...	Never True	Rarely True	Sometimes True	Often True	Very Often True
1. I didn't have enough to eat.	•	•	•	•	•
2. I knew that there was someone to take care of me and protect me.	•	•	•	•	•
3. People in my family called me things like "stupid," "lazy," or "ugly."	•	•	•	•	•
4. My parents were too drunk or high to take care of the family.	•	•	•	•	•
5. There was someone in my family who helped me feel that I was important or special.	•	•	•	•	•
6. I had to wear dirty clothes.	•	•	•	•	•
7. I felt loved.	•	•	•	•	•
8. I thought that my parents wished I had never been born.	•	•	•	•	•
9. I got hit so hard by someone in my family that I had to see a doctor or go to the hospital.	•	•	•	•	•
10. There was nothing I wanted to change about my family.	•	•	•	•	•
11. People in my family hit me so hard that it left me with bruises or marks.	•	•	•	•	•
12. I was punished with a belt, a board, a cord, or some other hard object.	•	•	•	•	•
13. People in my family looked out for each other.	•	•	•	•	•
14. People in my family said hurtful or insulting things to me.	•	•	•	•	•
15. I believe that I was physically abused.	•	•	•	•	•
16. I had the perfect childhood.	•	•	•	•	•
17. I got hit or beaten so badly that it was noticed by someone like a teacher, neighbor, or doctor.	•	•	•	•	•
18. I felt that someone in my family hated me.	•	•	•	•	•
19. People in my family felt close to each other.	•	•	•	•	•
20. Someone tried to touch me in a sexual way, or tried to make me touch them.	•	•	•	•	•
21. Someone threatened to hurt me or tell lies about me unless I did something sexual with them.	•	•	•	•	•
22. I had the best family in the world.	•	•	•	•	•

23. Someone tried to make me do sexual things or watch sexual things.	•	•	•	•	•
24. Someone molested me.	•	•	•	•	•
25. I believe that I was emotionally abused.	•	•	•	•	•
26. There was someone to take me to the doctor if I needed it.	•	•	•	•	•
27. I believe that I was sexually abused.	•	•	•	•	•
28. My family was a source of strength and support.	•	•	•	•	•

Appendix E

Matched CTQ-SF and YPP Items



Appendix F

Development and Validation of the CT-CM