REVISITING BORDERLINE PERSONALITY DISORDER AS A FEMALE EXPRESSION
OF PSYCHOPATHY: A FACET LEVEL ANALYSIS AND META-ANALYSIS

BY

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THESIS

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ABSTRACT

Epidemiological and clinical evidence indicates gender differences in the rates of many forms of psychopathology. Understanding these differences is crucial to continued construct development and the advancement and implementation of primary, secondary and tertiary interventions across groups. Of particular interest is how psychopathology may manifest differently based on gender. A unique illustration of this is found in the relationship between borderline personality disorder (BPD) and psychopathic traits. Research suggests gender differences in relationships between psychopathic traits and BPD such that women but not men scoring high on both the interpersonal-affective (Factor 1) and impulsive-antisocial (Factor 2) features of psychopathy display higher levels of BPD. Here, we use hierarchical regression to investigate and extend these findings by examining distinct facets of Factor 1 (interpersonal versus affective) and Factor 2 (impulsive lifestyle versus antisocial) across two community dwelling samples with recent histories of violence and/or drug use (N=467, 34% women; N=319, 42% women). Adjusting for demographic factors and other facets, we find that antisocial traits are a stronger correlate of BPD in women than men. This effect is further moderated by interpersonal traits such that antisocial traits are most strongly related to BPD at high versus low levels of interpersonal traits in women, with the opposite being the case in men. In addition, we conduct a meta-analysis of the currently available literature. We are able to show that the gendered effect at the psychopathy factor level is likely small, that there is heterogeneity across study results, and that measurement technique (e.g., interview vs. self-report) may impact effect strength. These results suggest distinct manifestations of psychopathic traits in women, provide a more fine-grained understanding of the relationship between gender, psychopathy, and BPD, and provide directions for further research.

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CHAPTER 1

INTRODUCTION

1.1 Background

Epidemiological and clinical evidence indicates gender differences in the rates of many forms of psychopathology (Earls, 1987; Eme, 1979, 1992; Hartung & Widiger, 1998; Rutter, 1970; Seeman, 1995). Understanding these differences is crucial to continued construct development and the advancement and implementation of primary, secondary and tertiary interventions across groups (Rutter, Caspi, & Moffitt, 2003; Westen & Rosenthal, 2005). Of particular interest is how psychopathology may manifest differently based on gender (Martel, 2013; Zahn-Waxler, 2008). In men, emotional and behavioral problems more commonly manifest in externalizing psychopathology, such as substance use and antisocial behavior, whereas women more often suffer from internalizing psychopathology, such as major depression and generalized anxiety disorder (Caspi et al., 2013; Eaton et al., 2013; Kessler et al., 1994). These, however, are generalizations and there are many instances of complex relations between gender, emotionality, and psychopathology (Nolen-Hoeksema, 2012; Zahn-Waxler, Shirtcliff, & Marceau, 2008). A unique illustration of this is found in the relationship between borderline personality disorder (BPD) and psychopathic traits.

Theory and data support overlap between BPD and psychopathy. For example, both are characterized by antagonism (e.g., hostility, manipulation) and disinhibition (e.g., impulsivity, risk-taking) (Miller, Lynam, Widiger, & Leukefeld, 2001; Patrick, Fowles, & Krueger, 2009). Despite this overlap, BPD is associated with extremes in emotional lability and is more prevalent in women than men seeking clinical services (Lieb, Zanarini, Schmahl, Linehan, & Bohus, 2004; Paris, 2010). Psychopathy, in contrast, is usually associated with a callous lack of emotion and is

more prevalent in men (Hare, 2003). However, psychopathy is a heterogeneous construct (Skeem, Polaschek, Patrick, & Lilienfeld, 2011) and particular aspects of psychopathy (e.g., impulsive-antisocial traits) and specific subtypes (e.g., secondary psychopathy) have been shown to be associated with higher negative emotionality (Hicks & Patrick, 2008). Thus, the commonalities and distinctions in psychopathy and BPD may vary depending on the features or the manifestation of psychopathic traits being examined.

These complexities are further aggravated by suggestions that psychopathy may present differently in women (Forouzan & Cooke, 2005; Verona & Vitale, in press). Given similarities between psychopathy and BPD, and the impact gender may have on presentations of psychopathology, some theorists have suggested that BPD may represent a female phenotypic expression of psychopathy (Cale & Lilienfeld, 2002; Gunderson, 1994). Indeed, while the co-occurrence of psychopathy and BPD ranges from 20% to 65% (Blackburn & Coid, 1998; Blackburn, Logan, Donnelly, & Renwick, 2003), rates are typically higher in women (mean estimates: women = 32.6%, men = 16.9%; Rogers, Jordan, & Harrison, 2007). Investigators have only recently begun to assess the moderating role of gender in associations between psychopathic traits and BPD (James & Taylor, 2008; Sprague, Javdani, Sadeh, Newman, & Verona, 2012), with the only two published studies on distinct psychopathic traits providing conflicting results. Specifically, one reported evidence of a gender-differentiated relationship (Sprague et al., 2012) while the other reported no gender difference (Hunt et al., 2015). To this end, we present two studies that seek to replicate and extend previous work, as well as a meta-analysis of the findings published to date, in an attempt to further clarify the links between gender, distinct psychopathic traits, and BPD.

1.1.1   Psychopathy Factors and BPD

Although it is possible to view psychopathy as a unitary construct (e.g., Cleckley, 1976), historically investigators have noted the presence of unique subtypes (e.g. primary and secondary subtypes; Blackburn, 1975; Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003) as well as distinct trait dimensions (Hare, 2003; Skeem & Monahan, 2011). This heterogeneous nature is often described via factors and facets (Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; Cooke & Michie, 2001; Harpur, Hare, & Hakstian, 1989). The most prominent of these models is the two-factor model, derived from the Psychopathy Checklist (PCL) and its progeny (PCL-Revised, PCL-Screening Version, PCL-Youth Version), and consists of Factor 1 interpersonal-affective traits (grandiosity, charm, manipulativeness, deceitfulness, shallow affect, callousness,) and Factor 2 impulsive-antisocial traits (aggressiveness, impulsivity, irresponsibility, antisocial acts) (Fowles, 2011; Harpur et al., 1989).

Using this model, previous research linking psychopathy and BPD has shown that Factor 2 traits are empirically and conceptually related to BPD, whereas Factor 1 traits alone are typically less related to BPD (Hart & Hare, 1989; Rutherford et al., 1997; Salekin et al., 1997; Shine & Hobson, 1997). This pattern is not surprising given that Factor 2 and BPD are both characterized by impulsivity, risk-taking, and common genetic and non-shared environmental influences (Hunt et al., 2014). Research and theorizing also suggests that the connection between impulsivity or antisociality and BPD may be stronger in women. For example, women with more extreme forms of BPD often engage in substance use and reactive violence – behavior typically associated with externalizing psychopathology captured by Factor 2 (Casillas & Clark, 2002; Trull, Sher, Minks-Brown, Durbin, & Burr, 2000). Moreover, the literature highlights the heterogeneity of BPD presentations, with at least one subtype

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reflecting an angry/aggressive expression of BPD (Hallquist & Pilkonis, 2012; Kernberg & Caligor, 2005). This expression, compared to other expressions of BPD found in this work (e.g., poor identity, angry/mistrustful, prototypical), presented the highest levels of aggression, manipulation, antisocial behavior, and dysfunctional bids to maintain close interpersonal relationships.

Psychopathy, nonetheless, is characterized by high levels of both Factor 1 and Factor 2, and more recent findings indicate that Factor 1 traits may moderate the effect of Factor 2 traits on BPD. Sprague et al. (2012) showed that, in men, Factor 2 traits were related to greater levels of BPD regardless of scores on Factor 1. In contrast, Factor 2 traits in women were most related to BPD when Factor 1 traits were also high rather than low, with this latter finding being observed in female college students and female prisoners. Although these results involving Factor 1 may seem counter-intuitive, the authors note that BPD is often characterized by a fluctuation between two extremes – a highly emotional, impulsive, and reactive side, and a disengaged, manipulative, and emotionally restrictive side (Linehan, 1993). The former traits clearly map onto psychopathy's Factor 2 traits, while the latter relate to Factor 1 traits. Further, prototypical descriptions of psychopathy in women highlight manifestations that resemble BPD, including emotional instability, low self-concept, as well as callousness and manipulation (Forouzan & Cooke, 2005; Kreis & Cooke, 2011). Besides Sprague et al. (2012), the only other published study directly examining gender differences in relationships between psychopathy and BPD reported no significant gendered-differentiated interaction between Factor 1 and Factor 2 in a sample of over 1,500 offenders (83.3% men) (Hunt et al., 2015). Of note, the latter study's effect size for the Gender x Factor 1 x Factor 2 interaction was similar to that found in Sprague et al. (i.e., Hunt et al., 2015: $\beta = .31$; Sprague et al., 2012: $\beta = .31$).

However, since they tested this three-way interaction in relation to other forms of psychopathology (e.g., depression, anxiety), they controlled for multiple testing by using a stricter cutoff for significance testing ($p < .01$) compared to Sprague et al. (2012) ($p < .05$). Thus, it may be helpful to attend more to effect sizes rather than significance levels in interpreting findings across studies.

In sum, further research is required to replicate previous findings and reconcile potentially conflicting results (e.g. Hunt et al., 2015; Sprague et al., 2012). Additionally, previous studies are not clear regarding the specific psychopathic traits that could account for the overlap between psychopathy and BPD in women relative to men, either because these studies did not examine specific facets (Hunt et al., 2015; Sprague et al., 2012) or because the moderating role of gender was not assessed. Here, we present two studies, and a small meta-analysis, that seek to clarify previous findings and directly address their limitations.

1.1.2 Psychopathy Facets and Female Manifestations

As discussed, research on psychopathic traits and BPD has focused on the two-factor model, whereas more recent work recommends the further parsing of these factors into four facets (Hare, 2003; c.f. Cooke & Michie, 2001). In this model, Factor 1 is split into Facet 1: Interpersonal (grandiosity, charm, manipulativeness) and Facet 2: Affective (shallow affect/callousness, lack of guilt or remorse). Similarly, Factor 2 is split into Facet 3: Lifestyle (impulsivity, irresponsibility, lack of goals) and Facet 4: Antisocial (poor behavioral control, early behavior problems, criminal versatility). Deconstructing psychopathy further into these facets may help clarify which psychopathic traits are implicated in BPD, how gender may

moderate the association, and what may explain putatively conflicting results in previous studies.

Given that the Affective facet reflects shallow affect and lack of emotionality, traits not typically characterizing BPD, it is unlikely that the Affective facet of psychopathy will contribute to explaining the overlap and previously noted gender-differentiated relationship between psychopathic traits and BPD. Clinical descriptions, however, would instead implicate the Interpersonal facet. Clinical accounts of psychopathy emphasize a seemingly normal, well-adapted, charming, and superficial appearance that belies pathology (Cleckley, 1976), aspects well associated with the Interpersonal facet of the PCL (Patrick et al., 2009). A similar, although not identical characterization, can be found in BPD. Linehan (1993) describes individuals with borderline traits as showcasing "apparent competence" or functional behaviors; a facade that dissipates over time, especially when confronted with real or imagined rejection. Moreover, psychopathy and BPD have both been described as involving interpersonal manipulation and egotism (Cleckley, 1976; Kreis & Cooke, 2011; Linehan, 1993), although Linehan characterizes manipulative behavior in BPD, unlike psychopathy, as a maladaptive coping strategy in reaction to unmet needs or negative emotion. The latter interpretation of seemingly manipulative behaviors in BPD is reminiscent of the secondary subtype of psychopathy, which is thought to involve motivations for psychopathic behaviors that overlap with those observed in BPD (e.g., negative affectivity, impulsivity, environmental adversity). Thus, at least at the phenotypic level, there appears to be overlap between BPD and the Interpersonal facet of psychopathy.

The current literature provides less guidance for gender-differentiated roles of the Lifestyle and Antisocial facets of Factor 2 in relation to BPD. Two existing studies indicate

gender-differentiated links between the Factor 2 facets and a BPD-relevant outcome, suicide risk. In a sample of incarcerated women, Hicks et al. (2005) showed the Antisocial facet was more strongly associated with suicide risk, whereas in a sample of incarcerated men Douglas et al. (2008) reported that suicide was more closely linked to the Lifestyle facet. So, while conceptually the Lifestyle facet, involving impulsivity, may appear to be more closely linked to BPD, the Antisocial facet has been associated with suicide risk, a common feature of BPD, specifically among incarcerated women.

1.1.3 Current Studies

We present two studies investigating the link between gender, psychopathic traits, and BPD using both the two-factor and four-facet model across two separate samples. Our first goal was to attempt another replication of previous research showing a gender-differentiated interaction between Factor 1 and Factor 2 in regard to BPD (Sprague et al., 2012). Specifically, we hypothesized that in women, but not men, Factor 1 will moderate the relationship between Factor 2 and BPD, such that Factor 2 will relate to higher levels of BPD traits or symptoms when Factor 1 is also high and not low.

Our second goal was to extend this research by investigating facets of psychopathy (Interpersonal, Affective, Lifestyle, Antisocial). This work has the potential not only to clarify the role of specific psychopathic traits but may also suggest reasons why a gendered effect is found in some samples and not others. Working from prior theory and data, we were able to develop a priori hypotheses about the Factor 1 facets, Interpersonal and Affective. We hypothesized that the Interpersonal facet will explain the link between Factor 1 traits and BPD in women relative to men, based on the potential manifestations of BPD traits in women. Given the lack of previous research in mixed-gender samples, we did not have a priori hypotheses for

the specificity of the Factor 2 facets (Lifestyle and Antisocial) in gendered relationships with BPD.

The third goal was to meta-analyze findings from the few existing studies in the published literature (2 estimates from Sprague et al. (2012), 2 estimates from Hunt et al. (2015), and 2 estimates from the current study) in an attempt to estimate the effect of gender on the relationship between psychopathic traits and BPD.

CHAPTER 2

STUDY 1

2.1 Goals

The main goal of Study 1 was to replicate Sprague et al.'s (2012) findings of an

interaction between the two main psychopathy factors in explaining BPD symptoms in women

versus men (Factor 1 by Factor 2 interaction in women). To elaborate on previous findings, we

then examined the two Factor 1 facets. Specifically, we tested our hypothesis that the

Interpersonal traits, but not the Affective traits, would explain the gendered link between

psychopathy and BPD.

2.1.1 Study 1 Method

2.1.2 Participants

Participants consisted of 467 individuals (34% women) with histories of legal

involvement, recruited from the community (community-dwelling subsample; e.g., parole,

probation, advertisements, treatment agencies; n = 297; 41% women), or county jails (jail

inmate subsample; n = 170, 23% women). Across the entire sample, 43% of participants were

currently on parole or probation, with the majority of the sample having a history of

incarceration in jail (76%) or prison (56%). See Table 1 for demographic characteristics.

Across all participants, age ranged from 18-61 (M = 30.59, SD = 8.5). The majority of

participants self-identified as either African American (54.2%) or Caucasian (37.3%). About a

third of our participants reported dropping out of high school (34%), 21% reported completing

their high school diploma, and 38% indicated taking at least some college courses. Most

individuals reported either being employed full-time (33.8%) or unemployed but seeking

employment (33.2%). The only significant gender difference in demographics was in regard to

employment, with more women reporting a status of unemployed and more men reporting full-time employment (X^2 (6, $N = 456$) = 16.26, $p = .012$).

The community-dwelling and jail subsamples differed in expected directions. Specifically, the community-dwelling offenders were significantly older (community: M = 32.40, SD = 9.10; jail: M=27.34; SD = 7.70), included more individuals identifying as Caucasian (community: 45%; jail: 24%; X^2 (6, $N = 467$) = 28.47, $p = .000$), with more having taken college classes (community: 40%; jail: 30%; (X^2 (5, $N = 457$) = 20.85, $p = .001$) versus dropping out of high school (community: 27%; jail: 47%). Subsamples were not significantly different in regard to BPD, psychopathy total score, psychopathy factor scores, or scores on the Interpersonal, Affective and Lifestyle facets (all p's > .085). The jail sample was rated as significantly higher on the Antisocial facet, as would be expected, (t (465) = -3.272, $p = .001$). Recruitment subsample was entered as a covariate in initial analyses and showed no significant effects. For the sake of conciseness, all analyses and results reported below exclude recruitment subsample from the model.

Participants provided informed consent and were informed that their status within correctional systems and/or treatment agencies would not be affected by their decision regarding participation. IRB approval and a certificate of confidentiality were obtained, and IRB-approved protocols were followed. The sample used here has been further characterized in previous studies (e.g., Sadeh, Javdani, & Verona, 2013; Schoenleber, Sadeh, & Verona, 2011).

2.1.3 Measures

Psychopathy. Due to our inclusion of community-dwelling and incarcerated samples, we elected to use the 12-item Psychopathy Checklist: Screen Version (PCL: SV; Hart, Cox, & Hare, 1995) as it requires less collateral information than the 20-item PCL-R (Hare, 2003). For

each of the 12 items, participants were rated on a 3-point scale: 0 = *item does not apply*, 1 = *item applies to a certain extent*, 2 = *item applies*. Ratings were based on a life history interview as well as reviews of available public criminal records. Interviews were conducted by trained graduate students and advanced undergraduates under the supervision of a PhD-level licensed clinical psychologist with expertise in psychopathy. Factor and facet scores were calculated by adding the relevant PCL:SV item ratings for each factor (i.e., Factor 1, Factor 2; 6 items each) and facet (i.e., Interpersonal, Affective, Lifestyle, Antisocial; 3 items each). Two raters (a main rater and a trained secondary rater) were present for 23% of the interviews. The interclass correlation across raters was excellent across factors (Factor 1 – ICC = .96, Factor 2 - ICC .96) and facets (Interpersonal - ICC = .95, Affective - ICC =.94, Lifestyle - ICC = .88, Antisocial - ICC = .97). Analyses presented here are based on data from primary raters. Given the scope of the current study and a priori hypotheses, our analyses in this study focused on Factor 1 and Factor 2 and the Factor 1 facets (Interpersonal and Affective).

Borderline traits. BPD was assessed via the self-report Borderline Features Scale of the Personality Assessment Inventory (PAI-BOR; Morey, 1991, 2007), a measure that, due to its reliability and validity (Morey, 1991, 2007; Trull, 1995), is frequently used to investigate BPD in both community and clinical samples. The PAI-BOR is made up of 24 items rated on a 4-point scale (0 = *False, not at all* true, 1 = *Slightly true*, 2 = *Mainly true*, 3 = *Very true)* and can be parsed into four subscales: affect instability, identity problems, negative relationships, and self-harm—with the total score being used for data analyses in the present paper (α = .81).

2.1.4 Data Analytic Plan

Hierarchical multiple regression analyses (SPSS 20.0.0) were conducted to investigate the independent and interactive effects of gender and psychopathic traits in explaining variance

in BPD traits. These analyses allow us to determine if our effects of interest explain the variance in BPD traits in a meaningful way above and beyond other variables (Cohen, Cohen, West, & Aiken, 2003). Age was included as a covariate due to its relationship with BPD traits in both men ($r(303) = -.23$, $p = .000$) and women ($r(160) = -.18$, $p = .026$). Ethnicity, which consisted of two dummy-coded variables involving African Americans vs. Others and Caucasians vs. Others, was not significantly correlated with BPD in the current study (men: r's(305) = .08 and -.10, p's > .09; women: r's(162) = .06 and -.05, p's > .49). However, ethnicity was correlated with BPD symptoms in Study 2 (Table 2). To ensure similar models across the two studies, ethnicity dummy variables were included as covariates in both studies.

For all analyses, age and ethnicity were entered as covariates in the first step. In our primary analyses gender, dummy coded as men (1) vs. women (0), and the two PCL: SV factor scores were entered in the second step, all two-way interactions were entered in the third step, and the three-way Gender x Factor 1 x Factor 2 interaction was entered in the fourth step. Power simulations for the Gender x Factor 1 x Factor 2 interaction were run in R (R Development Core Team, 2008) using estimates from Sprague et al. (2012) and Hunt et al. (2015) (e.g., Gender x Factor 1 x Factor 2 $\beta = .31$). To detect a similar effect at 95% power for an alpha of .05, a sample of 152 with equal numbers of men and women would be needed, making our sample size more than sufficient to detect a three-way interaction.

To extend these results and examine Factor 2 interactions with the separate Interpersonal and Affective facets, we conducted hierarchical regression analyses with Gender, Interpersonal, Affective, and Factor 2 entered in the second step; all two-way interactions entered in the third step; and Gender x Interpersonal x Factor 2 and Gender x Affective x

Factor 2 interactions entered in the fourth step. Centered independent variables were used in all analyses and for the creation of interaction terms (Aiken & West, 1991).

In all analyses, we examined effect size using squared partial correlation coefficients (pr^2), which indicate the percent of variance explained by a particular IV that is left unexplained by other IV's. Following Cohen's (1992) recommendations, .02 is considered a small effect, .13 a medium effect, and .26 a large effect.

2.2 Results

2.2.1 Descriptive Statistics

Table 1 (left panel) shows descriptive statistics for the psychopathy factors and facets and BPD scores for men and women separately. Consistent with the literature, men had higher scores on psychopathy factors and facets, whereas women had higher PAI:BOR BPD total scores. Table 2 (top panel) indicates that the intercorrelations across study variables are similar across men and women, with few exceptions (e.g., correlation between Factor 1 and the PAI:BOR BPD).

2.2.2 Replication: Two-Factors

Table 3 (top panel) shows results for the regression analyses involving Gender, Factor 1, and Factor 2. This analysis revealed small to medium sized main effects for gender (pr^2 = .099) and Factor 2 (pr^2 = .057), such that women and participants scoring higher on impulsive-antisocial traits had significantly higher ratings on BPD traits. Thus, as in previous research, Factor 2, but not Factor 1, was related to BPD across the whole sample. A small main effect of age was also present (pr^2 = .032) indicating that younger individuals scored higher on BPD traits. As shown in Figure 1 (top panel), there was also a significant Gender x Factor 1 interaction, such that interpersonal-affective traits were negatively related to BPD scores in

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men (β = -.253, t = -4.103, p = .000, pr^2 = .053) but not in women (β = .026, t = .298, p = .766, pr^2 = .001), with a small-to-medium effect in men and a negligible effect in women. Unlike Sprague et al. (2012), there was no evidence of a three-way interaction (Gender x Factor 1 x Factor 2) (β = .018, p = .814, pr^2 = .000).

2.2.3 Extension: Factor 1 Facets

Given a priori goals, we repeated our analyses above, this time replacing Factor 1 with the separate Interpersonal and Affective facets, and keeping Factor 2 in the analyses. As before, analyses revealed small to medium main effects of gender (pr^2 = .101), Factor 2 (pr^2 = .065), and age (pr^2 = .032) (see Table 3 – bottom panel). A very small main effect for the Interpersonal facet was also found (pr^2 = .009), but was qualified by a Gender x Interpersonal interaction. In men, psychopathy's interpersonal traits were negatively related to BPD traits (β = -.185, t = -2.932, p = .004, pr^2 = .028), with a small protective effect (Figure 1, bottom panel). In contrast, interpersonal traits in women displayed a very small positive and non-significant relationship with BPD traits (β = .119, t = 1.341, p = .182, pr^2 = .012). The Affective facet did not interact with gender, Factor 2, or the Interpersonal facet. These results more precisely characterize the role of the Factor 1 traits found above, indicating that interpersonal traits but not affective traits show gender-differentiated relationships with BPD (i.e., protective effects in men but not women). However, as with the two-factor model, analyses failed to reveal a three-way Gender x Interpersonal x Factor 2 interaction (β = .014, p = .867, pr^2 = .000).

2.3 Study 1 Discussion and Study 2 Rational

The results of Study 1 were partly consistent with previous findings on gender differences in psychopathy's link to BPD, but did not replicate an interaction between the two

main factors of psychopathy in women. In specific, although Factor 2 was positively related to BPD in both genders, Factor 1 appeared to be protective of BPD in men, but not women. Moreover, we were able to show that this relationship is driven by the interpersonal traits rather than the affective traits. While the size of this effect was small, it suggests possible gender differences in the expression (or measurement) of psychopathy's interpersonal traits, such that men's expression of interpersonal traits is antithetical to BPD traits, although this is not the case for women.

Given the importance of conceptual and direct replications (Rosenthal, 1990), and the study's limitations, we pursued analyses of these questions using a new dataset. First, it is possible that our findings did not fully replicate Sprague et al. (2012) because of a disproportionately lower number of women in Study 1 (34%), or sample-specific variability in relationships. Second, while Study 1 was able to clarify the role of the Interpersonal and Affective facets of Factor 1 in terms of BPD and gender, the separate facets of Factor 2, Lifestyle and Antisocial, were not investigated to prevent multiple testing and to limit the scope of the study. Third, BPD was assessed through a self-report measure in Study 1. Clinician ratings obtained from a more thorough diagnostic assessment may yield different results. In Study 2, we addressed these limitations and further clarified the role of psychopathy's facets by adding the Factor 2 facets. Specifically, Study 2 involved a separate sample with a higher percentage of women, assessed BPD by a structured clinical interview, and extended Study 1's analysis to include all 4 psychopathy facets.

CHAPTER 3

STUDY 2

3.1 Goals

Our first goal involved another attempt to replicate the three-way Gender x Factor 1 x Factor 2 interaction from Sprague et al. (2012). Our second goal was to expand on Study 1 by incorporating Factor 2 facet-level analyses along with the Factor 1 facets, focusing on the Interpersonal facet in analyses.

3.1.1 Study 2 Method

3.1.2 Participants

Data from this study came from a larger project aimed at investigating the gendered pathways to illicit drug use and violence. Participants were 319 community-dwelling individuals (42% women; Age $M = 34.82$, $SD = 11.95$; see Table 1—right panel for demographics) who qualified for the study based on recent histories of illicit drug use and/or violence. They were recruited through advertisements (28%), flyers (25%), substance use treatments centers (7%), and other means (e.g. word of mouth; 36%). Based on self-report, 54% of participants had a history of parole or probation and 52% were previously incarcerated (e.g., jail, prison). Men made up a significantly greater number of those previously imprisoned (X^2 (2, 162) = 9.694, .008). The majority of participants self-identified as either African American (48.59%) or Caucasian (36.36%). Less than a fifth of the sample dropped out of high school (18%), with 26% obtaining a high school diploma or equivalent (e.g. GED) and the majority having taken at least some college classes (56%). Lastly, the majority of participants were unemployed but seeking employment (41.7%) or working part-time (20.1%) or full-time

(12.2%). The only significant gender difference besides previous imprisonment was in education, with men reporting a higher level of education (X^2 (5, 319) = 11.320, p = .045). IRB approval and a certificate of confidentiality were obtained, and IRB-approved protocols were followed for all study aspects.

3.1.3 Measures

Psychopathy. Psychopathy was again measured using the PCL:SV. Two raters (a main rater and a trained secondary rater) were present for 56% of the interviews. Mirroring our previous study, interclass correlation across raters was excellent for factors (Factor 1 ICC = .95, Factor 2 ICC = .97) and facets (Interpersonal ICC = .94, Affective ICC =.92, Lifestyle ICC = .95, Antisocial ICC = .98). Analyses presented here were again based on data from primary raters.

Borderline symptoms. BPD symptoms were assessed using the 9-item BPD module of the Personality Disorder Interview IV (PDI-IV; Widiger, Mangine, Corbitt, Ellis, & Thomas, 1995). The PDI-IV is a widely used semi-structured interview that provides categorical and dimensional ratings for the 10 *DSM-IV-TR* personality disorders (Samuel & Widiger, 2011). Each item in the PDI-IV is rated as 2 (threshold), 1 (sub-threshold), or 0 (absent). Data points were calculated as the number of *DSM-IV-TR* symptoms meeting threshold criteria (out of 9 symptoms). The BPD threshold symptom count variable was non-normally distributed, with skewness of 1.035 (SE = .137) and kurtosis of 0.377 (SE = .272), thus we applied Blom's transformation before data analysis (Blom, 1958). Secondary raters were present for 56% of the interviews and achieved an ICC of .76 for threshold BPD symptom counts, consistent with previous work on the PDI-IV (e.g., low of .57 for narcissistic personality disorder, high of .92 for dependent personality disorder; Samuel & Widiger, 2011).

3.1.4 Data Analytic Plan

In our attempt to replicate the Gender x Factor 1 x Factor 2 interaction, we used the same model presented in Study 1. For our facet-level analyses, we used a hierarchical regression model with age, ethnicity and the Affective facet (not part of our a priori hypothesis) entered as covariates in the first step. Gender and the Interpersonal, Lifestyle and Antisocial facets were entered in the second step. We then entered all two-way interactions of Interpersonal, Lifestyle, Antisocial, and Gender. In the fourth step, we entered the two three-way interactions, Gender x Interpersonal x Lifestyle and Gender x Interpersonal x Antisocial. Finally, post-hoc analyses were conducted to verify that results were specific to the Interpersonal facet, by replacing the Interpersonal facet with the Affective facet. Again, centered independent variables were used in all analyses and for the creation of interaction terms (Aiken & West, 1991).[1]

3.2 Results

3.2.1 Descriptive Statistics

Table 1 (right panel) shows the descriptive statistics for the psychopathy factors and facets and BPD symptom counts for men and women. Like Study 1, and as expected, men scored higher on psychopathy factors and facets, whereas women scored higher on BPD symptom counts. In line with Study 1, Table 2 (bottom panel) shows that the intercorrelations across gender are very similar.

3.2.2 Replication: Two-Factors

Table 4 (top panel) shows the results of the regression analyses using the two-factor model, involving Gender, Factor 1, and Factor 2. Analysis revealed a medium main effect for gender ($pr^2 = .141$), a small ethnicity effect (African-American vs. Others: $pr^2 = .038$), and

medium effect for Factor 2 (pr^2 = .108), such that women, individuals who did not self identify as African-American, and those with higher levels of the Factor 2 were rated as having more BPD symptoms. Unlike Study 1, there was no significant Gender x Factor 1 interaction (β = -.040, p = .662, pr^2 = .000). Like Study 1, but unlike Sprague et al. (2012), there was no evidence of a three-way interaction (Gender x Factor 1 x Factor 2) (β = -.017, p = .847, pr^2 = .000).

3.2.3 Extension: Facet-Level Analyses

See Table 4 (bottom panel) for results of the facet-level analyses. As before, we obtained small to medium main effects of gender (pr^2 = .171) and ethnicity (African-Americans vs. Others: pr^2 = .043), plus a medium effect of the Antisocial facet (pr^2 = .123). Thus, when all facets are included, only the Antisocial facet shows a significant main effect for BPD symptoms. Several interactions were also found, including Interpersonal x Lifestyle, Interpersonal x Antisocial, and Gender x Antisocial interactions (β = -.187, p = .046; β = .278, p = .023; and β = -.293, p = .004 – respectively). These latter two interactions were qualified by a three-way Gender x Interpersonal X Antisocial interaction (β = -.294, p = .016), reminiscent of Sprague et al. (2012).

To decompose the three-way interaction, further analyses were split by gender and revealed a significant Interpersonal x Antisocial interaction in women (β = .200, t = 2.230, p = .028, pr^2 = .038) but not in men (β = -.053, t = -.704, p = .483, pr^2 = .003). As shown in Figure 2, simple slopes analyses revealed that Antisocial traits are more related to BPD symptoms at high (β = .748, t = 5.302, p = .000, pr^2 = .182) versus low (β = .325, t = 2.691, p = .008, pr^2 = .054) levels of Interpersonal traits in women, with a medium effect for the former. In contrast, Antisocial trait relationships with BPD were similar for men scoring high (β = .333, t =

3.017, p = .003, pr^2 = .059) and low (β = .440, t = 3.787, p = .000, pr^2 = .077) on the

Interpersonal facet.

Secondary analyses were conducted replacing the Interpersonal facet with the Affective

facet. Besides the same main effects for gender, ethnicity, and Antisocial facet, analyses also

revealed a Gender x Antisocial interaction (β = -.261, t = -2.535, p = .012). Follow up analyses

within gender showed that Antisocial traits were more strongly associated with BPD symptoms

in women (β = .486, t = 5.245, p = .000, pr^2 = .179) than in men (β = .390, t = 4.644, p = .000,

pr^2 = .111). Notably, we did not detect any other two-way interactions or any three-way

interactions involving the Affective facet.

3.3 Study 2 Discussion

Study 2 extended the results of Study 1 by providing further evidence of a gender

differentiated relationship between psychopathy and BPD, with specific evidence for the role of

the Interpersonal and Antisocial facets of psychopathy. First, as in Study 1, we failed to replicate

Sprague et al.'s (2012) significant Gender x Factor 1 x Factor 2 interaction in explaining

variance in BPD. Second, facet-level analyses again indicated that the interpersonal features of

psychopathy are key to understanding gender-differentiated relationships between psychopathy

and BPD, but this time the Antisocial facet further modified this relationship. Indeed, Study 2

indicated that the Antisocial facet might drive the relationship between psychopathy's Factor 2

traits and BPD symptoms.

CHAPTER 4

META-ANALYSIS

4.1 Gender x Factor 1 x Factor 2

The factor-level analyses presented here did not replicate the Gender x Factor 1 x Factor 2 interaction seen in Sprague et al. (2012). Given that previous studies (Sprague et al., 2012; Hunt et al., 2015) reported similarly sized effects (i.e. β's = .31) and that the values presented here differ (i.e. Study 1 replication: β = .018; Study 2 replication: β = -.017), we used meta-analytic techniques to estimate the size of the three-way interaction across all currently published data. Specifically, we obtained estimates from each of the following: Study 1 and Study 2 presented here; Study 1 in Sprague et al., (2012) (self-report psychopathy and BPD traits); and two estimates from Hunt et al. (2015) - one from their PCL-R based analysis and one from their Psychopathic Personality Inventory (PPI) based analysis. Of note, sample characteristics varied across studies. Studies 1 and 2 here used a mix of community-dwelling offenders and forensic samples, Sprague et al.'s (2012) Study 1 consisted of undergraduates, and Hunt et al.'s (2015) analyses were based on individuals who were incarcerated or in court mandated drug treatment programs.

To estimate the effect of the Gender x Factor 1 x Factor 2 interaction across all studies, standardized beta's for each study's Gender x Factor 1 x Factor 2 interaction were transformed into correlations (Peterson & Brown, 2005) and weighted with their specific variance (Hunter & Schmidt, 1990). These weighted values were then entered into a random effects model in the metafor package for R (Viechtbauer, 2010). Given that estimates from the present studies were smaller than those from the two published studies results indicated, as expected, significant

heterogeneity in values across studies, $Q(4) = 87.57$, $p = < .0001$. Results also indicated that the estimated Gender x Factor 1 x Factor 2 effect was small in size and significant (r = .17 $p = .023$).

Following this we investigated Factor 1 x Factor 2 interactions within each gender. For women we obtained estimates from Study 1 and 2 here, Study 1 and 2 in Sprague et al. (2012), and Hunt et al.'s (2015) PCL-R and PPI analysis. For men we obtained estimates from Study 1 and 2 here, Study 1 in Sprague et al. (2012), and Hunt et al.'s PCL-R and PPI analysis. Meta-analyzed effects were estimated using the same technique described above. Results indicated significant effect heterogeneity in both women ($Q(5) = 62.79$, $p = < .0001$) and men ($Q(4) = 53.67$, $p = < .0001$). Factor 1 x Factor 2 interactions were negligible and non-significant in both women (r = -.006, $p = .95$) and men (r = -.023, $p = .69$).

4.2 Measurement Effect

We were also able to investigate the impact of measurement methodology on the Gender x Factor 1 x Factor 2 interaction - specifically, whether psychopathy and BPD were assessed via interview or self-report. To do so we grouped estimates from each study based on measurement type: Study 2 here assessed psychopathy and BPD via interview; the present Study 1 and Hunt et al's PCL-R analysis assessed psychopathy via interview and BPD via self-report; Sprague et al.'s Study 1 and Hunt et al.'s PPI analysis assessed psychopathy and BPD via self-report. For each of these the meta-analyzed standardized beta was estimated by the same technique described above. Results indicated significant heterogeneity within measurement grouping (psychopathy via interview, BPD via self-report: $Q(1) = 29.26$, $p = < .0001$; both self-report: $Q(1) = 17.05$, $p = < .0001$). While no significant Gender x Factor 1 x Factor 2 effects were found within assessment groupings (both interview: r = -.017 $p = .847$; psychopathy via interview and BPD via self-

report: r = .213 *p* = .136; both self-report: r = .222 *p* = .082) results indicate variability based on assessment technique.

Breaking this analysis down by first grouping for gender and investigating the impact of measurement on the Factor 1 x Factor 2 interaction shows that assessment variability differs across gender. Specifically, in women we see variation in effect heterogeneity (both interview: Q(df = 1) = 0.5712, *p* = 0.4498; psychopathy via interview and BPD via self-report: Q(df = 1) = 25.4387, *p* < .0001; both self-report: Q(df = 1) = 3.3513, *p* = 0.0672) as well as effect size and significance (both interview: r = .1222, *p* = .0023; psychopathy via interview and BPD via self-report: r= -.1816, *p* = .4744; both self-report: r = .0595, *p* = .5177). Similarly in men we see variation in effect heterogeneity (psychopathy via interview and BPD via self-report: Q(df = 1) = 22.0908, *p* < .0001; both self-report: Q(df = 1) = 3.0687, *p* = 0.0798) and effect size (both interview: r = -.0058, *p* = .923; psychopathy via interview and BPD via self-report: r = -.0512, *p* = .7326; both self-report: r = .0151, *p* = .8338).

4.3 Sprague et al.'s Key Finding

Lastly, we were able to use meta-analysis to investigate Sprague et al.'s (2012) key finding – that for women, but not men, the relationship between Factor 2 and BPD is moderated by Factor 1 such that Factor 2 relates to higher levels of BPD when Factor 1 is also high. Specifically, for Study 1 and 2 presented here, Study 1 in Sprague et al. (2012), and Hunt et al.'s (2015) PCL-R and PPI analyses we obtained one estimate for men and one estimate for women. Study 2 in Sprague et al. (2012) used an all female sample and thus provided another estimate for women. Thus, we had a total of 6 estimates for women and 5 estimates for men. For each estimate we converted the standardized beta weights of Factor 2 at high and low levels of Factor 1 (mean + / -1 SD) into correlations (Peterson & Brown, 2005). This was done separately for

men and women, again weighting each value with its specific variance (Hunter & Schmidt, 1990). As before, these weighted values were entered into a random effects model in the metafor package for R (Viechtbauer, 2010). Results show that for women the confidence intervals for the correlations for Factor 2 at high and low Factor 1 overlap (high: $r = .49$, 95% CI [.31,.68]; low: r = .59, 95% CI [.34,.83], $k = 6$). This is also true for men (high: $r = .54$, 95% CI [.38,.69]; low: r = .59, 95% CI [.52,.67], $k = 5$). Moreover, the confidence intervals for men and women at both high and low Factor 1 overlap. Together these results suggest that if there is a gendered difference, it is likely to be small.

In sum, our meta-analysis indicates that if there is a gender-differentiated link between BPD and psychopathy at the factor level the effect is likely to be small. Given the variability in effect sizes, this interaction is not considered robust across samples. Moreover, our results indicate that measurement approach may impact the strength of this interaction and that this itself may also vary by gender.

CHAPTER 5

DISCUSSION

5.1 General Discussion

Given discussions of gender differences in the manifestations of many forms of psychopathology, we addressed theoretical formulations and previous evidence suggesting gender-differentiated links between psychopathic traits and BPD. In particular, we sought to replicate previous positive findings involving the two main factors of psychopathy and BPD (e.g., Sprague et al., 2012), as well as clarify the potential role of specific psychopathic traits at the facet level. Finally, we conducted a small meta-analysis to clarify the factor level effect. This study contributes to the expanding literature by attempting direct and conceptual replications of previous work (Hunt et al., 2015; Rosenthal, 1990; Sprague et al., 2012), analyzing gender differences directly, providing a small meta-analysis of published findings to-date, and highlighting the replicable and less replicable aspects of the BPD-psychopathy relationship across genders.

First, the expected relationship between the Factor 2 impulsive-antisocial traits and BPD was reliable across both studies and genders. Study 2 extended these findings, indicating that the Antisocial facet drives the relationship between Factor 2 and BPD, especially in women (Gender x Antisocial interaction). This result is consistent with prior research linking the unique variance of psychopathy's antisocial traits (versus impulsive lifestyle) to greater levels of emotional distress, interpersonal aggression, and maternal criminality (Kennealy, Hicks, & Patrick, 2007). It is also in line with findings from a sample of female inmates indicating that psychopathy's Antisocial facet is uniquely associated with post-traumatic stress disorder, with BPD fully accounting for this relationship (Blonigen, Sullivan, Hicks, & Patrick, 2012). Moreover,

evidence from genetic and personality research provides further support for antisociality being differentially linked to emotional dysregulation across genders. Specifically, Hauser et al. (2002) reported that a functional polymorphism of monoamine oxidase-A, characterized as the "warrior gene," was linked to antisocial behavior in men but to mood disorders in women, and Blonigen et al. (2005) found that in women, but not men, the genetic effects contributing to Impulsive Antisociality increased the risk for both internalizing and externalizing psychopathology . These latter findings would indicate that diatheses related to antisociality may be more strongly linked to emotional dysregulation in women than men.

Second, less consistent findings across studies were found for the role of interpersonal-affective traits (Factor 1). Specifically, Study 1 found a gender-differentiated effect of Factor 1 and the Interpersonal facet, which did not interact with Factor 2 traits. Study 2, however, showed a three-way interaction involving gender, the Interpersonal facet, and the Antisocial facet. Further, while our meta-analysis showed a significant three-way Gender x Factor 1 x Factor 2 interaction across available studies, this was small with significant heterogeneity across studies. This heterogeneity suggests that more work is needed to clarify ways in which Factor 1 psychopathy traits relate to BPD in men and women.

Despite these nuances, there is consistency in that Factor 1 traits played a gender-differentiated role in relation to BPD across both studies. That is, Factor 1 was consistently negatively related to BPD in men, but this was not the case in women, for whom Factor 1 or Interpersonal traits were either not protective or exacerbating. In Study 1, the findings of the protective effects of Factor 1 for men are consistent with general theory and evidence (Frick, Lilienfeld, Ellis, Loney, & Silverthorn, 1999; Hicks & Patrick, 2006; Skeem et al., 2003; Verona, Patrick, & Joiner, 2001; Verona et al., 2012) that the interpersonal-affective traits, and

potentially the interpersonal traits more specifically (Hall et al., 2004), are protective of negative emotionality and dysregulation. Moreover, that our results showcase a gendered effect fits with the available evidence indicating that some aspects of this protective effect may be specific to men (Miller, Watts, & Jones, 2011; Verona & Vitale, in press), including for suicidal behaviors (Verona et al., 2012). These results suggest that, although Factor 1's interpersonal traits may have some similar correlates across men and women (Miller et al., 2011), this may not be the case for forms of psychopathology marked by emotional dysregulation. In Study 2, the three-way interaction between gender, the Interpersonal facet, and the Antisocial facet seems to best mirror the three-way interaction seen in Sprague et al. (2012). If this facet-level three-way interaction is replicated in future work, it provides a more trait-specific version of their narrative regarding the overlap between psychopathy and BPD. Specifically, psychopathy's interpersonal traits may be seen as paralleling BPD's interpersonal style marked by egotism, apparent competence, and manipulation; while psychopathy's antisocial traits may best represent the emotionality and anger of BPD. These results suggest that BPD's various symptoms are best captured in women demonstrating high levels psychopathy's interpersonal and antisocial traits.

We believe that our results could provide some clarity regarding inconsistent results across studies (e.g., Sprague et al. 2012; Hunt et al., 2015). First, given the findings in Study 2, it is possible that evaluations of psychopathy's lower-order trait dimensions (e.g., facets) may produce more reliable results across samples. Further, sample-specific effects may vary depending on the representation of interpersonal traits among the female offenders in the sample. Second, as described earlier, there is a rich history of theory and data (Kernberg, 1967,1985; Hallquist et al., 2012; Kernberg & Caligor, 2005; Lenzenweger et al., 2008) supporting different subtypes or expressions of BPD (e.g. prototypical, poor identity/low anger, angry/mistrustful,

angry/aggressive). Specific subtypes (e.g., angry/aggressive) likely show more overlap with psychopathic traits. Inconsistent findings across samples could be due in part to the presence or absence of these BPD subtypes. In this regard, it is important to note that women with high levels of BPD symptoms would not necessarily be psychopathic; instead, it is likely that specific manifestations of BPD (e.g., angry) would show psychopathic-like behaviors and traits. More work is needed to confirm these hypotheses.

Lastly, our meta-analysis suggests that broader measurement issues may confound interpretation of gender-differentiated relationships between psychopathic traits and BPD. Measurement technique, in the sense of interview vs. self-report, influenced the Gender x Factor 1 x Factor 2 effect size. Studies that assessed both psychopathy and BPD via self-report measures or assessed at least BPD via self-report produced similar effects ($r = .222$, $r = .213$) relative to the studies assessing both psychopathy and BPD via interview ($\beta = -.017$). Moreover, we found that the impact of measurement technique varied by gender. Of course, these are all very preliminary findings, given that we had only 2 effect sizes per measurement for most groupings and only one measurement for the interview-interview three-way effect and again only one measurement for the interview-interview two-way effect in men. However, these results indicate that method variance is important to consider in evaluating inconsistency across papers.

5.2 Alternative Explanations: Manifestations and Measurement

One interpretation of our results is that they reflect the etiological overlap between two constructs, psychopathy and BPD. As discussed, prototypical descriptions of psychopathy in women tend to highlight emotional instability, dysregulation, and unstable self-concept (Forouzan & Cooke, 2005; Kreis & Cooke, 2011), traits also typically associated with BPD. This characterization is not inconsistent with descriptions of two variants of psychopathy,

primary and secondary (Blackburn, 1975; Karpman, 1941; Lykken, 1995; Schmitt & Newman, 1999; Skeem et al., 2003). Whereas primary psychopathy is seen as showcasing a cool-headed, premeditated, detached, and callous style, secondary psychopathy is better characterized by impulsivity, aggression, and co-occurring psychopathology. Primary psychopathy is thought to reflect a constitutional deficit in emotionality (Factor 1), which in turn leads to the Factor 2 traits (e.g., lack of empathy results in offending and aggression against others). In contrast, secondary psychopaths are thought to develop Factor 1 traits due to constitutional deficits in regulatory control, which result in maladaptive ways of coping with difficult environments (e.g., low socioeconomic status, childhood abuse, neighborhood violence). The link between BPD and psychopathic traits may reflect the latter pathway in women. That is, regulatory control problems also associated with BPD may, over time, lead to the expression of Factor 1 traits (e.g., manipulation, conning, or lying) in an attempt to cope with an invalidating environment (Linehan, 1993).

Another possibility is that our findings, and similar results, are due in part to the imperfect measurement or operationalization of the borderline and psychopathic constructs. One issue that has been discussed is whether there is a gender bias in labeling individuals or rating their behaviors. Specifically, are women more likely to be seen as evidencing BPD traits and are men more likely to be seen as displaying psychopathic traits, despite similar behaviors? Skodol & Bender (2003) suggested that there is limited empirical support for diagnostic biases in diagnoses of BPD. Similar conclusions have been reached in regards to psychopathic traits, although no research has tested gender bias in assessment of Factor 1 traits (Cale, Ellison, Lilienfeld, 2002; Forouzan & Cooke, 2005). Additionally, no studies have looked at gender bias when assessing psychopathy and BPD within the same individual. Our meta-analysis indicates

the strongest Gender x Factor 1 x Factor 2 effect is seen when psychopathy and BPD are both assessed via self-report while the weakest is seen when psychopathy and BPD are both assessed via interview. Moreover, we also showed preliminary evidence suggesting that this measurement effect may vary with gender. With the current methodology, we cannot directly rule out a gender bias in the overlap between psychopathy and BPD for women relative to men.

Even if gender bias has a minimal influence on observed relationships, it is still unclear whether measures of psychopathy in women parallel established conceptualizations in men. Dating back to seminal work in psychopathy, most descriptions and measurement procedures have been centrally, if not exclusively, based on men. While research has been more inclusive of women in recent decades, with much work indicating general measurement invariance across genders, measurement invariance is still poorly understood. Verona and Vitale (in press) suggest that a lack of specificity in operationalization of psychopathy items may conflate symptoms of BPD and psychopathy in women more so than in men. That is, characteristics associated with psychopathic interpersonal traits, such as manipulation, egotism, and charm, may appear to be present in women who are high on BPD; however, the motivation or context of these behaviors likely differ from what is observed in prototypical psychopathy (e.g., instrumental aggression, conning, displays of dominance). Individuals with BPD likely present with these characteristics as maladaptive coping strategies in reference to unmet needs, negative emotions, and attempts to maintain relationships. These behavioral expressions may result in individuals with BPD obtaining higher ratings on psychopathy's Interpersonal facet, and this conflation may occur more in women. More gender-informed measurement of psychopathy may produce different results and clarify the association between psychopathy and BPD.

5.3 Strengths and Limitations

The results presented here should be interpreted within their limitations. First, despite relatively large sample sizes, our samples were not large enough to allow us to properly investigate all interactions of possible interest (e.g., all possible interactions of the facets and gender). Models accounting for all the interactions may produce more complex effects that qualify our current results. Second, while we did use a well validated measure of psychopathy (PCL:SV) as well as widely accepted factor models (two-factor and four-facet models), there are multiple measures and models of psychopathy that may provide additional clarity to the gender differentiated links between psychopathy and BPD. Relatively new assessment tools such as the Triarchic Psychopathy Measure (Drislane, Patrick, & Arsal, 2014), Comprehensive Assessment of Psychopathic Personality (Hoff, Rypdal, Mykletun, & Cooke, 2012), and the Elemental Psychopathy Assessment (Few, Miller, & Lynam, 2013; Wilson, Miller, Zeichner, Lynam, & Widiger, 2010) may produce different results as well as help clarify the role of construct measurement. Third, we are unable to directly rule out the impact of gender bias or improper measurement of interpersonal traits in women in our results. Future studies may wish to specifically investigate a gender bias more directly in concurrent assessments of psychopathy and BPD. One paradigm that has proven fruitful in investigating gender bias involves utilizing case histories with the gender of the individual in question being manipulated (Warner, 1978). This could be used with participant vignettes to examine whether raters tend to see more overlap, and what kind of overlap, between BPD and psychopathy if the client is a woman. Lastly, because the focus on BPD subtypes was beyond the scope of the present studies, we did not directly investigate the potential heterogeneity of the BPD construct.

Despite these limitations, our studies have numerous strengths that directly address several key gaps in the extant literature. First, these studies are among only a handful directly investigating gender-differentiated links between psychopathy and BPD (Hunt et al., 2015; Sprague et al., 2012). Second, these studies provide two replication attempts for Sprague et al.'s (2012) Gender x Factor 1 x Factor 2 results, plus a meta-analysis to test the size and heterogeneity of this effect across studies as well as the impact of measurement approach. Given the paucity of research in this area as well as the contradictory results found in previous studies, the findings presented here bear unique weight. They support some aspects of previous findings, but not all. That is, they support the differential role of Factor 1 traits in relation to BPD in women and men, but it is unclear whether being high on both Factor 1 and Factor 2 related traits or facets is needed to manifest as BPD. Further, the facet approach allowed us to more precisely characterize the overlap between psychopathy and BPD across genders. This paper provides motivation for further research on psychopathy and BPD and development of more gender-informed models of externalizing syndromes.

FOOTNOTE

[1] Because our BPD variable was based on threshold symptom count, we re-ran all models using zero-inflated Poisson regression (ZIP; Lambert, 1992). All significant and null results remained the same.

TABLES

Table 1. Descriptive Statistics for Study 1 and Study 2

Study 1				Measures	Study 2			
Men (*n* = 305)		Women (*n* = 162)			Men (*n* = 183)		Women (*n* = 136)	
Frequency	%	Frequency	%		Frequency	%	Frequency	%
				Ethnicity				
99	32.5	75	46.3	**Caucasian**	72	39.3	44	32.4
178	58.4	75	46.3	**African-American**	84	45.9	71	52.2
28	9.2	12	7.4	**Other**	27	14.8	21	15.4
M *(SD)*	**Range**	**M *(SD)***	**Range**		**M *(SD)***	**Range**	**M *(SD)***	**Range**
30.37 (9.09)	18-61	31.00 (8.68)	18-53	**Age**	35.15 (12.13)	18-62	34.38 (11.74)	18-59
30.12 (12.72)***	3-69	36.85 (14.55)***	0-68	**Study 1: PAI – BOR Study 2: PDI-IV**	1.38 (1.51)***	0-7	2.54 (2.11)***	0-8
				PCL:SV				
5.40 (2.64)***	0-12	3.67 (2.26)***	0-10	**Factor 1**	4.91 (2.64)***	0-12	3.73 (2.56)***	0-10
7.61 (2.56)***	0-12	6.07 (2.71)***	0-12	**Factor 2**	6.44 (3.00)***	0-12	5.18 (2.69)***	0-12
2.44 (1.66)***	0-6	1.55 (1.36)***	0-6	**Interpersonal**	2.46 (1.71)***	0-6	1.78 (1.43)***	0-5
2.97 (1.43)***	0-6	2.12 (1.36)***	0-5	**Affective**	2.45 (1.44)**	0-6	1.95 (1.53)**	0-6
3.53 (1.40)**	0-6	3.25 (1.48)**	0-6	**Lifestyle**	3.31 (1.54)**	0-6	2.90 (1.56)**	0-6
3.99 (1.68)***	0-6	2.79 (1.67)***	0-6	**Antisocial**	3.13 (1.97)***	0-6	2.29 (1.58)***	0-6

PAI - BOR = Personality Assessment Inventory Borderline Scales (Morey 1991); PDI-IV = Personality Disorder Interview (PDI-IV; Widiger et al., 1995); PCL:SV = Psychopathy Checklist: Screening Version (Hart, S.D., Cox, D.N., & Hare, R.D. 1996). Factor 1 = Interpersonal-Affective traits. Factor 2 = Impulsive-Antisocial (Factor 2). Interpersonal = Facet 1. Affective = Facet 2. Lifestyle = Facet 3. Antisocial = Facet 4. Gender Differences: * = significant at $p<.05$, ** = significant at $p<.01$, *** = significant at $p <.001$

Table 2. Correlation Table

	PAI:BOR	Age	AA vs. Others	Cauc. vs. Others	Factor 1	Factor 2	Interpersonal	Affective	Lifestyle	Antisocial
PAI:BOR	-	-.175*	-.055	.051	.235**	.445***	.241**	.148	.410***	.364***
Age	-.229***	-	.149	-.073	.145	-.075	.142	.098	.013	-.103
African American vs. Others	.075	.010	-	-.862***	-.033	.020	-.084	.029	-.105	.110
Caucasian vs. Others	-.096	-.022	-.815***	-	.072	.011	.126	-.007	.180*	-.121
Factor 1	-.031	.146*	.016	-.057	-	.536***	.829***	.829***	.447***	.477***
Factor 2	.334***	-.006	.090	-.057	.526***	-	.346***	.542***	.824***	.877***
Interpersonal	-.089	.136*	.011	-.047	.878***	.350***	-	.374***	.352***	.268***
Affective	.043	.115*	.012	-.046	.826***	.564***	.456***	-	.389***	.523***
Lifestyle	.330***	.076	-.033	.042	.404***	.788***	.304***	.387***	-	.460***
Antisocial	.252***	-.077	.174**	-.134*	.447***	.859***	.273***	.508***	.390***	-

	PDI-IV: BPD	Age	AA vs. Others	Cauc. vs. Others	Factor 1	Factor2	Interpersonal	Affective	Lifestyle	Antisocial
PDI-IV BPD	-	.000	-.215*	.225**	.110	.399***	.092	.096	.260**	.421***
Age	-.089	-	.208*	.006	.186*	.248**	.100	.209*	.268**	.161
African American vs. Others	.260***	-.362***	-	-.723***	.227**	.129	.182*	.209*	.078	.147
Caucasian vs. Others	-.192**	.215**	-.742***	-	-.117	.007	-.146	-.069	.066	-.056
Factor 1	.036	.400***	.184*	-.147*	-	.614***	.863***	.811***	.463***	.575***
Factor 2	.378***	.251**	.063	-.017	.614***	-	.391***	.654***	.819***	.888***
Interpersonal	-.068	.336***	.158*	-.178*	.863***	391***	-	.494***	.343***	.343***
Affective	.151*	.344***	.144	-.060	.811***	.654***	.409***	-	.440***	.512***
Lifestyle	.320***	.172*	-.044	.041	.463***	.819***	.272***	.514***	-	.471***
Antisocial	.321***	.258***	.131	-.052	.575***	.888***	.374***	.608***	.468***	-

Correlations for women located above the diagonal. Correlations for men located below the diagonal. Factor 1 = Interpersonal-Affective traits. Factor 2 = Impulsive-Antisocial traits. Interpersonal = Facet 1. Affective = Facet 2. Lifestyle = Facet 3. Antisocial = Facet 4. * = significant at p<.05, ** = significant at p<.01, *** = significant at p <.00

Table 3. Hierarchical regression results for BPD in Study 1

Study 1 – Replication: Two-Factors					
	β	S.E.	t	R^2	ΔR^2
Step 1				.049	.049***
Age	-.160***	.064	-3.853		
African American vs. Others	-.068	2.03	-.916		
Caucasian vs. Others	.029	2.10	..397		
Step 2				.248	.199***
Gender	-.338***	1.39	-7.029		
Factor 1	.048	.510	.485		
Factor 2	.452***	.438	5.212		
Step 3				.262	.014*
Gender x Factor 1	-.241*	.599	-2.565		
Gender x Factor 2	.018	.541	.214		
Factor 1 x Factor 2	.031	.135	.423		
Step 4				.262	.000
Gender x Factor 1 x Factor 2	.018	.166	.235		

Study 1 – Extension: Int-Aff Facets					
Step 1				.048	.048***
Age	-.159***	.064	-3.820		
African Americans vs. Others	-.069	2.03	-.934		
Caucasian vs. Others	.020	2.09	.275		
Step 2				.249	.201***
Gender	-.345***	1.40	-7.087		
Interpersonal	.183*	.785	1.980		
Affective	-.140	.911	-1.438		
Factor 2	.488***	.443	5.557		
Step 3				.271	.023*
Gender x Interpersonal	-.282**	.925	-3.107		
Gender x Affective	.009	1.106	.091		
Gender x Factor 2	-.012	.551	-.147		
Interpersonal x Factor 2	-.023	.255	-.269		
Affective x Factor 2	.037	.280	.435		
Step 4				.272	.000
Gender x Interpersonal x Factor 2	.014	.311	.167		
Gender x Affective x Factor 2	.024	.343	.279		

Results presented here are for the final step. Factor 1 = Interpersonal-Affective. Factor 2 = Impulsive-Antisocial. Interpersonal = Facet 1. Affective = Facet 2. Lifestyle = Facet 3. Antisocial = Facet 4. *= significant at p<.05, **= significant at p<.01, ***=significant at p <.001.

Table 4. Hierarchical regression results for BPD in Study 2

Study 2 – Replication: Two-Factors					
	β	S.E.	*t*	R^2	ΔR^2
Step 1				.053	.053***
Age	-.043	.004	-.003		
African American vs. Others	-.252***	.131	-.455		
Caucasian vs. Others	-.001	.130	-.003		
Step 2				.334	.282***
Gender	-.391***	.100	-.713		
Factor 1	-.125	.030	-.042		
Factor 2	.601***	.030	.185		
Step 3				.340	.005
Gender x Factor 1	-.040	.041	-.018		
Gender x Factor 2	-.096	.038	-.038		
Factor 1 x Factor 2	.017	.010	.002		
Step 4				.340	.000
Gender x Factor 1 x Factor 2	-.017	.012	-.002		

Study 2 – Extension: Facets					
Step 1				.065	.065***
Age	-.024	.004	-.461		
African American vs. Others	-.266***	.131	-3.675		
Caucasian vs. Others	.001	.131	.008		
Affective	-.123	.038	-1.943		
Step 2				.339	.275***
Gender	-.403***	.093	-7.913		
Interpersonal	.032	.052	.344		
Lifestyle	.080	.051	.898		
Antisocial	.703***	.053	6.483		
Step 3				.359	.020
Gender x Interpersonal	-.092	.064	-1.006		
Gender x Lifestyle	.096	.066	1.121		
Gender x Antisocial	-.293**	.061	-2.871		
Interpersonal x Lifestyle	-.187**	.032	-2.002		
Interpersonal x Antisocial	.278**	.036	2.283		
Lifestyle x Antisocial	.029	.017	.538		
Step 4				.371	.012
Gender x Interpersonal x Lifestyle	.123	.039	1.333		
Gender x Interpersonal x Antisocial	-.292**	.040	-2.386		

Results presented here are for the final step. Factor 1 = Interpersonal-Affective. Factor 2 = Impulsive-Antisocial. Interpersonal = Facet 1. Affective = Facet 2. Lifestyle = Facet 3. Antisocial = Facet 4. *= significant at p<.05, **= significant at p<.01, ***=significant at p <.001

Figure 1: Top Panel – Gender x Psychopathy Interpersonal/Affective Factor (Factor 1) in Study 1; Bottom Panel – Gender x Psychopathy Interpersonal Facet (Facet 1) in Study 1.
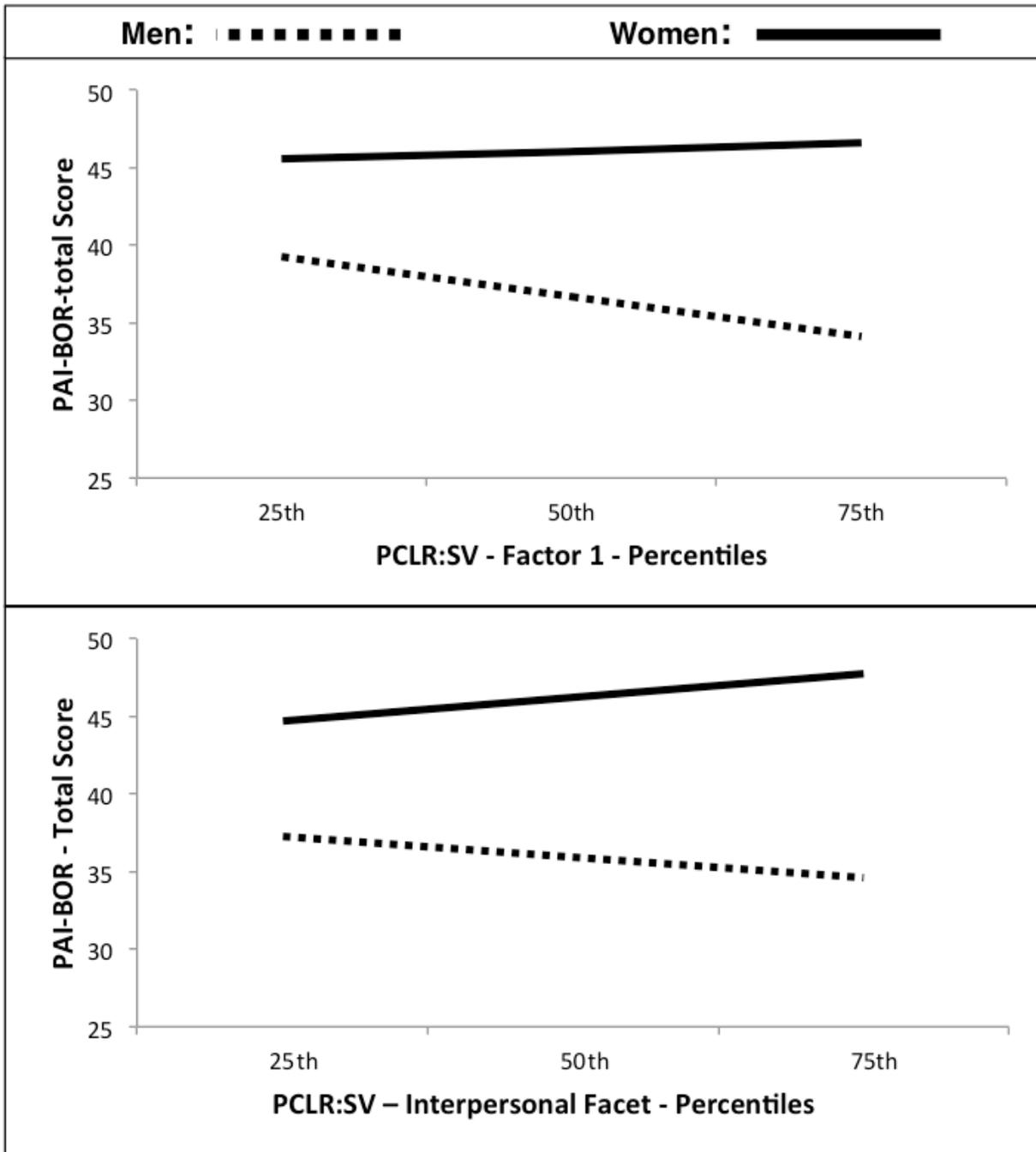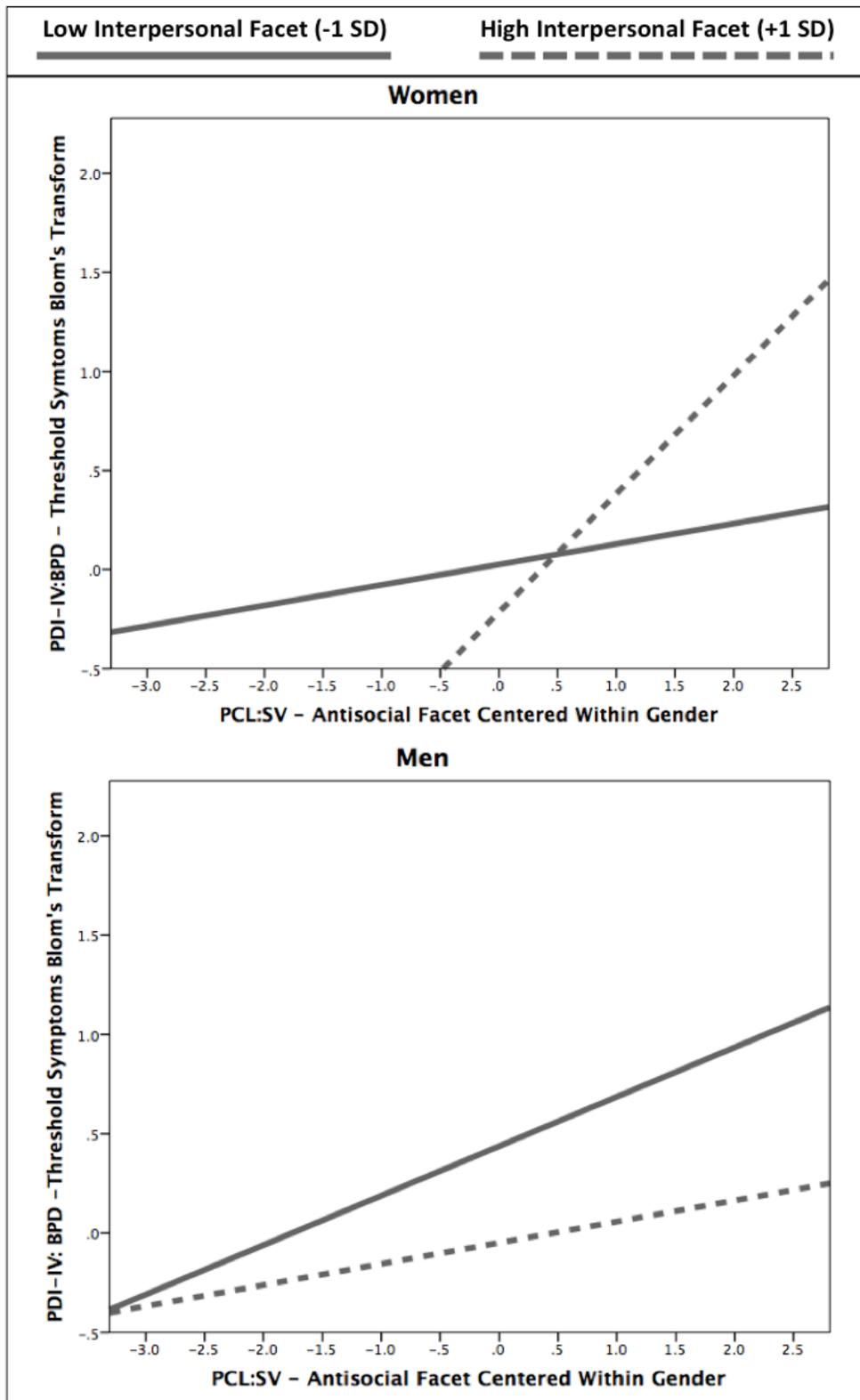
Figure 2: Psychopathy Interpersonal Facet (Facet 1) x Psychopathy Antisocial Facet (Facet 4) in Study 2 in Women (Top Panel) and Men (Bottom Panel).

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