

REJECTION SENSITIVITY AND BORDERLINE PERSONALITY DISORDER

REJECTION SENSITIVITY AND BORDERLINE PERSONALITY DISORDER: OUTCOMES AND CORRELATES

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Abstract

This thesis presents research aimed at examining rejection sensitivity in adolescent girls with borderline personality disorder (BPD) features. Although rejection sensitivity has been discussed more generally in the literature, few studies have identified how this construct may contribute to psychopathology in adolescence. There is also limited research regarding outcome behaviours that may be associated with high rejection sensitivity as well as factors that contribute to the manifestation of this construct. Here, this thesis aims to further the understanding of rejection sensitivity in adolescence and provide evidence to support the clinical utility of examining and offering treatment for this factor in youth presenting with BPD features. Although research has shown that BPD and high rejection sensitivity are strongly correlated, few studies have investigated the outcomes that may result from having this comorbidity. In the first paper of this thesis, disordered eating was examined as an outcome behaviour in a clinical sample of girls with BPD features. The results showed that girls who met diagnostic criteria for BPD had significantly higher disordered eating behaviour and that rejection sensitivity, operationalized as fears of abandonment, mediated this relationship. In the second paper of this thesis, the relationship between self-esteem, BPD features and perceived peer rejection was investigated in a longitudinal community sample of adolescent girls. We tested the sociometer hypothesis (Leary, 2005) that self-esteem served as a metric to detect the degree of belongingness in a group context. The results indicated that the relationship between BPD features and perceived peer rejection depended on self-esteem over time. Overall, the two studies presented in this thesis contribute to the knowledge regarding rejection sensitivity in adolescents with BPD features and explores correlates and outcomes of this relationship to aid in the identification of novel treatments to target and ameliorate rejection sensitivity in this population.

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Abandonment and Disordered Eating behaviour (DE behaviour)

List of Abbreviations

ACC	Anterior Cingulate Gyrus
ADHD	Attention-Deficit Hyperactivity Disorder
ANOVA	Analysis of Variance
BASC-2	Behavioural Assessment System for Children-2
BPD	Borderline Personality Disorder
BPFSC	Borderline Personality Feature Scale for Children
BPQ	Borderline Personality Questionnaire
CD	Conduct Disorder
CES-D	Center for Epidemiological Studies- Depression
dACC	Dorsal Anterior Cingulate Cortex
DAWBA	The Developmental and Well-Being Assessment
DE	Disordered Eating
DIB-R	Diagnostic Interview for Borderlines- Revised
MDD	Major Depressive Disorder
NSSI	Non-Suicidal Self Injury
OCD	Obsessive Compulsive Disorder
ODD	Oppositional Defiant Disorder
PPR	Perceived Peer Rejection
PTSD	Post-traumatic Stress Disorder
QOL	Quality of Life
RS	Rejection Sensitivity
RSQ	Rejection Sensitivity Questionnaire
SE	Self-Esteem
SSED	The Short Screen for Eating Disorders
SD	Standard Deviation
VADPRS	Vanderbilt ADHD Diagnostic Parent Rating Scales

Declaration of Academic Achievement

This thesis consists of 4 chapters: Chapter 1 provides background information on rejection sensitivity, rejection sensitivity in the context of borderline personality disorder and BPD in adolescence; Chapters 2 and 3 are manuscripts of original work completed during the duration of this Master's degree, one of which is pending publication and one of which is in preparation to be submitted for publication; Chapter 4 discusses the results of the two studies in the context of research on rejection sensitivity and BPD in adolescence and the future directions of this research. The study in Chapter 2 was conceived and designed by Dr. Khrista Boylan as the TiGER Study and the participants were recruited and data was collected in Hamilton, Ontario at Hamilton Health Sciences. I designed the research question and ran the statistical tests for this manuscript as well as performed the literature review and wrote the first draft. I presented portions of this work at the 5th International Congress on Borderline Personality Disorder in Sitges, Spain. This paper has been accepted for publication in the *Journal of the Canadian Academy of Child and Adolescent Psychiatry*. The lead investigator in the Chapter 3 study is Dr. Tracy Vaillancourt and there are many co-investigators and collaborators, including my supervisor, Dr. Khrista Boylan. Participant recruitment and data collection was carried out in the community of Hamilton, Ontario. I performed the data analysis for this document as well as the literature review and wrote the first draft of the manuscript for this paper. This paper will be submitted to *Journal of Personality Disorder and Emotion Dysregulation*.

Chapter 1

General Introduction

This thesis aims to expand on our understanding of factors that contribute to features of borderline personality disorder or BPD (hereafter referred to as borderline personality disorder features) as well as rejection sensitivity which is a facet of BPD. Research that attempts to both alleviate critical symptoms of BPD, such as high rejection sensitivity, and identify factors that contribute to the development of BPD features are new areas for investigation in the adolescent literature.

In this thesis, two research papers are presented supporting the importance of early identification of BPD features in adolescence as well as diagnosis of BPD during this developmental period. The first paper, presented in chapter 2, describes the relationship between rejection sensitivity, BPD and disordered eating behaviour in adolescent girls. In this study, participants with BPD exhibited significantly more disordered eating behaviour compared to controls and rejection sensitivity mediated this relationship. This is the first study to examine these constructs in a clinical sample of adolescent girls and it further demonstrated that targeting rejection sensitivity in girls with BPD may alleviate other pathological behaviours such as disordered eating. Chapter 3 of this thesis presents a second paper which describes the role of self-esteem as an important factor in the relationship between BPD and rejection sensitivity. In this paper, self-esteem negatively moderated the relationship between BPD features and perceived peer rejection in a longitudinal sample of adolescent girls. This study adds to the growing literature as it is the first to examine the role of self-esteem in this relationship over time and applications are discussed such as potential therapeutic techniques to target self-esteem in

high-risk adolescents. Before these papers are introduced, a general overview of the literature regarding rejection sensitivity and BPD in adolescence will be discussed.

The following literature review is divided into five sections to provide a comprehensive summary of the current state of research on rejection sensitivity and BPD in adolescence. In the first section, we discuss the literature regarding the nature of rejection sensitivity and the breakdown of the common theories and development of sensitivity to rejection in adolescence. In the second section, we review the literature pertaining to the measurement of rejection sensitivity, outlining which measures are the “gold-standard” as well as new tools that propose to tap into different dimensions of rejection sensitivity. In section three, we turn our attention to the existing literature discussing rejection sensitivity and BPD, how these two constructs are linked and the current research on this emerging topic. In section four, we review borderline personality disorder in adolescence, briefly discussing the controversy behind the diagnosis, benefits of early identification as well as outcomes of persistent BPD. Finally, in section five, we provide a brief overview of the original research that is presented in chapters two and three.

1.1 Rejection Sensitivity as a Construct

The term “rejection sensitivity” was first coined by Feldman and Downey in 1994. The authors posited that rejection sensitivity, which they operationalized utilizing clinical interviews, is the intense dejection (or introjected sadness) following perceived rejection in a given social interaction (Feldman & Downey, 1994). Rejection-sensitive people, according to the authors, are those who “anxiously expect, readily perceive and overreact to rejection” (Downey et al., 1994; Downey & Feldman, 1996). This construct came about by combining contributions from

classical interpersonal theories of personality such as Bowlby's works on Attachment Theory (1969) and Mischel's Social-Cognitive Theory (1973).

Attachment Theory is one of the most studied models of early childhood experiences predicting later pathology in the literature (Bowlby 1969; 1973). Bowlby proposed that children develop perceptions of themselves and their relationships with others based on early interactions with caregivers, which in turn go on to influence interactions in future relationships. Childhood experiences of rejection, especially from parent-child interactions, lead to insecure attachment styles that create anxiety and mistrust in future interpersonal interactions. Insecure styles of attachment have been identified as an underlying factor contributing to mistrust and ambivalence in adult relationships (Hazan & Shaver, 1994). In sum, Downey and Feldman's model proposes that when children's needs are met with rejection from parents and/or caregivers, children become sensitive to rejection and begin to expect it from others. These children perceive an increased probability that they will be rejected and because this experience is painful, these individuals will go on to avoid experiences that may induce rejection and experience anticipatory anxiety when the threat of rejection is perceived (Bowlby, 1980; Downey & Feldman, 1996).

Following the work of Mischel (1973), Downey and Feldman conceptualized rejection sensitivity as a cognitive-affective disposition (Downey & Feldman, 1996). This perspective proposes that early life experiences shape cognitive processes that generate behaviour in social situations (Mischel & Shoda, 1995). Utilizing several theories and their own research practices, they described a model of rejection sensitivity (Figure 1) as a positive feedback loop: an individual's anxious expectations of rejection leads to behavioural reactions which may then cause rejecting experiences, reinforcing the rejection sensitivity in a continuous cycle.

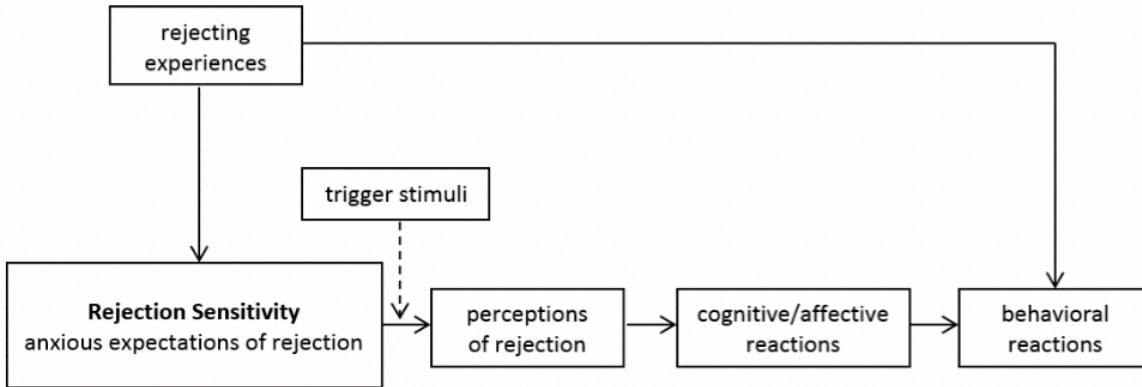


Figure 1: The Model of Rejection Sensitivity (Levy, Ayduk, Downey, & Leary, 2001)

It is important to note that there is great interchangeability in the usage of the term “rejection sensitivity” in the literature which can add to some confusion when reading works about this topic. “Social anxiety and avoidance”, “perceived peer rejection” and “thoughts or feelings of abandonment” have all been used as terms or phrases to describe “interpersonal sensitivity to rejection” (Marin and Miller, 2013) and are similar, although not identical, constructs to quantify and describe experiences of rejection among individuals. Both “perceived peer rejection” and “abandonment” are terms used in this thesis that will be described further in their corresponding chapters.

1.2 Measuring Rejection Sensitivity

The most commonly used measure to operationalize and measure rejection sensitivity is the Rejection Sensitivity Questionnaire (RSQ; Feldman and Downey, 1994; 1996). This measure consists of 18 items displaying interpersonal situations such as “You ask a friend to do you a big favour”, with the respondent rating their level of anxiety and perceived likelihood of rejection for each given situation. The two scales are then summed into their individual scores over the two

dimensions of (1) anxiety and (2) perceived likelihood of rejection, followed by a composite score of overall rejection sensitivity. This measure has excellent psychometric properties such as high internal consistency (Cronbach's $\alpha = 0.81$) and test-retest reliability ($r_{tt} = 0.83$ after 2 weeks, $r_{tt} = 0.78$ after 4 months; Downey & Feldman, 1996). This version of the RSQ is most often used with undergraduate samples (ie. individuals aged approximately 18 to 30) as the measure was originally adapted utilizing undergraduate-aged participants and their perspectives of difficult interpersonal scenarios.

To accommodate additional research, the RSQ has been adapted to older adult samples (ARSQ; Downey, Berenson & Kang, 2006) as well as children (CRSQ; Downey, 1998), with prompts/scenarios reflecting common interpersonal situations that are appropriate to their given life stages (e.g. "You ask your parents or another family member for a loan to help you through a difficult financial time" for adults, or "Your teacher asks for a volunteer to help plan a party for the class. Lots of kids raise their hands so you wonder if the teacher will choose YOU" for children). The RSQ has also been adapted to include different languages and specialized populations (see <http://socialrelations.psych.columbia.edu> for more information).

It is important to note that the assessment of rejection sensitivity is not limited to the RSQ. Similar to the interchangeability of the terms describing negative social evaluation, there have been other measures utilized in the literature to quantify sensitivity to rejection such as the Interpersonal Sensitivity Measure (IPSM; Boyce & Parker, 1989; Harb et al., 2002; Rosenbach & Renneberg, 2011) or the Interpersonal Sensitivity Subscale of the Symptom Checklist (SCL-90; Derogatis, Rickels & Rock, 1976; Hessel et al., 2001; Otani et al., 2014). This current thesis utilized a measurement of abandonment (Borderline Personality Questionnaire/BPQ; Poreh et al., 2006) and perceived peer rejection (Behavioural Assessment System for Children – Second

Edition/BASC-2; Reynolds & Kamphaus, 2004) as proxies to describe rejection sensitivity in studies 1 and 2, respectively.

There are also indirect measures of rejection sensitivity such as the Cyberball paradigm, developed by Williams and colleagues (2000). In the Cyberball task, participants engage in an online ball-tossing game with virtual partners, however, they are told that they are in fact playing with other real-life participants or peers. The game is designed so that the virtual players are pre-programmed to either include or exclude the participant by passing or repeatedly not passing the ball to the participant in an arranged circle. This task is often used with individuals who are sensitive to rejection, such as those with BPD, to measure perceptions of ostracism, social exclusion and rejection. Compared to healthy controls, individuals with BPD experience stronger feelings of rejection during both the exclusionary and inclusionary condition (Staebler et al., 2011). Other researchers have replicated these findings and have discovered that individuals with BPD have a biased perception for social exclusion even during inclusive or neutral situations (Domsalla et al., 2014; Bungert et al., 2015). Thus, it is likely that individuals with BPD are particularly sensitive to rejection, especially if they are also adolescents, who are hypersensitive to rejection during this stage of life (Downey et al., 1998).

Sensitivity to social rejection begins to increase in adolescence due to the emergence of significant peer and romantic relationships (Berndt, Hawkins & Rubin et al., 2004; Wargo, Aikens, Bierman & Parker, 2005). These experiences of rejection can lead to disruptions in social and emotional functioning, a diminished sense of well-being and interpersonal dysfunction (Downey & Feldman, 1996; Martson, hare & Allen, 2010). In fact, some researchers have posited that experiences of peer rejection have a direct contribution to psychological and emotional maladjustment in adolescence and even into adulthood (Downey & Feldman, 1996;

Downey et al., 1998; Zimmer-Gembeck et al., 2014). Although rejection sensitivity is persistent in a wide range of psychiatric disorders, for the purposes of this thesis, we will focus our discussion to individuals with BPD, particularly adolescents, for which this is a common feature of the disorder.

1.3 Rejection Sensitivity and Borderline Personality Disorder

BPD is a severe mental disorder characterized by patterns of affective instability, impulsivity, dysfunctional interpersonal relationships and disturbed self-image. The cause of BPD is multifactorial and unknown; however, there are many hypotheses relating to its development found in the literature. One important theory is Linehan's biosocial theory which states that individuals with BPD have a biological vulnerability to emotion dysregulation and this is compounded by invalidating environments in childhood (Linehan, 1993). Some of the biological abnormalities found in adults with BPD include amygdala hyperactivity and volumetric deficits in the anterior cingulate cortex (ACC) and anterior cingulate gyrus in adolescents with BPD (ACG; Goodman et al., 2014; Whittle et al., 2009; Goodman et al., 2011). Consistent with the biosocial theory, heritability is estimated at about 47% (Livesey, 1998), and gene-environment interaction models supporting hereditary and environmental factors contributing to the etiology of this disorder have been hypothesized (Steele & Siever, 2010). Childhood trauma, sexual abuse, and neglect are environmental factors that have been identified in retrospective research as common variables that predict the onset of BPD (Zanarini et al., 1997) and serve as important social factors which differentially impact youth who are already biologically predisposed to develop BPD by nature of their intense emotional reactivity.

BPD presentation consists of nine core features, five of which are required to be present in order to meet criteria for diagnosis: impulsivity, affective instability, feelings of abandonment, relationship dysfunction, self-image instability, thoughts of suicide/self-mutilation, emptiness, intense anger, and quasi-psychotic states. Of these nine criteria, thoughts or feelings of abandonment has been proposed as a core feature of BPD that contributes to and overlaps with the other facets, referred to as an integral part of the presentation of BPD (Zeichner, 2013; Benjamin, 1996; Gunderson, 1996, 2001). This criterion is defined as an “anxious preoccupation with real or imagined abandonment” in which individuals with BPD perceive interpersonal interactions as highly rejecting despite their companion’s intentions (Bungert et al., 2014). Patients with BPD often partake in extreme behaviours to avoid loneliness, such as engaging in emotional outbursts, and experience intense pain when experiencing rejection (Rosenbach, 2013).

This interpersonal feature of abandonment fits under the previously described umbrella of rejection sensitivity and is frequently used to describe BPD-specific experiences (Leary, 2005; Stafford, 2007). The literature regarding the etiology of rejection sensitivity in those with BPD is scarce, however, it is important to note the developmental parallels between the development of BPD and rejection sensitivity. One factor that has been consistently shown as an environmental risk-factor in the development of BPD is physical and emotional neglect during childhood. Abusive and rejecting family environments may lead to insecure attachment style (Linehan, 1993; Zanarini, 2000; Fonagy et al., 2003) and therefore predispose individuals to a painful sensitivity to rejection (Butler, Doherty & Potter, 2007). Early traumatic childhood experiences are also similarly found in relevant literature as potential developmental factors relating to high

rejection sensitivity (Downey et al., 1997; Feldman & Downey, 1994), thus showing a potential intrinsic developmental relationship among the two factors.

BPD diagnosis and BPD features have been associated with high sensitivity to rejection in several adult studies. In fact, BPD patients were demonstrated to have high rejection sensitivity compared to controls and report greater tendency to expect and perceive rejection even when compared to mood or anxiety disorders (Staebler et al., 2011; Williams, Cheung & Choi, 2000). These feelings of rejection can induce a strong aversive tension which is both stronger and more long-lasting than healthy controls, implying that individuals with BPD experience significantly more distress during rejecting experiences (Stiglmayr et al., 2005).

Research has also demonstrated several neurological and physiological contributors to the development of rejection sensitivity in those with BPD. For example, individuals with BPD have a bias towards perceiving angry but not fearful faces (Domes et al., 2008) compared to healthy controls. High sensitivity to rejection even plays a role in neural pain processing: Bungert and colleagues (2015) demonstrated that BPD patients, who typically have a hyposensitivity to physical pain (Schmahl et al., 2006), had a lower pain threshold and differences in neural pain processing when accompanied by a social exclusion task. Feelings of abandonment also show unique neural activity in women with BPD compared to women who have suffered trauma but do not have a BPD diagnosis: in a study by Schmahl and colleagues, twenty women with a history of childhood sexual abuse (half with BPD, half without) underwent a PET scan while listening to scripts describing neutral and abandonment events. The abandonment scripts were associated with greater increases in blood flow in the bilateral dorsolateral and prefrontal cortices in women with BPD as well as greater decreases in right anterior cingulate blood flow (Schmahl et al.,

2003). These results suggest that individuals with BPD experience abandonment differently than those without, even when both are subjected to trauma.

Research utilizing explicit measures of rejection sensitivity have provided evidence in support of the hypothesis that individuals with BPD are rejection sensitive. Both Bernenson and colleagues (2011) and Staebler and colleagues (2011) applied the RSQ in a clinical BPD setting of adults and confirmed high levels of rejection sensitivity in these populations. Regarding implicit measures of rejection sensitivity, BPD patients are extremely sensitive to the previously described Cyberball social exclusion task. Renneberg and colleagues found that participants with BPD felt more excluded during this task compared to healthy controls regardless of whether they were in the inclusion or exclusion phase of the task (2012). Mirroring these results, Gutz and colleagues (2015) found that individuals with BPD showed similar brain activity during both the inclusionary and exclusionary phases of the game, whereas healthy controls only showed this neural activity during the inclusion condition. Thus, high rejection sensitivity in BPD induces an experience of exclusion even during situations of objective inclusion. Despite the growth of literature on these phenomena, there is very little work done on rejection sensitivity in adolescents with BPD or BPD features. This may be due to the new acceptance of diagnosis during this developmental period, and this limitation/phenomena will be discussed in the next section.

1.4 Borderline Personality Disorder in Adolescence

Although there is a general agreement within the literature that features of personality disorders have predictors in childhood and adolescence, diagnosing adolescents with BPD has been controversial (Chanen & McCutcheon, 2008; Miller et al., 2008). Despite research arguing that a recognition of this disorder in adolescence may be beneficial for early intervention, many

clinicians are still reluctant to provide a diagnosis for any personality pathology before the age of 18 (Miller, Muehlenkamp & Jacobson, 2008). Common arguments for not providing a diagnosis include the prevalence of BPD features found in typically developing adolescents who are experiencing changes and turmoil during this developmental period (Miller, Muehlenkamp & Jacobson, 2008), the stigma surrounding BPD in general (Aviram, Brodsky & Stanley, 2006), the ongoing development of personality which is unlikely complete before the age of 18 (Kaess, Romauld & Chanen, 2014), and the claim that diagnosing BPD in adolescence may not be valid due to the higher prevalence and remission rates of BPD in this population (Kaess et al., 2014). Despite these arguments, there is strong advocacy for diagnosing BPD in individuals under the age of 18 (Chanen et al., 2008) to enable indicated prevention efforts that will reduce the lifelong functional impairment associated with the disorder.

BPD diagnosis in adolescence has been found to be just as reliable and valid in adolescence as it is in adulthood with research suggesting that diagnosis is valid as early as 11 or 12 years old (Michonski, Sharp, Steinberg & Zanarini, 2012). The same diagnostic criteria are applied to youth as with adults (Chanen et al., 2008; Miller, Muehlenkamp & Jacobson, 2008) and BPD occurs at a similar rate in adult and adolescent inpatient samples (Miller et al., 2008; Sharp & Romero, 2007). With regards to diagnostic stability, Chanen and colleagues they found that adolescent BPD appeared to be just as stable as adults at a 2-year follow-up, justifying diagnosis and early intervention in this age group (2004). Studies have also shown that adolescent BPD demonstrates incremental validity, or the validity used to determine if a new diagnosis will provide more information than the comorbidities alone. In a study examining 177 psychiatric outpatients aged 15 to 18, a BPD diagnosis significantly predicted general functioning, peer relationships, self-care, and interpersonal functioning over other Axis I disorders (Chanen, Jovev

& Jackson, 2007). Finally, early intervention and BPD-specific treatment, such as Dialectical Behaviour Therapy (DBT), is beneficial for adolescents long-term. Remission of BPD is higher when diagnosis is made during adolescence, but this is also common in adulthood as well (Biskin et al., 2011). Peak symptoms of BPD tend to appear at around 14 years of age (Chabrol et al., 2001) and 80% of adolescents diagnosed with BPD will suffer from some sort of personality disorder in adulthood with mid-adolescent BPD being a good predictor of BPD diagnosis in mid-adulthood (Deschamps & Vreugdenhil, 2008; Winsper et al., 2017).

Due to the research supporting personality disorder diagnosis before 18, national treatment guidelines have now mirrored these findings. The newest version of the Diagnostic and Statistical Manual (DSM-5) and International Classification of Diseases (ICD-11) have changed their diagnostic criteria, highlighting the importance of BPD diagnosis in adolescence and validating the legitimacy of clinicians who research this population (APA 2013; Tyrer et al., 2011; WHO, 2018). There also seem to be gender differences in BPD diagnosis, even in adolescence. In clinical populations, females represent 75% of all BPD patients (Goodman et al., 2010) and this effect is also seen in adolescents (Cailhol et al., 2013), hence girls will be the focus of this thesis. Some researchers argue that the reason there is a greater proportion of females diagnosed is not because BPD is more prevalent in females, but because of an under-recognition of BPD in males (Goodman et al., 2010). However, this hypothesis has yet to be verified empirically.

Diagnosing BPD in adolescence is important to both alleviate and avoid the long-term consequences that arise from BPD. BPD is a devastating condition that includes a high risk of suicide, extensive use of mental health services, severe impairment in psychosocial functioning, and high social and economic costs. In fact, BPD costs tens of thousands of dollars a year per

patient in direct and indirect costs, including treatment, hospitalization, sick leave, and productivity loss (van Asselt et al., 2007). Individuals with BPD often engage in self-harm, substance abuse, and risky sexual behaviours, and these behaviours are particularly pervasive during adolescence. (Sansone et al., 1996, 2001). The risk of death by suicide in BPD patients is estimated at between 4 and 10%, one of the highest of any psychiatric illness (Paris, 2002). Suicide risk is also higher if BPD is comorbid with a mood disorder or substance abuse (Paris, 2002). Thus, targeting BPD features is critical -- identifying adolescents with BPD and implementing early intervention strategies may assist in remission, prevent this disorder from persisting into adulthood, and reduce the risk of suicide and other life-altering risky behaviour both during adolescence and later adulthood.

1.5 Overview of the Presented Work

The original research work presented in this thesis is based on two studies utilizing two different datasets. Chapter 2, titled “Borderline personality disorder and eating disorder behaviour: The mediating role of rejection sensitivity” reflects data collected by the Teenage Girls Emotion Regulation (TiGER) study which was purposed to examine disruptive behaviour, BPD symptoms, and other clinical correlates relating to suicidal and self-harming behaviour in a clinical sample of adolescent girls. The presented analyses of these data reveal that disordered eating behaviour is highly prevalent in adolescent girls with BPD and that the observed relationship between BPD and disordered eating is mediated by rejection sensitivity, measured using the construct of abandonment. Chapter 3, titled “Self-esteem moderates the perception of peer rejection in adolescents with features of borderline personality disorder” utilizes data from the Mac Teen Study, a longitudinal community study examining the stability and change of mental health symptoms and social factors from a community sample of male and female

children and adolescents in grades 8 through 10. Here, we demonstrate that self-esteem moderates the relationship between BPD features and perceived peer rejection in girls over this three-year time period.

Together, these studies highlight the potential pathological outcomes of BPD features in adolescent girls as well as factors that may contribute to these features for use as therapeutic targets. These studies contribute to areas of research relating to a growing field on adolescent BPD and identify important mechanisms relating to the complex phenomenon of rejection sensitivity in this population. Identifying behaviours that are common in adolescents with BPD, such as disordered eating behaviour, are important as they may be utilized as markers for a probable diagnosis of BPD, which is often misdiagnosed as bipolar disorder or depression (Ruggero et al., 2010). Chapter 2 of this thesis adds to this literature and explains how rejection sensitivity contributes to these behaviours. Although the understanding of BPD features in adolescence is not as developed in comparison to manifestation in adulthood, there has been a surge of research in recent years aimed at understanding this phenomenon. Chapter 3 is in line with this goal, examining how BPD features contribute to rejection sensitivity and how self-esteem may moderate this relationship. Self-esteem, as a moderator, may have the potential of being used as a therapeutic target to mitigate the development of rejection sensitivity, which has been identified as a potential risk-factor that predisposes for the development of mood disorders in adulthood (Rosenbach & Renneberg, 2011) and a trigger for non-suicidal self-injury (NSSI) in those with BPD (Lawrence, Chanen & Allen, 2011).

Chapter 2

Borderline personality disorder and eating disorder behaviour: The mediating role of rejection sensitivity

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Abstract

Objective: To examine the relationship between disordered eating behaviour and Borderline Personality Disorder (BPD) in a clinical population of female adolescents. We hypothesized that BPD and disordered eating would be strongly associated, and that this association would be partially mediated by rejection sensitivity.

Method: Participants were 73 female patients aged 11-18 presenting for mental health treatment at an outpatient psychiatry clinic in a large metropolitan hospital. Measures used in this study include the Diagnostic Interview for Borderline Personality Disorder- Revised, Borderline Personality Questionnaire and The Short Screen for Eating Disorders.

Results: Youth with BPD had significantly more disordered eating behaviour compared to controls. Of the nine facets of BPD, eight were highly correlated with disordered eating, suggesting important shared variance between the constructs of BPD and disordered eating. This study also demonstrated that rejection sensitivity significantly mediated the relationship between BPD symptoms and disordered eating.

Conclusions: This paper provides a novel association between a diagnosis of BPD in adolescents and disordered eating and the mediation effect of rejection sensitivity. These findings suggest that disordered eating should be screened in BPD samples and interventions targeting rejection sensitivity may be of clinical use.

Key words: Borderline personality disorder, adolescence, disordered eating, abandonment, rejection sensitivity

Borderline personality disorder and disordered eating behaviour: The mediating role of rejection sensitivity

Borderline Personality Disorder in Adolescence

Borderline personality disorder (BPD) is marked by instability in the core symptom domains of impulsivity and negative affect as well as associated dysfunctional interpersonal relationships (American Psychological Association [APA], 2013). Historically, the diagnosis of BPD had been restricted to adults. However, in the recent decade there has been a surge in research supporting the diagnosis of BPD in adolescents due to changes in diagnostic criteria and awareness of the disorder (Fossati, 2015). The literature suggests that BPD in adolescents and adults is similar in terms of symptomatology, outcomes, and treatment success (Kaess, Brunner & Chanen, 2014).

Of the nine symptoms of BPD, fear of real or imagined abandonment has been proposed as a core feature of the disorder that contributes to many of the observable symptoms and subjectively experienced cognitions and emotions in affected individuals (Zeichner, 2013). This fear of being abandoned or rejected by others relates to the social psychology concept of rejection sensitivity. Rejection sensitivity is defined as “the cognitive affective disposition that influences expectations, perceptions and behaviour within the context of social rejection” (Downey & Feldman, 1996). Although the theoretical model of rejection sensitivity encompasses the etiology, nature and outcomes of social rejection, there is great interchangeability in the usage of the term (Leary, 2005) to describe any form of negative social evaluation, including fear of abandonment, which was posited as the “ultimate form of rejection” (Stafford, 2007). The model of rejection sensitivity specifically suggests that anxious expectation of rejection or

abandonment is the cognitive-affective mediator that links situational perceptions to the behavioural manifestations that influence interpersonal relationships (Downey & Feldman, 1996). Thus, people high in rejection sensitivity are characterized by high levels of anxiety and fear of abandonment, a construct that has become a defining feature of BPD specifically. Although fear of abandonment, typically triggered by rejection, is common throughout the lifespan, the impact of its experience is greatest during childhood or adolescence (Feldman & Downey, 1994).

Rejection Sensitivity in BPD

Borderline Personality Disorder has been both empirically and theoretically linked with the construct of rejection sensitivity (Lakatos, 2012). Rejection sensitivity, which encompasses the concept of fear of abandonment (Downey & Feldman, 1996), is the persistent perception of rejection or assuming intentional hurt by others even if the behaviour is ambiguous. This construct exists on a continuum with some individuals overreacting to rejection cues while others do not (Staebler et al., 2011). High rejection sensitivity leads to a misinterpretation of relational conversation, such as the inability of a colleague to attend an appointment as excluding and neglectful, despite the companion's intentions.

Many adult studies have examined rejection sensitivity in relation to various psychopathological conditions, especially with regards to BPD. In the recent literature, Staebler and colleagues (2011) reported that individuals with BPD had significantly higher feelings of rejection sensitivity when compared to persons with mood disorders, anxiety disorders, avoidant personality disorder, and healthy controls. This finding has also been replicated in studies by Berenson et al (2011) and Domsalla et al (2014) in which rejection sensitivity was higher in

those with BPD than any other psychiatric disorder. Impulsive actions such as non-suicidal self-injury (NSSI) and substance use, common to individuals with BPD, may also be mediated by social rejection sensitivity (Twenge, Catanese & Baumeister, 2002). Specific to this point, these authors noted that the experience of social rejection appeared to increase feelings of emptiness, suicidality, and dissociation, all of which can serve as emotional triggers for NSSI (Glenn and Klonsky, 2013). Further evidence that rejection sensitivity and BPD are etiologically linked are the presence of shared risk factors such as neglectful family environments and insecure attachment style (Zanarini, 2000; Fonagy et al., 2003).

BPD and Disordered Eating

Studies have shown that disordered eating is found in adults with BPD, whether or not they are diagnosed with a co-morbid eating disorder (Marino & Zanarini, 2001). Disordered eating is defined as abnormal eating behaviour that do not meet the threshold for an eating disorder diagnosis (Tabler & Geist, 2016), but can also be present in individuals with eating disorders. These behaviour include binge eating, dieting, skipping meals regularly, and self-induced vomiting, among others. Although disordered eating behaviour have been traditionally used to define eating disorders, some researchers argue that these behaviour are clinically relevant on their own and common in adolescent girls (Aimé et al., 2008; Lee & Vaillancourt, 2018; Menzel et al., 2010; Tabler & Geist, 2016). For example, although eating disorders affect less than 2% of the population, a study by Croll and colleagues (2002) showed that approximately 50% of adolescent girls engaged in at least one disordered eating behaviour. Neumark-Sztainer and colleagues also demonstrated in a 10-year longitudinal study that disordered eating in adolescence, independent of eating disorder diagnosis, had long-lasting

impacts on overall well-being and tended to persist even into young adulthood (Neumark-Sztainer et al. 2011, 2012).

Disordered eating can be classified into categories of behaviour such as chronic restriction of food as well as compulsive/binge eating with or without purging. BPD is associated with both types of behaviour, and particularly with impulsive eating pathology such as binge eating and purging. In fact, in a review of nine empirical studies on personality pathology associated with eating disorders in adult samples, BPD was the most common comorbid personality disorder reported in those with eating pathology with an average prevalence rate of approximately 25% and 28% in inpatients with anorexia nervosa and bulimia nervosa, respectively (Sansone, Levitt & Sansone, 2004; Sansone & Sansone, 2013).

Does rejection sensitivity link BPD and disordered eating?

Studies have shown that a causal and maintaining feature of disordered eating behaviour is fear of negative social evaluation which is directly related to rejection sensitivity (Rieger et al., 2010). Patients with disordered eating also endorse significantly more maladaptive relationships than controls, similar to those with BPD (De Paoli et al., 2017). Adults with high rejection sensitivity have a bias towards processing angry faces, a trait seen in both those with disordered eating (Pringle, Harmer & Cooper, 2010) as well as BPD (Kaiser et al., 2016) suggesting that similar neural networks underlie rejection sensitivity in persons with BPD or with disordered eating.

Since existing studies demonstrate a significant association between BPD symptoms and rejection sensitivity, we predicted that rejection sensitivity may mediate the relationship between BPD and disordered eating behaviour. In further support of this hypothesis, rejection sensitivity,

BPD, and disordered eating are each associated with childhood experiences of rejection and dysfunctional attachment to caregivers (Alexander, 2017; Bungert et al., 2015; De Paoli, Fuller-Tyszkiewicz & Krug, 2017).

Longitudinal studies have shown that personality disorder symptoms first manifest during childhood in the form of childhood emotional and behavioural disturbances (Bernstein et al., 1996; Chanen & Kaess, 2012; Stepp et al., 2014). Therefore, symptoms of personality pathology likely precede disordered eating behaviour as the latter are reported to develop in adolescence largely due to the pervasive nature of dieting and body dissatisfaction during this time period (Jones et al., 2001; Sansone & Sansone, 2007; Slane et al., 2014; Tyrka, Graber & Brooks-Gunn, 2000). A causal model of this phenomenon would best place BPD symptoms before the onset of disordered eating behaviour, or, in the absence of longitudinal data, BPD symptoms – in general – serve as risk factors for disordered eating.

The specific objective of the present study was to report the prevalence of disordered eating and BPD in a clinical sample of adolescent girls. We predicted that BPD diagnosis and BPD symptoms would be strongly associated with disordered eating behaviour. The second objective was to test whether the relationship between BPD and disordered eating behaviour was accounted for by rejection sensitivity specifically.

Methods

Procedure

This study utilized data collected by the Teenage Girls Emotion Regulation (TiGER) Study which examined the relation between disruptive behaviour and BPD symptoms in a clinical sample of adolescent girls. This study recruited females exclusively due to the original

research question being female-specific. All procedures were approved by the Hamilton Integrated Research Ethics Board prior to initiation and both participants and guardians consented to participate. Girls were originally referred to the clinic by family doctors, emergency room physicians or self-referral to a central referral agency. Before commencing the study, it was confirmed by researchers that all girls were able to read at a Grade 6 (age 12) level using the Slosson Oral Reading Test (Slosson & Nichololson, 1990).

Participants

Participants were 73 female patients aged 11-18 ($M = 14.92$, $SD = 1.50$) consecutively recruited as they presented for mental health treatment at an outpatient psychiatry clinic in a large metropolitan hospital. A score of > 16 on the Center for Epidemiologic Studies- Depression (CES-D scale; Radloff, 1977) and/or having endorsed suicidal thoughts or self-harm was required in order to participate in the study. Exclusionary criteria included a moderate intellectual disability, autism spectrum disorder (ASD) or substance abuse disorder with severity likely to impact ability to participate in the study.

Measures

Center for Epidemiologic Studies – Depression (CES-D)

Current severity of mood symptoms was assessed using the total score from the Center for Epidemiologic Studies – Depression (CES-D scale; Radloff, 1977). This 20-item self-report measure asked youth to rate how often they experienced a variety of depressive symptoms over the week prior to participation in the study. The scale has a range of 0-60 and a cut-off score of 16 or higher indicated increased risk of depression with good sensitivity and specificity and high internal consistency (Lewinsohn, Seeley, Roberts, & Allen, 1997).

Diagnostic Interview for Borderlines – Revised (DIB-R)

The Diagnostic Interview for Borderlines – Revised (DIB-R; Zanarini et al. 1989) was used to determine the prevalence of BPD in our sample. The DIB-R is the most commonly used tool to diagnose BPD and has been validated for use in adolescent samples (Ludolph et al, 1990; Wall, Sharp, Goodman & Zanarini, 2017). It is a semi-structured interview measuring the four domains of BPD: Affect, Cognition, Impulsive Action Patterns and Interpersonal Relationships. The interview includes 97 items assessing thoughts, feelings and behaviour reported by the individual over a two-year period ($\alpha=.877$). These items determine scores on 24 subsections which are then used to calculate scores across the four domains as well as a total score. A total revised DIB score ranges from 0 to 10 and a score of 7 and above was used as the cut-off to indicate a diagnosis of BPD. This tool has excellent psychometric properties including inter-rater reliability and test-retest reliability (Zanarini, Frankenburg & Vujanovic, 2002).

Borderline Personality Questionnaire (BPQ)

The BPQ was used to quantify the symptoms and severity of BPD based on nine subscales parallel to the DSM-IV diagnostic criteria for BPD (impulsivity, abandonment, unstable relationships, self-image, self-injury, emptiness, intense anger, and quasi-psychotic states (Poreh, Rawlings, Claridge, Freeman, Faulkner, & Shelton, 2006). This measure consisted of 80 true or false questions which can be scored to calculate a total for each of the nine subscales with a higher numerical score indicating higher results on that subscale. The BPQ has been used in many studies and has excellent diagnostic accuracy (0.85), test-retest reliability (ICC = 0.92) and internal consistency (alpha = 0.92; Chanen et al., 2008). For this study, the internal consistency of the total score was .81 and .83 for the abandonment factor.

The Short Screen for Eating Disorders (SSED)

The Short Screen for Eating Disorders (SSED) was used to measure disordered eating using the continuum model of eating disorders (Lee and Vaillancourt, 2018; Miller & Boyle, 2009). This measure is novel as it focuses on eating behaviour and not thoughts which has been shown to increase specificity of the items to pathological eating/eating disorders. The scale has 12 items responded to on a 5-point scale (0=never; 1=a few times last month; 2=once a week; 3=2-4 times every week; 4=almost every day) where higher total scores indicate more severe disordered eating behaviour (0-48). Examples of statements include “How often did you eat in secret?” and “How often did you vomit on purpose after eating?”. The SSED has an internal consistency reliability of .81 and as a screening instrument has exhibited 83-97% sensitivity and specificity in predicting cases vs. non-cases. The internal consistency for the current study was .71.

The Development and Well-Being Assessment (DAWBA)

The Development and Well-Being Assessment (DAWBA; Goodman et al., 2010) was used to measure prevalence of separation anxiety, social phobia, post-traumatic stress disorder, obsessive-compulsive disorder, generalized anxiety disorder and major depressive disorder in participants. The DAWBA is a computerized interview completed by parents and children to identify youth diagnosis using a multi-informant best estimate procedure. This measure includes both structured and open-ended question format which a computer program can then use to predict the presence or absence of diagnoses based on DSM-IV criteria. A clinician then reviews the results and determines whether to accept or reject computer-based predictions. The DAWBA can successfully discriminate between clinic and community populations (Fleitch-Bilyk &

Goodman, 2004; Goodman et al., 2000) and there are high levels of agreement between the DAWBA and diagnostic case notes among clinical samples (Kendall's tau $b=0.47-0.70$; Goodman et al., 2000).

Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS)

The VADPRS is a parent-completed rating scale that was used to assess symptoms of Attention-Deficit Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD) in our sample (Wolraich et al., 2003). This measure includes all 18 of the DSM-IV criteria for ADHD, 8 criteria for ODD, 12 criteria for CD as well as 7 items that screen for anxiety and depression which were not used in this study. Parents are asked to rate their child's severity of each behaviour on a 4-point (range 0-3) scale ranging from ("never" to "very often"). A clinically significant symptom is considered present if scores of 2 or 3 are endorsed on that symptom. Diagnosis of ADHD inattentive or hyperactive-impulsive subtype required 6 symptoms, ADHD-combined type required 12 symptoms, ODD required 4 ODD symptoms and CD required 3 or more CD symptoms. This measure has high internal consistency (>0.93) and factor structure based on other accepted measures of ADHD (Wolraich et al., 2003). The reliability across the three scales for this sample was high (ADHD $\alpha = .94$; ODD $\alpha = .90$; CD $\alpha = .70$) with reliability for CD being lower due to only having 3% prevalence in the sample.

Statistical Approach

All statistical analyses were performed using SPSS 22.0 statistical software. Descriptive statistics were calculated for all continuous variables (Table 1). Individuals were categorized as "yes" or "no" for BPD based on a cut-off score of 7 on the revised DIB. A disordered eating score was calculated using a total score of unhealthy eating behavior on the SSED. For the first

analysis which addressed hypothesis 1, examining if youth with BPD had significantly more disordered eating behaviour, an independent samples 2-tailed *t-test* was used to compare differences in average disordered eating behavior between youth with and without a diagnosis of BPD.

Secondly, a hierarchical regression was utilized to explore our hypothesis to determine which facet of BPD (Impulsivity, Affective Instability, Abandonment, Dysfunctional Relationships, Self-Image, Suicide/Self-Mutilation, Emptiness, Intense Anger, and Quasi-Psychotic States) contributed most to disordered eating behavior, measured as the total SSED score. These facets were identified using the sum of particular items from the BPQ. Violations of assumptions of multiple regression analysis were checked to ensure validity of the results. These assumptions include adequacy of sample size, normality, a lack of multicollinearity, non-homoscedasticity, and independence of observations. After verifying the results utilizing a stepwise regression, suicide/self-mutilation was also identified as a factor that contributed significantly to the model. Abandonment was entered first in followed by Suicide/Self-Mutilation in this block.

To test our second hypothesis examining if the relationship between BPD and disordered eating behaviour was fully or partially mediated by rejection sensitivity, mediation was tested using Hayes' PROCESS macro (2013). This is a regression path analysis tool that estimates direct and indirect effects of predictor variables on the outcome variable. All assumptions of this model were satisfied, so data were bootstrapped to 1000 draws to generate confidence intervals. BPD was entered as the predictor variable and disordered eating behavior as the outcome variable with abandonment as the mediator.

Results

Prevalence of psychiatric disorders in the sample is shown in Table 1. Approximately 25% of the sample met criteria for BPD (N=18) and most girls had more than one comorbid psychiatric disorder.

Table 1: Psychiatric Disorders in Participants (N= 73)

<i>Disorder</i>	<i>N</i>	<i>Prevalence (%)</i>
<i>Depression[†]</i>	35	47.9
<i>Generalized Anxiety Disorder[†]</i>	44	60.3
<i>Social Phobia[†]</i>	32	43.8
<i>ODD[‡]</i>	30	41.1
<i>ADHD-Inattentive[‡]</i>	24	32.9
<i>ADHD-Hyperactive[‡]</i>	7	9.6
<i>ADHD-Combined[‡]</i>	4	5.5
<i>BPD[§]</i>	18	24.7
<i>Separation Anxiety[†]</i>	9	12.3
<i>PTSD[†]</i>	6	8.2
<i>OCD[†]</i>	2	2.7
<i>CD[‡]</i>	2	2.7
<i>Number of Diagnoses (Mean)</i>	2.4	

Note: Development and Wellbeing Assessment (DAWBA)[†]. Vanderbilt ADHD Parent Rating Scale (VADPRS)[‡]. Diagnostic Interview for Borderline (DIB)[§].

Association between disordered eating behaviour and BPD diagnosis

Compared to those without a diagnosis of BPD (*Mean score (disordered eating) = 27.1, SD = 3.39, n = 55*), individuals with BPD (*M = 30.4, SD = 3.68, n = 18*) exhibited significantly more disordered eating behaviour; $t(72) = 3.61, p < .01, r_{pb} = .393, p < .01$.

Association between BPD symptoms and disordered eating behaviour

All nine facets of BPD, except intense anger, were significantly correlated with disordered eating behaviour (Table 2). As its correlation was the highest of all facets, Abandonment was entered first in a regression analysis, explaining 32% of the variance in disordered eating behaviour ($F(1, 72) = 33.682, p < .001, MSE = 9.54, \beta = .565$). Suicide/Self-Mutilation contributed to the model, explaining an additional 5% of the variance in disordered eating behaviour ($F(2, 71) = 21.121, p < .05, MSE = 8.91, \beta = .276$). Together, both Abandonment and Suicide/Self-Mutilation explained 37% of the variance in disordered eating behaviour. All other variables (Impulsivity, Affective Instability, Dysfunctional Relationships, Self-Image, Emptiness, Intense Anger and Quasi-Psychotic States) did not significantly contribute to the model.

Table 2: BPQ Subscales Descriptive Statistics and Correlations with Disordered Eating

	<i>M</i>	<i>SD</i>	<i>Disordered Eating</i>	<i>Impulsivity</i>	<i>Affective Instability</i>	<i>Abandonment</i>	<i>Relationships</i>	<i>Self- Image</i>	<i>Suicide/Self- Mutilation</i>	<i>Emptiness</i>	<i>Intense Anger</i>	<i>Quasi- Psychotic States</i>
<i>Disordered Eating</i>	27.9	3.72	1	.313**	.411**	.565**	.436**	.466**	.499**	.489**	.199	.332**
<i>Impulsivity</i>	7.52	2.66		1	.329**	.335**	.225*	.241*	.428**	.223*	.375**	.363**
<i>Affective Instability</i>	4.80	2.98			1	.409**	.381**	.378**	.424**	.476**	.442**	.226*
<i>Abandonment</i>	4.75	2.47				1	.692**	.547**	.519**	.639**	.386**	.537**
<i>Relationships</i>	5.71	2.82					1	.557**	.361**	.616**	.379**	.413**
<i>Self-Image</i>	4.44	2.01						1	.405**	.845**	.425**	.307**
<i>Suicide/Self- Mutilation</i>	6.38	3.17							1	.421**	.155	.253*
<i>Emptiness</i>	5.77	2.92								1	.508**	.394**
<i>Intense Anger</i>	2.68	1.96									1	.408**
<i>Quasi- Psychotic States</i>	2.05	1.57										1

Note: Significance at $p < .05$ is denoted by *, $p < .01$ by **

Abandonment as a mediator of BPD and disordered eating behaviour

We evaluated whether Abandonment would mediate the relation between BPD symptoms and disordered eating behaviour (Table 3). Regression analysis was used to investigate this hypothesis utilizing the method by Preacher and Hayes (2013). Results indicated that BPD was a significant predictor of disordered eating behaviour, $R^2 = .15$, $F(1, 71) = 13.0$, $p < .001$, $\beta = .39$, $SE = 0.1091$, 95% CI [.1758, .6109]. As well, Abandonment was a significant predictor of

disordered eating behaviour, $\beta = .49$, $SE = .11$, 95% CI [.26, .70]. The relation between disordered eating behaviour and BPD became non-significant after including Abandonment as a mediator, $R^2 = .34$, $F(2, 70) = 18.14$, $p > .05$, $\beta = .17$, $SE = .11$, 95% CI [-.04, .39]. After bootstrapping to 1000 cases, the indirect effect of BPD to disordered eating behaviour through Abandonment was $\beta = .22$, $SE = 0.64$, 95% CI [.11, .34]. Since $\beta_c = .17 < \beta_c = .39$ and β_c is no longer significant, Abandonment is a full mediator of this relation and the hypothesis is supported (Figure 1).

Table 3: Regression analysis of BPD and Abandonment as predictors of disordered eating behaviour

	<i>B</i>	<i>R</i> ²	<i>F</i>	<i>T</i>
<i>Model 1:</i>				
<i>BPD</i>	.393**	.155	13.0**	3.61**
<i>Model 2:</i>				
<i>BPD and Abandonment</i>		.341	18.1***	
1. <i>BPD</i>	.172			1.58
2. <i>Abandonment</i>	.485***			4.45***

*Note: Significance at $p < .05$ is denoted by *, $p < .01$ by ** and $p < .001$ by ****

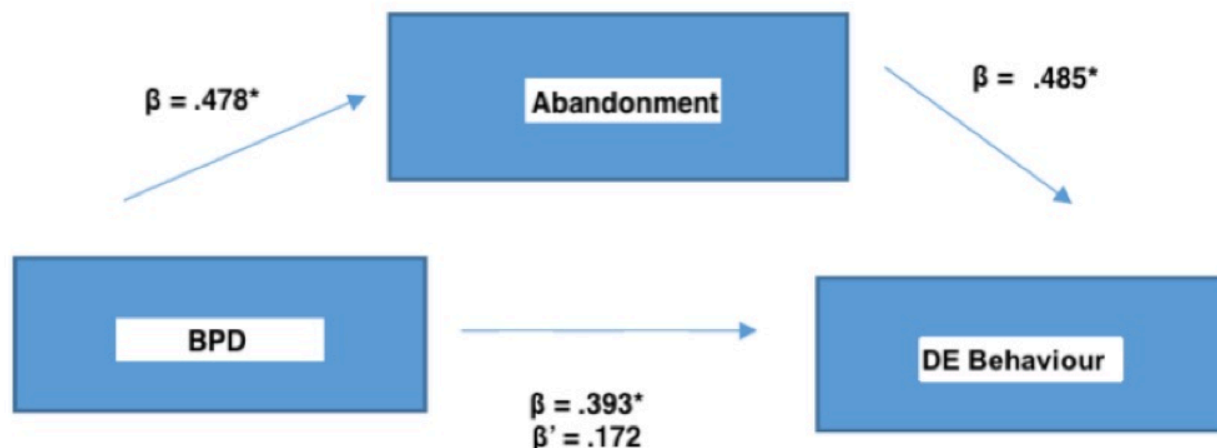


Figure 1: Results of regression analysis with Borderline Personality Disorder symptoms (BPD), Abandonment and Disordered Eating behaviour (DE behaviour)

Discussion

This study was the first to investigate the relationship between disordered eating behaviour and BPD symptoms in a clinical sample of adolescent girls who did not have eating disorders. We found that girls with BPD had significantly more disordered eating behaviour than those without a BPD diagnosis and that disordered eating behaviour and BPD symptoms were strongly correlated. Other studies have examined this relationship in youth with eating disorders, in samples where disordered eating as well as BPD symptoms would be prevalent. Selby, Ward & Joiner (2010) identified a relationship between BPD and disordered eating in adults and found that BPD symptoms predicted higher levels of rejection sensitivity, leading to emotion dysregulation and then subsequent dysregulated eating behaviour.

This study replicated previous findings that both BPD and disordered eating were associated with rejection sensitivity. Staebler and colleagues (2011) compared levels of rejection sensitivity in patients with BPD compared to other clinical disorders and found that BPD patients

had the highest scores on measures of rejection sensitivity, even when compared to patients with social anxiety disorder. Other research has also shown that even those with remitted BPD had higher levels of rejection sensitivity than healthy controls, indicating that this factor is persistent and requires increased attention during treatment (Bungert et al., 2015). With regards to disordered eating, De Paoli and colleagues found that rejection sensitivity mediated the relationship between disordered eating and insecure attachment, which is also prevalent in BPD (2017). Further, Cardi et al. (2013) found that lifetime eating disorder patients showed an attentional bias to rejecting faces compared to healthy controls, suggesting these patients may have elevated rejection sensitivity.

We found that rejection sensitivity accounted for 32% of the relationship between BPD and disordered eating in adolescents. Studies of adults have identified similar findings. De Paoli and colleagues (2017) found that rejection sensitivity mediated the relationship between disordered eating and insecure attachment, which is also prevalent in BPD. Other studies have found that emotional cascades (intense rumination and negative affect) mediated the relationship between BPD and binge-eating, suggesting that other dysfunctional cognitions may also contribute to this relationship (Selby et al., 2009). Selby, Ward & Joiner (2010) posited that adults with BPD may partake in disordered eating behaviour as an emotion regulation strategy to cope with feelings of rejection. This proposed mechanism may also apply to adolescents with BPD or without BPD and requires further investigation in longitudinal studies.

Clinical Implications

Disordered eating is highly prevalent in adolescents and is associated with long-lasting impacts on well-being such as depression, weight gain and other health concerns (Neumark-

Sztainer et al. 2011, 2012; Stephen et al. 2014) and can be easily missed due to its sub-threshold nature. Consideration should be given to screening for disordered eating in youth, particularly those who present with BPD symptoms.

Given our findings about the relationship between BPD and disordered eating, it is possible that disordered eating may be used by adolescents with BPD to regulate their emotions in situations where rejection sensitivity is exacerbated. Therapies targeting emotion regulation skill development such as Dialectical Behaviour Therapy (DBT) may be helpful to treat disordered eating in these populations (Linehan, 1993). A randomized controlled trial found that DBT in adults was beneficial in reducing binge eating and was found to have a much lower dropout than other therapies (Safer & Jo, 2010). Further, given the finding of rejection sensitivity as a mediator of disordered eating, targeting rejection sensitivity as a possible process variable with the therapy client by challenging thoughts of perceived abandonment may help reduce disordered eating. In Linehan's DBT manual, the interpersonal effectiveness module focuses on teaching clients social skills to help stabilize difficult relationship dynamics (May, Richardi & Barth, 2016). Rejection sensitivity has been shown to be a persistent issue even in remitted patients, indicating that this factor in treatment may be lacking (Bungert et al., 2015) and is often not directly addressed by DBT (Biskin, 2015). Incorporating a greater focus on rejection sensitivity specifically by educating clients about this concept and teaching methods to navigate situations in which they may be rejection sensitive may lead to better treatment success.

Limitations and Future Directions:

The findings of our study should be considered in the context of its limitations. Our findings cannot be generalized to the studies examining youth with eating disorders. No

participants in our study were being treated clinically for an eating disorder, although as our data show, there was a range of disordered eating behaviour. Second, the sample consisted exclusively of girls. Studying the relationship in boys is important as adolescent males and females have different rates of psychopathology (Zahn-Waxler, Shirtcliff & Marceau, 2008), including eating disorders (Raevuori, Keski-Rahkonen & Hoek, 2014) and likely also disordered eating (Kinasz et al., 2016). In fact, in a five-year longitudinal study by Lee & Vaillancourt, adolescent girls consistently reported higher disordered eating scores compared to boys except during one time point (Lee & Vaillancourt, 2018). Third, the sample was cross-sectional which does not allow inference to causality. Further research should examine this relationship in a longitudinal sample to observe if this relationship is consistent over time.

Future studies may also benefit from examining the type of rejection sensitivity (eg. Appearance-Based rejection sensitivity; De Paoli et al., 2017) that most contributes to disordered eating behaviour in BPD patients to allow for targeting of more specific treatment. Appearance-based rejection sensitivity differs from personal rejection sensitivity, which assesses sensitivity to rejection in general, as it is characterized by anxious concerns regarding expectations about being rejected based on physical attractiveness specifically (Park, 2007). This form of rejection sensitivity has been found to predict disordered eating in community samples (Park, 2007), increase interest in cosmetic surgery in college students (Park, Calogero, Harwin & DiRaddo, 2009) and was associated with more severe body dysmorphic disorder (BDD) and depressive symptoms in BDD patients (Kelly, Didie & Phillips, 2014). This form of rejection sensitivity was also found to be a mediator of the relationship between social anxiety symptoms and disordered eating cognitions and behaviour in a community sample of males and females (Linardon et al., 2017). Despite these findings, there are no known studies that have investigated

appearance-based rejection sensitivity in those with BPD, or in eating disorder samples in general.

In conclusion, we found that disordered eating behaviour are highly prevalent in adolescent girls with BPD and that the relationship between BPD and disordered eating is mediated by rejection sensitivity. Our results contribute to an increasing body of literature that examines the etiology of BPD in adolescents and its relationship to other behaviour and conditions.

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Chapter 3

Self-esteem moderates the perception of peer rejection in adolescents with features of borderline personality disorder

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Keywords: Borderline Personality Disorder, Rejection Sensitivity, Perceived Peer Rejection, Self-Esteem, Adolescence

Abstract

Objective: The present study sought to examine the relationship between rejection sensitivity, features of borderline personality disorder (BPD) and self-esteem in a longitudinal community sample of adolescent girls in grades 8 to 10. We hypothesized that features of BPD and rejection sensitivity would be strongly associated, and that levels of self-esteem would negatively influence this association over time.

Method: Participants were 307 female students recruited from a random community sample of 51 classrooms in the Hamilton area. Girls were followed starting in grade 5 and data from grades 8 to 10 were used in this study. Measures utilized included a demographic questionnaire, The Borderline Personality Feature Scale for Children (BPFS-C), and The Behavioural Assessment System for Children-2 (BASC-2, interpersonal relations and self-esteem subscales).

Results: The results indicated that BPD features, rejection sensitivity and self-esteem were moderately to strongly correlated at all three time points and that self-esteem negatively moderated this relationship over time. This moderation was significant at high, moderate and low levels of self-esteem.

Conclusions: This paper provided evidence to support previous findings that self-esteem influences rejection sensitivity in adolescence. The potential importance of targeting self-esteem through intervention is supported by these findings, especially for high-risk adolescents who have BPD features. This study is novel as it is the first to examine the relationship between self-esteem, perceived peer rejection and borderline personality disorder features across adolescent girls. Further research is required to extend our understanding on rejection sensitivity and to examine the clinical utility of targeting self-esteem in adolescence as a preventative mechanism.

Self-esteem moderates the perception of peer rejection in adolescents with features of borderline
personality disorder

Introduction

Borderline Personality Disorder (BPD) is a serious mental disorder characterized by patterns of affective instability, impulsivity, difficulties with interpersonal relationships and disturbed self-image. The diagnosis can be reliably identified in adolescence and is associated with persisting complex psychopathology and interpersonal difficulties (Kaess, Brunner & Chanen, 2014). Symptoms of BPD, in the absence of diagnosis, are important to examine in adolescents as higher levels of symptoms are linked with poor psychological adjustment, difficulties attaining life goals and decreased overall well-being (Cramer, Torgersen & Kringlen, 2006). Adolescents with higher levels of BPD scored lower on life satisfaction during subsequent follow-up periods into adulthood (Winograd, Cohen & Chen, 2008) and BPD symptoms predicted lower academic achievement, occupational success, and fewer attained adult milestones. Early adolescent BPD symptoms are also associated with poor grades, school dropout, and social problems. These social problems include short-lasting friendships, absence of close friends during a two-year follow up (Bernstein et al., 1993) and romantic dysfunction such as chronic interpersonal stress, relational conflicts, abuse and unwanted pregnancy in young girls (Daley, Burge & Hammen, 2000).

The developmental and social processes associated with the course of BPD symptoms in adolescence are important to examine because knowledge of these processes may afford opportunities for prevention or symptom modification in youth at risk. A core symptom domain of BPD, which may be amenable to early intervention is interpersonal dysfunction. One of the

diagnostic criteria relating to the interpersonal dysfunction of BPD is the “anxious preoccupation with real or imagined abandonment” irrespective of the companion’s intentions (APA, 2013). This concept of abandonment bears a marked similarity to rejection sensitivity, a construct from social psychology defined as the cognitive-affective disposition that influences expectations, perceptions and behaviour within the context of a social situation (Downey & Feldman, 1996). Rejection sensitivity was postulated as a “defensive motivational system” that allows an individual to detect and react to a potential threat that interferes with belonging and inclusivity (Downey et al., 2004; Pietrzak, Downey & Ayduk, 2005). Downey & colleagues (2004) observed an enhanced startle reflex response in adults with high rejection sensitivity while viewing rejection-related pictures compared to pictures showing acceptance or other non-interpersonal positive or negative scenes when compared to those with low rejection sensitivity scores. Although feelings of rejection can be persistent throughout the lifespan, the long-term impact of these feelings is most critical in early adolescence (10-14; Feldman & Downey, 1994) and can impact the trajectory of engaging in healthy adult relationships later in life (Hafen et al., 2014). As rejection sensitivity is a feature of BPD in adolescence, it may be an excellent target for early intervention given its links to future relational dysfunction and long-lasting pathology.

Relationship of Rejection Sensitivity and BPD

High rejection sensitivity is associated with mental health disorders, especially BPD (Rosenbach & Renneberg, 2011) and particularly in adolescence (Martson et al., 2010). Several adult studies reported that individuals with BPD had significantly higher feelings of rejection sensitivity even when compared to individuals with other mood or anxiety disorders (Staebler, 2011, Berenson et al., 2011; Domsalla et al., 2014). Bungert and colleagues reported that both acute and remitted BPD patients had higher rejection sensitivity scores compared to healthy

controls (2015). In fact, in several nonclinical samples, the number of BPD, or BPD features reported was directly related to the degree of rejection sensitivity in participants (Ayduk, Zayas et al., 2008; Boldeo et al., 2009). Little research has been done examining the underlying mechanisms relating rejection sensitivity to BPD features in adolescents, however, more is certainly required. This is important because adolescents are likely to be more sensitive to social rejection than adults, making this construct less clearly associated with BPD during this time period. In one recent adolescent study, the combination of high rejection sensitivity and BPD features predicted poor life satisfaction but only in girls, implying that this mechanism may also be gender-specific (Koster et al., 2018). More research is required to allow for inference on the factors involved in the manifestation of rejection sensitivity in adolescents, particularly those with BPD features, and this will be the focus of the current study.

Self-Esteem and BPD

Another important dimension of BPD is identity disturbance, defined in the DSM-5 as “markedly and persistently unstable self-image or sense of self”. Individuals with BPD have a less stable self-image compared to healthy individuals (Lumsden, 1993). A sub-domain of self-image is self-esteem (Bungert et al., 2015), and with adolescence acting as a period of development of a sense of who one is and what they believe, self-esteem may be a useful indicator of identity disturbance in youth. There are several theories as to how self-esteem influences human behaviour and the sense of belonging, one of which is the Sociometer Theory (Leary et al., 1995; Kirkpatrick & Ellis, 2001; Leary, 2005). This theory posits self-esteem as an affective disposition or state that assists individuals in predicting the potential for social rejection in a given situation; it is a “sociometer”. Thus, one’s self-esteem serves to help them monitor the degree to which they belong in a group by way of feedback on positive or negative interactions.

Hypothetically, low self-esteem influences a person's perception that others reject or exclude them, and high self-esteem influences whether a person feels accepted and included in a given group (Leary et al., 1995).

Support for the sociometer theory can be found in research on adults with BPD.

Individuals with BPD have significantly lower self-esteem when compared to healthy controls (Kanter, 2001), patients with major depression (Abela, Payne & Moussaly, 2003) and even remitted patients with BPD (Bungert et al., 2015). Self-esteem also contributes to the severity and intensity with which borderline patients experience negative emotions (Rosenthal et al., 2006) and influences BPD prognosis long-term (Paris and Zweig-Frank, 2001; Choi-Kain et al., 2010). One study also found that patients with BPD who engage in NSSI have lower self-esteem than BPD patients who do not (Almeida, 2018). Situations that induce fear of rejection and abandonment, real or imaginary, seem to threaten BPD patients' self-esteem and trigger maladaptive behaviours (Stanley and Siever, 2010). It has also been suggested that self-esteem is linked with the number of BPD features in healthy individuals. Tolpin and colleagues (2004) found that students with high BPD features had significantly lower self-esteem and more instability in their daily self-esteem when compared to those with low BPD features.

Rejection Sensitivity, Self-Esteem and BPD

Downey and Feldman, two pioneer researchers in the field of Rejection Sensitivity, proposed a direct association between rejection sensitivity and self-esteem (1996), and this finding has been replicated in additional studies. Kashdan and colleagues found that low self-esteem predicted a heightened distress-related neural response during a social rejection task (2014). Individuals with low self-esteem also experienced elevated cortisol (stress response)

levels when faced with rejection (Pruessner et al., 1999) as well as negative affect (Nezlek and Plesko, 2001). Mirroring these results, Leary and colleagues (1995) postulated a causal relationship between social rejection and self-esteem, arguing that individuals who perceive interpersonal interactions as rejecting and exclusionary tend to develop low self-esteem and those that perceive them as accepting and inclusionary are disposed to higher self-esteem. However, causal directionality has yet to be definitively examined in the current literature.

The biological basis of social rejection has also been explored. Brain areas such as the dorsal-anterior cingulate cortex (dACC) are activated when people are socially rejected (DeWall et al., 2010; Onoda et al., 2010) and even in response to viewing rejection-related imagery (Kross et al., 2007). Activity in the dACC is also elevated among those who display greater distress as a result of being rejected by others (Einseberger., 2003; Masten, Telzer & Eisenberger, 2011). Several researchers have posited that self-esteem may in fact modulate these neural responses to social rejection, implying an intrinsic link between these two constructs. Onoda and colleagues (2010) found that in a virtual ball-tossing task called “Cyberball”, a game that induces feelings of exclusion among participants, people with lower levels of reported self-esteem showed greater activation in the dACC in response to social rejection revealing that low self-esteem was a risk factor for heightened neurological distress in response to social rejection. These researchers also found positive connectivity in the dACC and prefrontal cortex for the lower self-esteem group and negative connectivity between these brain areas for those in the higher self-esteem group (Onoda et al., 2010). Finally, Kashdan and colleagues found that low self-esteem and negative emotion differentiation represented a “toxic combination” that resulted in greater activation in the dACC during the same Cyberball social rejection paradigm (2014).

To date, the literature has demonstrated that BPD, rejection sensitivity and self-esteem are all strongly interrelated (Rosenbach & Renneberg, 2011; Stanley and Siever, 2010; Onoda et al., 2010), with one cross-sectional adult study suggesting that BPD severity predicted higher rejection sensitivity scores with self-esteem mitigating this relationship (Bungert et al., 2015). However, no study has examined the longitudinal associations between BPD features, self-esteem and perceived peer rejection in a community sample of adolescents. There are many benefits to longitudinal studies over cross-sectional designs such as the ability to follow change over time, remove recall bias in participants and account for cohort effects (Caruana et al., 2015). Most importantly, this method of study also assists in identifying developmental factors that persist and may contribute to BPD diagnosis in the future, making these variables important targets for early intervention or prevention.

The first objective of this study was to examine the associations between rejection sensitivity, self-esteem and BPD features in adolescent girls during grades 8 to 10. It was hypothesized that self-esteem, perceived peer rejection and BPD would be highly inter-correlated, with self-esteem being negatively correlated with BPD and perceived peer rejection. The second objective was to investigate the potential moderating role of self-esteem as a unique mechanism in the proposed association between BPD features and rejection sensitivity. The hypothesis for this objective was that self-esteem, acting as a sociometer, moderates the relationship between BPD features and perceived peer rejection over time with high self-esteem decreasing the impact of BPD features on perceived peer rejection and low self-esteem amplifying the impact of BPD features on perceived peer rejection.

Method

Procedure and Participants

Data was collected from the McMaster Teen Study, a longitudinal study examining the stability and change of mental health symptoms in relation to contextual variables from childhood into adolescence in a community sample of boys and girls. Data collection began in 2008 in which various grade 5 classrooms were selected from a random sample of 51 schools in the area. This study is ongoing, and participants are currently 21 years old. Participants were compensated for their time throughout the study and data were collected in schools during the initial assessment (grade 5) and then at home or online during subsequent follow-ups. Data for the current study selected only girls from which only 307 reported data for the selected variables which were required in order to run analyses.

During initial intake in their grade 5-year, 875 youth participants agreed to participate in the study and 703 (80%) of all youth participated during at least one other time point for the remainder of the study. All parents and youth consented during each year of the study and all procedures were approved by the university ethics board.

Measures

Demographic Variables

Demographic variables such as age, sex, ethnicity, household income, and parental education level were collected to examine participant differences. Ethnicity identification was based on both parent and student reports and consisted of 9 response options (1. European-Canadian (White), 2. Middle-Eastern-Canadian, 3. African/West-Indian-Canadian (Black), 4.

Asian-Canadian, 5. South-Asian-Canadian, 6. Native-Canadian, 7. South/Latin American-Canadian, 8. Other, 9. I don't know). Household income was reported by parents using an 8-point scale ranging from \$20,000 annually to >\$80,000). Parents also self-reported their highest level of education using a 5-point scale (1. did not complete high school, 2. high school, 3. college diploma or trades certificate, 4. undergraduate degree, 5. graduate degree). All of these variables were collected at time point 1 (grade 5).

Borderline Personality Disorder Features

The Borderline Personality Feature Scale for Children (BPFS-C; Crick, Murray-Close & Woods, 2005) was used to examine borderline personality disorder features in the sample. This scale consists of 24 items rated on a Likert scale with responses ranging from 1 (not true at all) to 5 (always true). Scores are summed with higher scores indicating greater levels of BPD features. The total possible summed score is 120. This measure has an internal consistency of 0.76, modest concordance between parent and self-report as well as demonstrated concurrent validity with diagnosis (Sharp et al., 2011). The internal consistency for the BPFS-C for this sample was $\alpha = 0.91$.

Self-Esteem

Self-Esteem was measured using the self-esteem rating scale from the Behavioural Assessment System for Children-2 (BASC-2; Reynolds & Kamphaus, 2004) which measures a participant's feelings about oneself, self-respect and self-acceptance. This subscale consists of 8 items, four true and false dichotomous items and four on a Likert scale ranging from 0 (Never) to 3 (Almost always). Examples of statements include "I like who I am" and "I am upset about my looks". Internal consistency for this subscale was .89.

Perceived peer rejection

Rejection sensitivity was quantified utilizing a perceived peer rejection variable which was measured utilizing the interpersonal relations subscale from the Behavioural Assessment System for Children-2 (BASC-2), self-report of personality child and adolescent versions, consisting of 4 items (Reynolds & Kamphaus, 2004). Peer rejection items were rated on a dichotomous true/false scale for 2 items: “My classmates don’t like to be with me” and “Other children don’t like to be with me” and on a 4-point Likert scale ranging from “0=Never” to “3=Almost Always” for 2 items: “Other kids hate to be with me” and “I feel that nobody likes me”. These items were scored according to the BASC-2 manual and summed to a composite score indicating the degree of perceived peer rejection with the highest score being 10. Internal consistency for this subscale was .81.

Analytic Approach:

All statistical analyses were performed using SPSS 22.0 statistical software (IBM, 2013). Descriptive statistics were calculated for all continuous variables (Table 1). A series of independent 2-tailed t-tests and χ^2 tests were conducted to examine whether participants who were included in the analytic sample differed from those who were not in terms of demographics assessed at baseline (grade 5).

Dataset outliers were assessed using a standard score cut off of ± 3.29 or influential observations using standardized DFBETA (cut-off of $|2|$). Bivariate correlations were examined to test the relationship between the primary study variables. The Bonferroni correction was utilized adjust the significance values to control for multiple comparisons.

To test the longitudinal associations, specifically if the relationship between borderline personality features and perceived peer rejection was moderated by self-esteem, moderation was tested using PROCESS Hayes' (2013) PROCESS Macro v3.0, which is an observed variable ordinary least squares regression path analysis tool estimating direct and indirect effects. The predictor (borderline personality features) was measured at time 1 (grade 8), the moderator (self-esteem) was measured at time 2 (grade 9) and the dependent variable (PPR) was measured at time 3 (grade 10). In step 1 of the analysis, borderline personality features were entered as a predictor of perceived peer rejection, and in step 2, the interaction term (BPD times the self-esteem at time 2) was entered to explicitly test for moderation. Violations of assumptions of multiple regression analysis were checked to ensure validity of the results. The assumptions include adequacy of sample size, normality, a lack of multicollinearity, non-homoscedasticity, and independence of observations.

Results

Preliminary Data Analysis

A total of 307 female students provided data for the selected variables when they were in grades 8-10. In grade 5, during initial assessment, the mean (SD) age of the students was 10.7 (.33) years and 70 % of the sample identified as white, 2.5% as Middle-Eastern, 3.5% as Black, 1.1% as South-Asian Canadian, 1.8% as Native-Canadian, .7% as South/Latin American-Canadian, 3.9% as other and 13.7 as "I don't know". The median household income of participants was between \$60,000 and \$70,000 CAD a year. Compared to participants who did not report any data, students in the analytic sample had higher mean levels of household income ($t = 5.11, P < .001$), and higher parental education levels ($t = 4.69, P < .001$). There was no difference in ethnicity between groups who reported and did not report data $\chi^2 = 10.1, P > .05$.

Descriptive statistics are presented in Table 1. Moderation assumptions were satisfied, with values of skewness and kurtosis under the recommended ranges of 3 and 10, respectively (Kline, 2011). To address missing data, Little's MCAR test indicated that the data were missing completely at random, $\chi^2(9) = 12.8, p=.2$. The BPD features subscale had 12% of cases missing, the self-esteem factor had 15% and the perceived peer rejection variable had 19% of cases missing. Expectation-maximization, which generates imputed values consistent with population values, was used to impute missing data in the self-esteem, borderline and perceived peer rejection variables. Means, standard deviations, and correlations between variables are presented in Table 1. Borderline and self-esteem variables were highly to moderately correlated with perceived peer rejection ($p < .01$) at all time points.

Table 1: Table of Descriptive Statistics and Correlations (N = 307)

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9
1. Borderline Features (Time 1)	32.1	14.9	–	.708**	.628**	-.566**	-.507**	-.409**	.389**	.382**	.435*
2. Borderline Features (Time 2)	33.8	15.5	.708**	–	.729**	-.476**	-.594**	-.491**	.369**	.468**	.409**
3. Borderline Features (Time 3)	35.8	15.6	.628**	.729**	–	-.367**	-.472**	-.632**	.264**	.333**	.535**
4. Self Esteem (Time 1)	15.1	4.9	-.566**	-.476**	-.367**	–	.700**	.512**	-.414**	-.428**	-.375**
5. Self-Esteem (Time 2)	13.9	5.3	-.507**	-.594**	-.472**	.700**	–	.717**	-.411**	-.622**	-.454**
6. Self-Esteem (Time 3)	13.3	5.6	-.409**	-.491**	-.632**	.512**	.717**	–	-.270**	-.425**	-.631**
7. Perceived Peer Rejection (Time 1)	1.0	1.8	.389**	.369**	.264**	-.414**	-.411**	-.270**	–	.535**	.339**
8. Perceived Peer Rejection (Time 2)	1.0	1.9	.382**	.468**	.333**	-.428**	-.622**	-.425**	.535**	–	.523**
9. Perceived Peer Rejection (Time 3)	1.3	2.1	.435**	.409**	.535**	-.375**	-.454**	-.631**	.339**	.523**	–

Note: $p < .01$ **

Self-Esteem as a Moderator

We assessed moderation using Hayes' (2013) PROCESS Macro v3.0 to investigate the hypothesis that self-esteem moderates the effect of BPD features on perceived peer rejection longitudinally. For the moderation analysis, both independent variables (BPD features and self-esteem) were entered as predictors of the dependent variable in step 1, and the interaction term (mean-centered) was entered in at step 2 to explicitly test for moderation.

The relationship between BPD features and perceived peer rejection was hypothesized to be moderated by self-esteem longitudinally. In step 1, BPD features and self-esteem were entered as predictors. Both BPD features and self-esteem were associated with perceived peer rejection in this block ($p < .001$). In step 2, as expected, self-esteem was found to be a significant moderator, $b = .2431$, $SE = .063$ 95% CI [.38, .11]. Overall, the moderation model predicted 30% of the perceived peer rejection variance, $F(3, 303) = 43.7$ $p = .000$, $\Delta R^2 = .302$. Simple slopes analyses indicated that the relationship between BPD features and perceived peer rejection was moderated by self-esteem at all levels of high, moderate and low self-esteem ($p < .001$ for all values of the moderator). To test for covariates, household income and parent education were added to the model but did not contribute significantly ($p > .05$).

Discussion

The purpose of this study was to examine the relationships between perceived peer rejection, self-esteem and borderline personality disorder features in a longitudinal sample of adolescent girls from grades 8 to 10. We found that the variables were moderately to strongly correlated at all three time points but importantly, that self-esteem negatively predicted the variables both cross sectionally and over time. Extending these findings, we showed that self-esteem influenced the relationship between BPD features and perceived peer rejection over time.

This is consistent with previous research in a clinical sample of adults where self-esteem was an important factor in the relationship between rejection sensitivity and BPD symptom severity in both remitted and acute BPD patients (Bungert et al., 2015). Two college sample also found that BPD features predicted low self-esteem, negative affect and feelings of rejection (Ayduk et al., 2000; Ayduk et al., 2008). This study is the first to examine the relationship between these variables in a longitudinal sample of female adolescents, assisting in bridging the knowledge regarding developmental factors that may contribute to the eventual diagnosis of BPD in adulthood in high-risk youth.

Self-esteem may be a significant factor to consider in helping young people with BPD features who struggle socially. The present study found that self-esteem moderated 30% of the variance between BPD features and perceived peer rejection. Onoda et al (2010) found that self-esteem moderated the relationship between positive or negative connectivity in brain areas linked to rejection sensitivity. Executive control – operationalized as the ability to delay gratification - has been shown to moderate the relationship between rejection sensitivity and BPD features in two studies (Ayduk et al., 2000; Ayduk et al., 2008). Other have found that the ability to delay gratification in childhood has been demonstrated as a protective factor against high rejection sensitivity (Mischel, Shoda & Rodriguez, 1989) in adulthood. Interestingly, in another study, children who demonstrated difficulty with delayed gratification at age 4 had lower self-esteem, ineffective coping strategies and impaired social functioning at age 28 during a follow-up study (Ayduk et al., 2000). These findings support an important relationship between self-esteem and rejection sensitivity and how executive control – or its maturation over time - may be relevant.

Strengths, Limitations and Future Directions

The longitudinal follow up over three consecutive years in a population-based sample are two major strengths to this study. Our findings cannot be generalized to clinical samples as formal diagnosis of BPD was not obtained in MacTeen during the years surveyed in this study. All measures in this study also relied on youth self-report, which reflects subjective experience. The impact of self-report bias in this study may be most important for the report of peer rejection as actual rejection experiences are not known. However, the perception of rejection would appear to be most relevant for this study as it has been demonstrated that even in the absence of supporting evidence, an individual is still affected by the *perception* of rejection (Baumeister & Leary, 1995.) Self report measures about self-esteem in BPD may be especially subject to bias due to the impact of high negative affect on cognition in BPD (Levy & Farber, 1986). Implicit self-esteem (ISE) is defined as automatic self-evaluation which taps into the unconscious processes of self-esteem which is free from conscious control and reflective bias (Falk & Heine, 2014) One study by Hedrick and colleagues utilized a method of implicit self-esteem with BPD patients, the Implicit Association Task, in which words of positive or negative valence are sorted as “self” or “other”. The researchers found that this tool may be more reliable than traditional measures of self-esteem to examine this construct in those with BPD (2012). Future studies would benefit from incorporating both implicit and explicit measures of self-esteem to ensure the validity of reported results.

Our target population consisted exclusively of girls due to the literature suggesting that BPD is more prevalent in girls (Bradley, Zittel & Western, 2005; Johnson et al., 2003) and that girls have significantly lower self-esteem during adolescence (Quatman & Watson, 2001). Gender differences in rejection sensitivity are mixed, with some studies indicating that there is

no gender difference in adolescence (Downey et al., 1998) or in college students (Ayduk, Gyurak, & Luerksen, 2009; Mellin, 2008) and others showing gender differences (Erozkan, 2009; Volz & Kerig, 2010; Marston et al., 2010). Women and men high in rejection sensitivity respond differently to rejecting experiences, with women being more likely to engage in both verbal and non-verbal hostility (Ayduk et al., 1999) and men responding with greater physical violence towards their partner (Downey, Feldman & Ayduk, 2000). Future studies would benefit from examining gender differences in rejection sensitivity and the role that self-esteem or BPD features may play in this relationship.

Our findings have implications for interventions for youth experiencing borderline symptoms. Rejection sensitivity is a core feature of BPD and our research suggests that targeting self-esteem in therapeutic intervention may mitigate feelings of perceived peer rejection. Common therapeutic techniques used in BPD treatment, such as dialectical behaviour therapy, can include self-esteem improvement worksheets but do not specifically target rejection sensitivity awareness or skills to recognize or regulate it. Thus, despite not being targeted directly, it is likely that rejection sensitivity is reduced in these psychotherapy sessions due to the targeting of self-esteem. Overall, existing treatments for BPD in youth may or may not target rejection sensitivity or self-esteem directly and specific attention to these constructs are needed, particularly for self-esteem. Some approaches that exist for targeting self-esteem in adolescents include cognitive-behaviour therapy by identifying and challenging dysfunctional beliefs as well as school-based interventions (Emler, 2001; Haney & Durlak, 1998). School-based interventions, in which self-esteem education is embedded into the curriculum, are relatively effective and can reach a large number of children at a low cost (Haney & Durlak, 1998). However, little experimental data exists on self-esteem interventions in adolescents and further research is

required to explore the nature of BPD in adolescents and the factors that may contribute to development of this disorder during the lifespan.

Conclusion

This study adds evidence from a longitudinal sample that a young woman's self esteem may have significant and important implications for how she perceives social rejection, particularly when borderline personality features are part of her lived experience. Working on self esteem may help buffer the impact of BPD features on perceived peer rejection and possibly other important functional outcomes in such youth. These findings add to the growing body of literature that examine factors that influence borderline personality disorder features and outcomes of rejection in adolescent girls. Clinicians should be aware of these findings and target self-esteem in preventative and therapeutic interventions to mitigate rejection sensitivity in adolescents. Further studies are required to extend our understanding on rejection sensitivity and self-esteem and the impact working on these features clinically can have for adolescents with and without BPD features.

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Chapter 4

Discussion

The work outlined in this thesis contributes to the body of research aimed at understanding the mechanisms relating to rejection sensitivity and BPD features in adolescence. BPD in adolescents benefits from early intervention; identifying targets for intervention, such as rejection sensitivity or low self-esteem as discussed in the thesis, is an important public health priority. Hypotheses were examined regarding self-esteem acting as a moderator of this relationship as well as disordered eating behaviour as a potential outcome for girls who exhibit rejection sensitivity and BPD features.

In chapter 2, a manuscript was presented with the objective of examining the relationship between rejection sensitivity, measured by the abandonment scale of the BPQ, borderline personality disorder and disordered eating behavior in adolescent girls. The results showed that girls with elevated BPD symptoms exhibited significantly more disordered eating behaviour than girls without BPD and that rejection sensitivity acted as a full mediator of the relationship between BPD and disordered eating, accounting for about 32% of the variance. Additionally, eight of the nine facets of BPD (Impulsivity, Affective Instability, Abandonment, Dysfunctional Relationships, Self-Image, Suicide/Self-Mutilation, Emptiness, Intense Anger) were each strongly correlated with disordered eating behavior, even though abandonment was by far the most strongly associated with the behaviour. This finding indicates that disordered eating behaviours are associated with the various presentations of BPD, as only five symptoms are required to meet diagnostic criteria (Biskin & Paris, 2012). This study replicated previous findings identifying that BPD and disordered eating were associated with rejection sensitivity (De Paoli et al., 2017; Selby, Ward & Joiner, 2010), however, this is the first study to propose a

mediation model in adolescent girls. The results of this study contributed to a growing body of literature examining the developmental relationship in girls between BPD symptoms and other harmful behaviours and whether the behaviours are a manifestation of BPD or a consequence of the emotional dysregulation of vulnerable adolescents. This study used cross sectional data, thus future research would benefit from examining these variables longitudinally. The research question was not tested in males, and disordered eating and BPD in male adolescents is dramatically understudied relative to females and is an important area for future research.

In chapter 3, a study was presented examining the role of self-esteem in the relationship between BPD and rejection sensitivity in a longitudinal sample of girls followed from grades 8 to 10. Drawing from the sociometer theory, a concept posited by Leary in 2005 in which self-esteem acts as a predictor for social rejection in a given interpersonal situation, it was hypothesized that self-esteem would act as a sociometer in a sample of adolescent girls with BPD features. Specifically, we predicted that self-esteem would be associated with both BPD features and rejection sensitivity (measured by perceived peer rejection) in adolescent girls and would moderate the relationship between these two variables over time. Our findings supported these hypotheses and it was found that self-esteem was a significant moderator, explaining about 30% of the variance in perceived peer rejection as well as being significant at all three levels of high, moderate and low self-esteem. These findings were consistent with previous research that found that self-esteem was associated with these variables in adult studies, acting as a buffer between rejection sensitivity and BPD symptom severity (Bunger et al., 2015; Tolpin et al., 2004; Zeigler-Hill and Abraham, 2006), however this study is the first to examine this relationship in a large community sample of exclusively adolescent girls. These findings emphasize the importance of cultivating self-esteem in youth as increasing self-esteem may

mitigate feelings of rejection sensitivity even in those with high levels of BPD features. Future research would benefit from examining this relationship in young boys who may exhibit rejection sensitivity differently than girls (Ayduk et al., 1999; Downey, Feldman & Ayduk, 2000) and by utilizing more implicit measures of self-esteem, such as the Implicit Association Task. The measurement of self-esteem in people with BPD has not been specifically examined. It is likely that the self-rating of self-esteem may be difficult for these youth as they may have limited capacity for objective introspection regarding interpersonal constructs, particularly in adolescence (Hedrick et al, 2012; Levy & Farber, 1986).

This thesis examines female adolescent BPD in populations with different symptom intensities and associated impairments (one clinical and one community sample) and used dissimilar measures of rejection sensitivity. Yet, both studies demonstrate the significant impact of rejection sensitivity in the mental health problems of adolescent girls. In the next segment of this thesis, ideas for future research applications and interventions targeting rejection sensitivity will be explored.

4.1 Avenues for Future Research and Applications

Throughout this thesis, the goal of examining rejection sensitivity, its correlates and outcomes in individuals with BPD features, has been a recurring theme, a direction in which the literature is slowly moving towards. To date, the majority of research investigating rejection sensitivity is in adults and few papers touch on this construct in adolescence, despite rejection sensitivity being particularly high during this period of development. Even fewer papers have examined rejection sensitivity in adolescents with BPD, however, this will likely change if the stigma surrounding diagnosing BPD in adolescence or recognizing BPD features before 18 becomes typical practice in clinical settings.

Although there is growth in the literature on the consequences of rejection sensitivity in adolescence and adulthood (Butler et al., 2007; London et al., 2007; Martson, Hare & Allen, 2010), less is known about its development in childhood or how to identify rejection sensitivity in early developmental years. Based on the Mischel and Bowlby theories, it is likely to be a predisposition established in early childhood. There is a small amount of empirical attention on the genetic predispositions to rejection sensitivity (Gillespe et al., 2001), however little is known about social and other environmental precursors. It is hypothesized that early rejection experiences from caregivers and/or chronic peer rejection may contribute to the development of rejection sensitivity in adolescence, but little is known about why some youth are more susceptible to this outcome when compared to others (Rudolph & Zimmer-Gembeck, 2014). One hypothesis that has been posited is that low emotional reactivity, high self-esteem and the degree to which children value social relationships (relational valuation) with others may be protective factors against the development of rejection sensitivity (Brown & Lohr, 1987; Wang et al., 2012). Relational value of social relationships is of particular importance- Brown and Lohr examined that individuals who attributed little importance to “fitting in” with crowd members exhibited higher self-esteem than those who desired peer-group affiliation (1987) and Wang and colleagues described these adolescents as significantly less rejection-sensitive (2012).

Studies examining the developmental origins of rejection sensitivity in childhood and early adolescence are also with limitation, as the majority of the studies identified in this thesis are cross-sectional, homogeneous (London et al., 2007) or retrospective in nature (Butler et al., 2007). A better indicator of rejection sensitivity in children could be accomplished through the utilization of implicit measures as children generally lack introspection compared to adults. In sum, it is clear that rejection sensitivity may result in negative consequences in adolescents and

even into adulthood, as outlined in Chapter 2, however the research regarding the development of rejection sensitivity and its prevention in childhood is still unclear. Longitudinal models following children into adolescence and measuring rejection sensitivity along with other contributing factors (such as BPD traits) may assist in elucidating these links.

4.12 Directionality

Longitudinal models will also clarify the directionality of the BPD-rejection sensitivity paradigm. There is a multitude of research that suggests that the developmental origins of rejection sensitivity and BPD features are linked or develop in parallel. Though these concepts are linked, it is unknown which of these variables appear first or if one induces a causal relationship with the other. The literature suggests that both BPD and rejection sensitivity may manifest from early maladaptive child-caregiver relationships in which a child is repeatedly exposed to rejecting experiences, exclusion or neglect (Bowlby, 1969). In this thesis, the model is consistent that BPD features predict rejection sensitivity, providing supporting evidence that BPD features may be a precursor of sensitivity to rejection, however more research is required to verify this hypothesis. During data analysis, both directionalities were tested: rejection sensitivity as a predictor of BPD features and rejection sensitivity as an outcome due to BPD features. In both the cross-sectional and longitudinal datasets, rejection sensitivity acted as the outcome variable and was non-significant in the opposite direction.

The literature reports mixed results on the directionality of these variables. One cross-sectional adult study by Ayduk and colleagues demonstrated that rejection sensitivity along with executive control jointly predicted BPD features (2008). Most studies examine these variables cross-sectionally to see how they are related, but few examine trajectories beginning in childhood. One of the few longitudinal studies examining rejection sensitivity in late adolescence

found that adolescent rejection sensitivity was predictive of changes in internalizing symptoms over time, but also that rejection sensitivity was predicted by depressive and anxiety symptoms as well, exhibiting a reciprocal relationship (Martson, Hare & Allen, 2010). Although several adult studies have examined rejection sensitivity and have demonstrated that those with BPD and BPD features exhibit much higher levels of RS compared to controls (Staebler et al., 2011; Domsalla et al., 2014), there are individuals who present with BPD yet do not exhibit the abandonment criterion, implying they are two separate constructs (Berenson et al., 2011). It is also likely that BPD or other disorders may occur in tandem with rejection sensitivity or a third variable. More research is required to disentangle this relationship.

Further research should also ensure the distinction between the role of *social competency* and rejection sensitivity. Social competency is the ability to successfully interact and maintain close relationships with others, whereas rejection sensitivity is the perception of rejection regardless of the closeness of the relationship (Lewinsohn et al., 1980). A study by Sandstrom and colleagues demonstrated these findings, showing that rejection sensitivity was the predictive factor of internalizing behaviours, even after controlling for children's social status, classified as rejected, neglected, average and popular (2003). Martson et al mirrored these findings showing that rejection sensitivity specifically, independent of the child's social status, was associated with greater internalizing problems in a longitudinal study of adolescents (2010). Thus, for future studies, it is important to isolate the *perception* of rejection and not necessarily the social status of the individual.

4.13 Clinical Outcomes

Despite the debilitating effects rejection sensitivity may have on adolescents, particularly those with BPD features, there is limited research on remediating rejection sensitivity in this population or in any population in general. However, it is especially important to target adolescents as rejection sensitivity is likely most salient during this critical phase of relationship development (Harper, Dickson & Welsh, 2006; Larson, Clore & Wood, 1999). There is, however, no present treatment that targets rejection sensitivity specifically despite its correlates and relationship with various forms of pathology, especially BPD. Dialectical behaviour therapy (DBT), a commonly used treatment module for those suffering with BPD, does not contain a rejection sensitivity module and rarely do therapeutic practitioners offer rejection sensitivity awareness education. Individuals with BPD would benefit from learning about rejection sensitivity, as it may improve interpersonal relationships and help identify dichotomous thinking such as viewing a companion as entirely “good” or “evil” based on an interaction they perceive as rejecting (Veen & Arntz, 2000; Staebler et al., 2011). However, as discussed previously, it is important to examine and measure relational valuation when identifying rejection-sensitive individuals, as those who view social acceptance with high regard are more likely to be rejection-sensitive (Brown & Lohr, 1987; Wang et al., 2012). This construct can be measured utilizing the Harter’s Self-Perception Profile for Adolescents (SPPA; Harter, 1988), which has demonstrated acceptable reliability (Burisch, 1997).

Alternatively, or in tandem, self-esteem can be targeted to help alleviate feelings of rejection, as verified by the sociometer hypothesis and discussed in chapter 3 of this thesis. Rejection sensitivity has been hypothesized to be a relatively stable trait (Kawamoto et al., 2015) which may be less malleable and prone to intervention compared to the lability of self-esteem in

individuals with BPD (Hedrick & Berlin, 2012). Unfortunately, there is also no known present treatment that targets self-esteem in DBT or any other form of psychotherapy for BPD. Although there are numerous educational skills programs in public schools aimed at improving self-esteem, they have not been evaluated empirically for their effectiveness (i.e. with randomly controlled experiments; Penny & Durlak, 2010). Independent of BPD, low self-esteem in adolescents is correlated with feelings of depression, hopelessness and suicidal tendencies (Brage et al., 1995; Overholser et al., 1995). One important thing to note is that community interventions that do not specifically focus on self-esteem as the primary goal do not tend to result in improvements in self-esteem (Haney and Durlak, 2010). Thus, in clinical interventions, it is important that therapists target self-esteem directly rather than attempt to improve this dimension indirectly through examining other areas of adjustment.

One interesting finding is that daily physical exercise has been investigated as a factor utilized to improve self-esteem in youth (Ekeland et al., 2005; Calfas & Taylor, 1994; Petty et al., 2009; Sani et al., 2016, Nieman, 2002). A study by Garcia and colleagues examined this hypothesis in an early adolescent sample and found that girls were initially more likely to have lower self-esteem, poorer perceived health status and rated themselves as less physically capable when compared to boys (1997). After a low-intensity exercise program, results showed increased self-esteem, decreased depressive symptoms and increased self-concept over time (Garcia et al., 1997), especially in the girls. Thus, the continual promotion of physical activity in youth may assist in raising self-esteem and thereby reducing rejection sensitivity (via the sociometer hypothesis) in high-risk populations. One meta-analysis even recommended implementing physical education in children as young as grade 1 in order to reap the benefits of increased self-esteem during turbulent adolescence (Fox, 1992). These results have also been replicated in

middle-aged and older adults (Sani et al., 2016; McAuley et al., 2000) showing that exercise improves self-esteem during all stages of life. These finding may be due to the physical effects that aerobic activity may have on enhancing mood states (Fox, 2007) or due to increased body satisfaction, particularly in girls (Mellor et al., 2010)

These findings tie back into chapter 2 of this thesis in which disordered eating was discussed as a potential outcome due to high rejection sensitivity in girls with BPD symptoms. Body image concerns peak in adolescence (Webster & Tiggemann, 2003) and there is some research that suggests that self-esteem and body dissatisfaction may be linked (Tiggemann, 2005). One longitudinal study by Paxton and colleagues found that body dissatisfaction predicted self-esteem in early adolescent girls two years later, specifically finding that low self-esteem is related to increased body dissatisfaction. Body dissatisfaction is in turn related to increased disordered eating behaviour (Darby et al., 2007) and thus implies that self-esteem is also directly related to disordered eating. Thus, by targeting self-esteem, perhaps through exercise programs, and providing self-esteem interventions to adolescents, particularly girls who are more prone to body dissatisfaction and disordered eating, the dangerous outcomes of disordered eating behaviours may be alleviated. This outcome may be possible through a more complex mechanism involving rejection sensitivity. Further research should examine this cascade of variables and identify how they may connect together to form complex relationships.

4.2 Conclusions

The primary aim of this thesis was to provide novel research findings that contribute to the understanding of rejection sensitivity and adolescent BPD and further the research findings regarding related variables that may correlate or contribute to these constructs. The results presented in chapter 2 demonstrate that rejection sensitivity is strongly associated with BPD and

disordered eating in adolescent girls and may mediate the relationship between these variables. These findings have the potential to aid in the development of effective treatment strategies for remediating or preventing disordered eating in youth with BPD features by targeting rejection sensitivity directly during treatment. The research presented in chapter 3 demonstrates support for the Sociometer Theory of self-esteem, showing that self-esteem indeed moderates the relationship between BPD features and perceived peer rejection in a community sample of adolescent girls. These findings support the need for self-esteem training in youth, particularly those who exhibit high levels of BPD features, as our results show that by increasing self-esteem perceived peer rejection may be mitigated in these youth. Overall, although these two studies have different objectives, together they demonstrate the importance of targeting rejection sensitivity *specifically* during therapeutic processes for adolescent girls with BPD or BPD features. Presently, there is no treatment protocol directed at those with BPD that focuses on rejection sensitivity and this concept is rarely discussed when explaining diagnostic terminology to newly diagnosed youth with BPD. This thesis demonstrates that rejection sensitivity is an important component of youth with BPD and more research is required to examine its etiology, directionality and outcomes.

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