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Parsing the Heterogeneity of Psychopathy and Aggression: Differential Associations Across Dimensions and Gender

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Psychopathy is a multidimensional construct that is broadly associated with both reactive (RA) and proactive (PA) aggression. Nevertheless, a consistent pattern of associations between psychopathy and these 2 aggression subtypes has yet to emerge because of methodological differences across studies. Moreover, research has yet to examine gender differences in the relation between dimensions of psychopathy and RA/PA. Accordingly, we examined the associations between psychopathy dimensions, as operationalized by 2 self-report instruments, and subtypes of aggression within a diverse sample of undergraduates ($N = 1,158$). Results confirmed that psychopathy is broadly associated with PA, as well as RA, with dimensions of psychopathy evidencing common and distinct associations with both raw and residual RA and PA scores. In both models of psychopathy, PA was significantly and positively associated with all dimensions, whereas RA was significantly negatively associated with interpersonal and affective dimensions, and significantly positively associated with dimensions related to an antisocial and impulsive lifestyle. Gender significantly moderated associations among dimensions of psychopathy and RA/PA, such that the antisocial/behavioral dimension of psychopathy was positively associated with PA for males, whereas the antisocial/behavioral dimension was positively associated with RA for females. Results suggest both generality and specificity of psychopathy dimensions as related to subtypes of aggression, as well as possible differential pathways from psychopathy to different subtypes of aggression in men and women.

Keywords: gender, proactive aggression, psychopathy, reactive aggression

Individuals who engage in repeated aggression constitute a heterogeneous group. To better understand and distinguish among these individuals, researchers have increasingly attempted to identify meaningful subtypes of aggression. Two commonly studied subtypes of aggression are reactive aggression (RA; also termed impulsive aggression) and proactive aggression (PA; also termed instrumental aggression), which are differentiated primarily by the motivations leading to the aggressive actions. Whereas RA is characterized by impulsive and emotionally driven acts in response to provocation, PA is characterized by planned and incentive-driven aggressive acts (e.g., Berkowitz, 1993).

One widely studied correlate of aggression is psychopathy. Psychopathy is a configuration of personality traits characterized

by superficial charm and social dominance, a manipulative interpersonal style, and deviousness, as well as deficits in guilt, empathy, and impulse control (Cleckley, 1976). Psychopathy is typically associated with an increased risk for both PA (Porter & Woodworth, 2006) and RA (Blair, 2010; Glenn & Raine, 2009). Nevertheless, research indicates that psychopathy is a multidimensional construct (e.g., Patrick, Fowles, & Krueger, 2009), composed of interpersonal (e.g., arrogance, dominance, and deceitfulness), affective (e.g., lack of guilt, empathy, and social emotions), and behavioral (e.g., impulsive and antisocial) dimensions. A growing body of research has attempted to delineate the specific associations between dimensions of psychopathy and subtypes of aggression (see Blais, Solodukhin, & Forth, 2014; Reidy, Shelley-Tremblay, & Lilienfeld, 2011), but many of these studies have operationalized the constructs of psychopathy, RA, and PA in different ways. Such methodological differences render it difficult to compare findings across studies. As such, we have a limited understanding of shared versus unique patterns of associations between dimensions of psychopathy and subtypes of aggression. To elucidate pathways between the broad constructs of psychopathy and aggression, it is important to consider how psychopathy dimensions relate to subtypes of aggression. Therefore, the purpose of the current study was to examine the associations between psychopathy dimensions and RA and PA. Given preliminary but mixed evidence that psychopathy dimensions sometimes manifest

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differential relations in men and women (Miller, Watts, & Jones, 2011), a subsidiary goal was to examine whether these associations vary by gender.

Reactive and Proactive Aggression

RA, which traces its roots to the frustration-aggression model (e.g., Berkowitz, 1993), is an angry and defensive response to a provocation. In contrast, PA is rooted in social learning theory (e.g., Bandura, 1978) and is a premeditated, deliberate act committed to achieve a secondary goal. RA and PA tend to be highly correlated (Poulin & Boivin, 2000), suggesting that the constructs may overlap to such a degree that the distinction lacks utility (Bushman & Anderson, 2001). Nevertheless, RA and PA demonstrate both shared and unique genetic and environmental influences (e.g., Brendgen, Vitaro, Boivin, Dionne, & Pérusse, 2006), and evidence differential correlates, potentially indicating shared as well as distinct etiological pathways underlying these subtypes of aggression (e.g., Crick & Dodge, 1996; Latzman, Vaidya, Clark, & Watson, 2011; Raine et al., 2006; Vitaro, Brendgen, & Barker, 2006). For example, RA is associated with younger age (Connor, Steingard, Cunningham, Anderson, & Melloni, 2004), family history of substance abuse (Connor et al., 2004), delinquency (Fite & Colder, 2007), negative emotionality (Miller & Lynam, 2006; Vitaro, Brendgen, et al., 2006; Vitaro, Barker, Boivin, Brendgen, & Tremblay, 2006), emotion dysregulation (Dodge, Lochman, Harnish, Bates, & Pettit, 1997), higher cortisol levels (Van Bokhoven et al., 2005), and dating violence (Brendgen, Vitaro, Tremblay, & Lavoie, 2001). In contrast, PA is associated with family history of violence and substance use (Connor et al., 2004), youth substance abuse (Connor et al., 2004), externalizing problems (Miller & Lynam, 2006; Vitaro, Gendreau, Tremblay, & Oligny, 1998), trait disagreeableness (Latzman et al., 2011), physical violence (Brendgen et al., 2001), lower cortisol levels (Cima, Smeets, & Jellic, 2008), lower baseline and reactive autonomic reactivity (Hubbard et al., 2002; Stanford, Houston, Villemarette-Pittman, & Greve, 2003), and callous-unemotional traits (Frick, Cornell, Barry, Bodin, & Dane, 2003).

All told, this literature underscores RA and PA's shared as well as distinct etiological influences and external correlates. Specifically, RA and PA appear broadly associated with the externalizing spectrum, but each may evidence important and distinctive associations with more specific, lower-level constructs pertinent to antisocial behavior and psychopathy. Examinations of *both* the shared and unique associations between dimensions of psychopathy and RA and PA are important for elucidating the etiological processes underlying RA and PA, ultimately allowing for a better understanding of, and discrimination between, these subtypes of aggression.

Psychopathy and Aggression

Although it is not exclusive to criminal populations (Hall & Benning, 2006; Schneider, 1958; Skeem & Cooke, 2010), psychopathy is a potent predictor of criminality, aggression, and recidivism (Cooke & Michie, 2001; Hart & Hare, 1997; Porter & Woodworth, 2006). Psychopathy is broadly associated with aggression, yet the specific associations between psychopathy and RA and PA remain unclear. Whereas some studies indicate that the

interpersonal and affective dimensions of psychopathy are associated with PA, others suggest these dimensions are associated with both RA and PA, and still others suggest the behavioral dimension is most strongly associated with RA (see Blais et al., 2014; Reidy, Shelley-Tremblay, et al., 2011).

The association between psychopathy and PA, although not unequivocal, is fairly well established. More psychopaths commit violence for material gain than do nonpsychopaths (Williamson, Hare, & Wong, 1987); high psychopathy ratings are positively related to the level of instrumentality of crimes (Walsh, Swogger, & Kosson, 2009; cf. Camp, Skeem, Barchard, Lilienfeld, & Poythress, 2013); more homicides committed by psychopaths are instrumental in nature than those committed by nonpsychopaths (Porter & Woodworth, 2007; Woodworth & Porter, 2002); and offenders classified as "instrumental" based on their history of violence are significantly more psychopathic than those classified as "reactive" (Cornell et al., 1996). In addition, higher levels of self-reported PA have been associated with higher levels of self-reported psychopathic traits (Cima & Raine, 2009). Moreover, PA may relate differentially to dimensions of psychopathy, although some studies have reported mixed results with regard to which dimension of psychopathy is most relevant to PA (e.g., Cornell et al., 1996).

Compared with psychopathy and PA, the association between psychopathy and RA is less well established. Woodworth and Porter (2002) found that only 6.7% of homicides committed by incarcerated male psychopaths were reactive, whereas 71.8% of homicides committed by nonpsychopaths were reactive, suggesting that individuals with high psychopathy scores are much less likely than other individuals to engage in RA. Nevertheless, studies using laboratory aggression paradigms have found that individuals high in psychopathy engage indiscriminately in both RA and PA, indicating that these individuals may simply engage in higher levels of aggression with and without provocation (Jones & Paulhus, 2010; Reidy et al., 2007, 2008; Reidy, Shelley-Tremblay, et al., 2011). These disparate findings may be a function of the dimensions of psychopathy examined in each study. For example, Falkenbach, Poythress, and Creevy (2008) found that individuals with higher levels of the interpersonal/affective dimension were more likely to engage in both RA and PA, whereas those with higher levels of the behavioral dimension were more likely to engage in RA only. Together, these findings suggest that it is important to examine dimensions of psychopathy, as a failure to do so may mask differential relationships.

Further highlighting the need for a coherent understanding of associations between psychopathy and RA and PA, Blais et al. (2014) recently conducted a meta-analysis ($k = 53$) to examine the associations between various dimensions or factors of psychopathy with RA and PA. Overall, results indicated that the interpersonal/affective dimension of psychopathy is more strongly associated with PA, whereas the behavioral dimension is more strongly associated with RA. Although this meta-analysis represents an important step forward in integrating the literature on psychopathy's association with RA and PA, the unique associations among these variables are not fully understood. Because the analyses were based on zero-order correlations in the original studies, shared variance among psychopathy dimensions or between RA/PA was not considered. Given that RA and PA and dimensions of psychopathy are often moderately or even highly intercorrelated, it is

important to consider the common as well as unique associations among these variables.

Dimensions of Psychopathy and Self-Reported RA/PA

A growing body of research examines the specific relations between dimensions of psychopathy and RA and PA. Nevertheless, researchers have used differing approaches to operationalize RA and PA, as well as psychopathy, rendering meaningful comparisons across studies difficult. Indeed, in their meta-analysis, Blais and colleagues (2014) reported significant between-study variability that was reduced when the method of psychopathy assessment (e.g., clinical rating scales, informant reports, and self reports) was considered as a moderator. Nevertheless, the meta-analysis included studies that adopted various approaches to operationalizing RA and/or PA, and this variability was not considered in analyses. Indeed, it is important to consider the operationalization of psychopathy as well as RA and PA. For example, studies involving forensic populations tend to use offense history to classify individuals as either RA or PA (Chase, O'Leary, & Heyman, 2001; Cornell et al., 1996; Serin, 1991), which may be problematic, because the motivations underlying aggression are difficult to discern. Further, offenders may have a diverse history of aggressive acts that is not accurately captured by coding a single offense (Chase et al., 2001; Cornell et al., 1996). Given that the distinction between RA and PA rests largely on the degree of planning and purpose behind the act, it is vital to consider a measurement approach, such as self-report, that allows for the assessment of an individual's private motivations for aggression.

Researchers are increasingly using self-report measures of RA and PA to examine their associations with psychopathy, although the majority of these studies have been conducted with adolescent males. For example, in a community sample of adolescent boys, Raine et al. (2006) found maternal ratings of a global psychopathy total score to be significantly associated with PA. Nevertheless, this study did not consider psychopathy subdimensions. In a longitudinal study of adolescent boys, childhood PA significantly predicted higher scores on interpersonal and affective dimensions of psychopathy in early adulthood, whereas RA was not significantly predictive of any psychopathy dimensions in early adulthood (Fite & Colder, 2007). Similarly, Muñoz Centifanti, Kimonis, Frick, and Aucoin (2013) found interpersonal features of psychopathy to be positively associated with unprovoked (proactive) aggression in adolescent boys. In a sample of adult male inmates, Cima and Raine (2009) examined the associations between self-reported RA and PA with self-reported psychopathic personality traits in an incarcerated male sample. Controlling for age, the authors found the behavioral dimension of psychopathy to be associated with both RA and PA, whereas the interpersonal dimension was associated only with PA.

In sum, a growing body of literature has examined the associations between dimensions of psychopathy and RA/PA, although much of this literature has focused primarily on adolescent and/or incarcerated male samples. It is important to examine the links between psychopathy and aggression subtypes in nonincarcerated, mixed gender samples. Bolstering this argument, research indicates that psychopathy is a dimensional construct (Edens, Marcus, Lilienfeld, & Poythress, 2006), suggesting that it can be profitably studied in noncriminal and community populations.

Importance of Gender

Although psychopathy and aggression are both more commonly studied in male samples, research points to mean-level differences in both constructs among men and women. For example, men tend to demonstrate higher levels of psychopathy (see Cale & Lilienfeld, 2002, for a review) and physical aggression (e.g., Hyde, 1984) than women. Nevertheless, less is known regarding gender differences in the behavioral manifestations of psychopathy (Cale & Lilienfeld, 2002). Although evidence is mixed and inconsistent, several studies suggest that psychopathy may be expressed somewhat differently in men and women. In particular, psychopathy's association with behavioral correlates may vary by gender (Verona & Vitale, 2006), although findings are mixed (e.g., Miller, Watts, et al., 2011). In one study, impulsivity-related personality traits exhibited divergent associations with psychopathy across genders, such that the behavioral dimension of psychopathy was more strongly related to impulsivity in women than in men (Miller, Watts, et al., 2011). Although to our knowledge this finding has not been replicated in an independent sample, it suggests the possibility of gender-specific manifestations of psychopathy with regard to impulsivity, which in turn bear on psychopathy's associations with impulsive (RA) versus premeditated (PA) acts of aggression. Indeed, research suggests that the association between psychopathy and specific types of aggression may vary by gender, such that psychopathy is more strongly associated with overt aggression in boys, and relational aggression in girls (Marsee, Silverthorn, & Frick, 2005; but see Schmeelk, Sylvers, & Lilienfeld, 2008, for negative findings). Although this study did not consider RA and PA in the analyses, the findings underscore the importance of considering the role of gender in the associations between these constructs.

Moreover, research indicates that aggression, and particularly RA, may exhibit differential correlates in males and females. Whereas impulsive and hyperactive behaviors predicted RA in males, early traumatic stress and verbal IQ were stronger predictors of RA in females (Connor, Steingard, Anderson, & Melloni, 2003). Such results suggest that differential processes may underlie the development of subtypes of aggression in males and females. Indeed, patterns of aggression may vary by gender (Crapanzano, Frick, & Terranova, 2010), raising the possibility that aggression is best understood when both gender and the subtype of aggression are considered (Stickle, Marini, & Thomas, 2012).

Current Study

The current study aimed to elucidate the unique associations between dimensions of psychopathy and RA and PA to allow for a better understanding of two potentially different pathways between psychopathy and aggression. This study used a self-report measure of RA and PA, which allows individuals to identify the private motivations underlying their aggressive actions. Moreover, because the operationalization of psychopathy may affect the associations between dimensions of psychopathy and RA and PA (Blais et al., 2014; Reidy, Shelley-Tremblay, et al., 2011), we used two measures of psychopathy reflecting different conceptualizations of the construct. The current study adds to the existing literature through the use of an adult sample consisting of both males and females, as well as the use of two well validated self-report psychopathy instruments, which allows us to examine

the generalizability of our findings to two psychopathy measures. Notably, these two measures were developed using different methodological approaches and assess somewhat different operationalizations of psychopathy.

Specifically, we used the Psychopathic Personality Inventory—Revised (PPI-R, Lilienfeld & Widows, 2005), which was designed using a bottom-up approach to test construction. The PPI-R is a widely used self-report measure of psychopathy that aims to detect psychopathic personality traits in nonincarcerated samples. It consists of eight content scales, seven of which often form two higher order factors: Fearless Dominance, associated with many of the core affective and interpersonal features of psychopathy, especially those that are potentially adaptive (e.g., social and physical boldness); and Self-Centered Impulsivity, associated with the largely maladaptive behavioral features of psychopathy (e.g., poor impulse control, manipulateness; Benning, Patrick, Blonigen, Hicks, & Iacono, 2005; Benning, Patrick, Hicks, Blonigen, & Krueger, 2003; but see Neumann, Malterer, & Newman, 2008 for an alternative factor structure). The eighth content scale, Coldheartedness, does not load highly on either factor, and is associated with certain key affective features of psychopathy, especially lack of guilt and empathy. We also used the Levenson Self-Report Psychopathy scale (LSRP; Levenson, Kiehl, & Fitzpatrick, 1995), a well-validated self-report measure of psychopathy designed using a top-down approach. The LSRP separates the dimensions of psychopathy into two scales: Primary Psychopathy, which assesses the interpersonal and affective dimensions of psychopathy; and Secondary Psychopathy, which assesses the antisocial and behavioral dimensions of the construct. In contrast to the PPI-R, which encompasses both adaptive and maladaptive features, the LSRP focuses almost exclusively on maladaptive features (Lilienfeld, Fowler, & Patrick, 2006). In addition to exploring the associations between these two models of psychopathy and RA and PA, we also explored the potential moderating role of gender.

In light of recent meta-analytic results that psychopathy is broadly associated with both RA and PA (e.g., Blais et al., 2014), we hypothesized that psychopathy would be positively correlated with both RA and PA at the bivariate level, with variation in the magnitude of these associations. Specifically, we hypothesized that overall psychopathy scores would be more strongly associated with PA, and that the scales assessing the interpersonal and affective dimensions of psychopathy (LSRP Primary Psychopathy, PPI-R Fearless Dominance, PPI-R Coldheartedness) would be more strongly correlated with PA, whereas those assessing the behavioral dimension of psychopathy (LSRP Secondary Psychopathy, PPI-R Self-Centered Impulsivity) would be more strongly correlated with RA. With shared variance taken into account, we expected to find greater differentiation in associations (Miller & Lynam, 2006). Specifically, we hypothesized that the interpersonal and affective dimensions of psychopathy would remain significantly and positively associated with residualized PA, but not with RA; and that the behavioral dimensions would remain positively associated with residualized RA, but not PA. Because psychopathy's behavioral correlates may vary by gender (Verona & Vitale, 2006), we hypothesized that gender would moderate the associations between psychopathy and aggression. Specifically, given Miller, Watts, et al.'s (2011) finding that the behavioral dimension of psychopathy was more strongly related to impulsivity in women than men, we provisionally hypothesized that compared with

males, females would exhibit stronger positive associations between both behavioral dimensions of psychopathy (LSRP Secondary Psychopathy and PPI-R Self-Centered Impulsivity) and RA.

Method

Participants

Participants were 1169 undergraduates between the ages of 18 and 58 years ($M_{age} = 20.71$, $SD = 4.65$; 72.9% female) who completed an online survey in partial fulfillment of a research exposure requirement at a large public university in the Southeastern United States in a highly racially diverse city. The sample was racially diverse, with 38% self-identifying as Black/African American, 34% as White, and 15% as Asian/Asian American. Participants provided informed consent and completed the surveys via a secure website. All procedures were approved by the university's Institutional Review Board. Details of the larger study from which these data were drawn, as well as psychometric properties of the measures included in the current study, have been described elsewhere (Latzman & Vaidya, 2013; Latzman, Vaidya, Malikina, Berg, & Lilienfeld, 2014).

Measures

Psychopathic Personality Inventory—Revised. The Psychopathic Personality Inventory—Revised (PPI-R; Lilienfeld & Widows, 2005) is a 154-item self-report measure of psychopathy that asks respondents to describe themselves using a 4-point Likert scale. The PPI-R yields a total score reflecting global psychopathy, as well as scores on eight content scales reflecting lower-order features of psychopathy. As noted earlier, higher-order factor analyses of these scales have sometimes yielded a two factor solution (Benning et al., 2003) with Fearless Dominance (PPI-I) consisting of summed scores on the PPI-R Fearlessness, Social Influence, and Social Immunity content scales and Self-Centered Impulsivity (PPI-II) consisting of summed scores on the PPI-R Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, and Carefree Nonplanfulness content scales. An eighth content scale, Coldheartedness, does not load highly on either PPI-I or PPI-II and is typically treated as a stand-alone factor in analyses. The PPI-R also contains three validity scales designed to detect potentially problematic response styles (Lilienfeld & Widows, 2005): Virtuous Responding (designed to detect positive impression management), Deviant Responding (designed to detect malingering and other forms of aberrant responding), and Inconsistent Responding (designed to detect random or inconsistent responding; see Lilienfeld & Widows, 2005). The PPI-R and its parent measure, the PPI, have shown impressive convergent and discriminant validity with a variety of theoretically relevant external criteria (Lilienfeld & Andrews, 1996; Lilienfeld et al., 2006; Lilienfeld & Widows, 2005). Within the current sample, the PPI-R demonstrated high internal consistency, with Cronbach's alphas across the eight content scales ranging from .80 to .87 (Latzman et al., 2014).

Levenson Self-Report Psychopathy Scale. The Levenson Self-Report Psychopathy Scale (LSRP; Levenson, Kiehl & Fitzpatrick, 1995) is a widely used 26-item questionnaire designed to measure psychopathic personality traits and behaviors in

noninstitutionalized populations. Participants endorse items on a 4-point Likert scale. The LSRP yields two factor-analytically derived scores, Primary and Secondary psychopathy, that map approximately onto the two-factor structure of the PCL-R, the traditional method of assessing psychopathy using clinical interviews and institutional records (Hare, 1991, 2003). The Primary scale reflects callousness and manipulation of others (but see Lilienfeld et al., 2006, for evidence that this scale may also assess a predisposition toward impulsive and antisocial behavior), whereas the Secondary scale reflects impulsive and undercontrolled behavior. Although the LSRP primary scale has been criticized on the grounds that it is primarily a measure of antisocial dispositions rather than of core affective and interpersonal features (Lilienfeld et al., 2006), the LSRP scales on balance exhibit good internal consistency and convergent validity with other psychopathy measures (e.g., PCL-R; Brinkley et al., 2001), and normal-range personality traits (Miller, Gaughan, Pryor, Kamen, & Campbell, 2009). In the current sample, the LSRP scales demonstrated adequate internal consistency, with Cronbach's alphas of .87 for Primary and .75 for Secondary Psychopathy (Latzman et al., 2014).

Reactive-Proactive Aggression Questionnaire. The Reactive-Proactive Aggression Questionnaire (RPQ; Raine et al., 2006) is a 23-item measure with two scales: Reactive Aggression (RA; e.g., "Got angry or mad or hit others when teased") and Proactive Aggression (PA; e.g., "Hurt others to impress people"). Items include both physical and verbal forms of RA and PA. Initially constructed using *n* adolescent sample (Raine et al., 2006), the RPQ has demonstrated good psychometric properties in college samples (e.g., Bailey & Ostrov, 2008; Latzman et al., 2011; Miller & Lynam, 2006). Participants respond to items using a 3-point scale (*never*; *sometimes*; *often*) to indicate how often they have engaged in various reactively aggressive and proactively aggressive behaviors. The RPQ demonstrates adequate construct validity, as scores from the scales are differentially associated in the expected directions with criterion variables (e.g., Raine et al., 2006; Fossati et al., 2009). The RPQ's two factor structure has been replicated across cultures, and total scores on the measure demonstrate adequate test-retest reliability (e.g., Fossati et al., 2009). Moreover, internal consistencies range from .86 for PA to .84 for RA (Raine et al., 2006). In the current sample, internal consistencies were .91 for RA and .91 for PA (Latzman & Vaidya, 2013).

Analyses

Consistent with previously established conventions (e.g., Lilienfeld & Widows, 2005), to eliminate invalid responders, we excluded participants who scored greater than or equal to 29 on the PPI-R Deviant Responding scale, and those who scored greater than or equal to 55 on the PPI-R Inconsistent Responding scale. This procedure excluded 11 participants, resulting in a final sample of 1,158 participants (73.1% female, $M_{age} = 20.72$, $SD = 4.67$).

Because RA and PA were highly correlated, $r = .59$, $p < .001$, and consistent with previous research (i.e., Cima & Raine, 2009), residualized RA and PA scores were saved to index "pure" RA and PA independent of each other. These scores were obtained by regressing RA onto PA, and also regression PA onto RA, and saving each standardized residual. We also examined raw (original) RA and PA scores in the analyses. To examine the specific associations between "pure" RA and PA and dimensions of psychopathy, and the potential moderating role of gender on these associations, four hierarchical linear regressions were conducted controlling for age. For both the LSRP and PPI-R, two separate regressions were conducted for residualized RA and PA. Variables were entered in the hierarchical regression models in the following order: Step (1) age, race (0 = non-White, 1 = White), and gender (0 = Male, 1 = Female); Step (2) PPI-R Fearless Dominance, Self-Centered Impulsivity, and Coldheartedness; or LSRP Primary and Secondary Psychopathy; and Step (3) the interaction (partialled product) terms between gender and three PPI-R factors or two LSRP scales. Given that the majority of the research in this area has been conducted primarily in White samples, we compared the findings among White versus non-White participants. To probe the effect of any significant interactions, a simple slopes analysis was conducted to examine the nature of the interaction between gender and psychopathy.

Results

Bivariate Analyses

Bivariate correlations between PPI-R and LSRP psychopathy scales are included in Table 1. Correlations among PPI-R scales were all significant, positive, and medium in magnitude (Mdn

Table 1
Intercorrelations Between Raw/Residualized Proactive and Reactive Aggression Scores and Psychopathy Dimensions

Psychopathy dimension	Raw scores		Residualized scores		PPI-R			LSRP	
	PA	RA	PA	RA	CH	SCI	FD	Primary	Secondary
PPI-R									
CH	.34**	.06	.38**	-.18**	—	—	—	—	—
SCI	.60**	.42**	.43**	.08*	.30**	—	—	—	—
FD	.15**	.04	.15**	-.06	.15**	.07*	—	—	—
LSRP									
Primary	.56**	.34**	.44**	.01	.53**	.63**	.13**	—	—
Secondary	.50**	.45**	.29**	.19**	.20**	.70**	-.11**	.57**	—

Note. PPI-R CH = Coldheartedness scale; PPI-R SCI = Self Centered Impulsivity Scale; PPI-FD = Fearless Dominance Scale; LSRP Primary = Primary Psychopathy; LSRP Secondary = Secondary Psychopathy.

* $p < .05$. ** $p < .01$.

$r = .15, p < .01$); and LSRP Primary and Secondary Psychopathy were also significantly positively correlated, $r = .57, p < .01$, albeit at a higher magnitude than among any of the PPI-R dimensions. Correlations between PPI-R scales and LSRP scales were also all significant and positive (*Mdn* $r = .53, p < .01$), with the exception of PPI-R Fearless Dominance and LSRP Secondary Psychopathy, which were slightly but significantly negatively correlated, $r = -.11, p < .01$.

Bivariate correlations between PPI-R and LSRP, on the one hand, and both raw and residualized RA and PA scores, on the other, are shown in Table 1. Overall, a notable pattern emerged such that once overlapping variance between aggression scores was removed through the use of residual scores, many correlations were attenuated. This attenuation among residual scores is not unexpected, given that the shared variance between RA and PA was removed.

Both raw and residualized PA were moderately positively correlated with all three PPI-R scales, with the lowest correlation emerging between both raw and residual PA and Fearless Dominance (both $r_s = .15, p's < .05$). PA scores were also moderately positively correlated with both LSRP scales, at similar magnitudes. Greater differentiation was observed among correlations between psychopathy dimensions and RA. For example, although both raw and residualized RA were significantly and positively correlated with PPI-R Self Centered Impulsivity, the magnitude of this association varied ($r = .42, p < .01$; $r = .08, p < .05$, respectively). A similar pattern was observed with the LSRP, such that raw RA was significantly and moderately associated with both scales, whereas the associations with residualized RA were attenuated (see Table 1). In contrast, whereas raw RA was associated with neither PPI-R Coldheartedness nor PPI-R Fearless Dominance, residualized RA was significantly, albeit weakly, negatively asso-

ciated with both ($r = -.18, p < .01$; $r = -.06, p < .05$, respectively).

Multivariate Associations Between Demographic Variables and Reactive and Proactive Aggression

Both race ($\beta = -.12, t = -4.01, p < .001$) and gender ($\beta = -.22, t = -7.75, p < .001$) evidenced main effects, with non-Whites and males reporting higher levels of PA than Whites and females, respectively. Only gender evidenced a main effect ($\beta = .10, t = 3.50, p < .001$) on RA, with women reporting higher levels of RA than men.

Explaining Reactive and Proactive Aggression From Dimensions of PPI-R Psychopathy

As shown in Table 2, dimensions of PPI-R psychopathy contributed an additional 21.2% of the variance in PA beyond demographic variables. After accounting for demographic variables, all three PPI-R dimensions emerged as significant contributors to PA, with the strongest contribution coming from SCI ($\beta = .35, t = 12.72, p < .001$) followed by Coldheartedness ($\beta = .23, t = 8.27, p < .001$) and FD ($\beta = .07, t = 2.72, p < .001$). In addition to main effects, the association between PPI-R SCI and PA was significantly moderated by gender ($\beta = -.11, t = -2.14, p < .05$). To probe the nature of this interaction, a simple slopes analysis was conducted. As shown in Figure 1, examination of simple slopes revealed that the association between SCI and PA was significantly stronger for men ($\beta = .50, p < .001$) than for women ($\beta = .31, p < .001$). Thus, although higher levels of SCI predicted higher levels of PA in both women and men, the magnitude of this association was stronger for men.

Table 2
Hierarchical Regression Results for Dimensions of PPI-R Predicting Proactive & Reactive Aggression

Step	Proactive aggression				Reactive aggression			
	β	t	R^2	ΔR^2	β	t	R^2	ΔR^2
Step 1								
Gender	-.22	-7.75**	.06**		.10	3.50**	.01**	
Age	-.05	-1.70			-.05	-1.70		
Race	-.12	-4.01**			.03	1.13		
Step 2								
Gender	-.10	-3.62**	.28**	.21**	.06	1.91	.06**	.05**
Age	.04	1.48			.00	-.12		
Race	-.07	-2.88**			.01	.33		
CH	.23	8.27**			-.21	-6.52**		
SCI	.35	12.72**			.16	5.21**		
FD	.07	2.72**			-.02	-.83		
Step 3								
Gender	-.08	-2.77**	.28**	.01	.05	1.56	.06**	.00
Age	.04	1.40			.00	-.09		
Race	-.07	-2.81**			.01	.31		
Coldheartedness	.28	5.92**			-.23	5.92**		
Self-centered imp.	.45	8.61**			.13	2.15*		
Fearless dominance	.09	1.74			-.04	-.76		
CH \times Gender	-.06	-1.17			.02	.36		
SCI \times Gender	-.11	-2.14*			.04	.65		
FD \times Gender	-.01	-0.27			.02	.35		

* $p < .05$. ** $p < .01$.

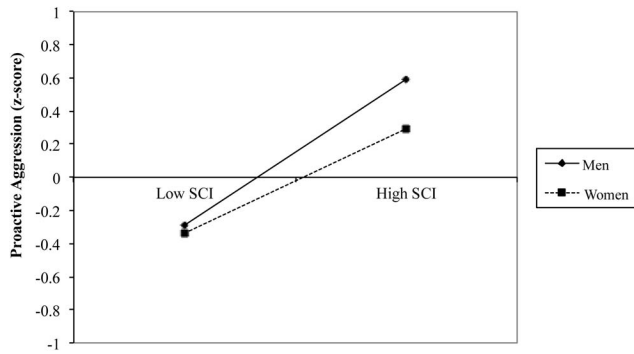


Figure 1. Moderating effect of gender on the association between PPI-R Self-Centered Impulsivity and proactive aggression. High and low values correspond to + 1.0 and -1.0 SD from the mean, respectively. Proactive aggression scores are standardized, $M = 0$, $SD = 1$.

After accounting for demographic variables, dimensions of PPI-R psychopathy accounted for an additional 5.0% of the variance in RA (see Table 2). PPI-R Coldheartedness was negatively ($\beta = -.21, t = -6.52, p < .001$) and PPI-R SCI positively ($\beta = .16, t = 5.21, p < .001$) associated with RA, whereas Fearless Dominance was not significantly associated. None of the PPI-R factor by gender interactions was significant (all β s $< .05$, all t s $< .66$, all p s $> .50$).

Explaining Reactive and Proactive Aggression From Dimensions of LSRP Psychopathy

As shown in Table 3, dimensions of LSRP psychopathy contributed an additional 15.0% of the variance in PA beyond demographic variables. Both Primary ($\beta = .36, t = 10.86, p < .001$) and Secondary ($\beta = .07, t = 2.26, p < .05$) Psychopathy

evidenced significant main effects, with a much stronger association evident for the former. None of the LSRP facet by gender interactions was significant (β s < 1.111 , all t s < 11.801 , p s $> .05$).

After accounting for demographic variables, LSRP psychopathy contributed an additional 4.7% of the variance for RA (see Table 3). Primary Psychopathy was negatively ($\beta = -.12, t = -2.95, p < .001$) and Secondary Psychopathy positively ($\beta = .26, t = 7.39, p < .001$) associated with RA. In addition, the association between LSRP Secondary Psychopathy and RA was significantly moderated by gender ($\beta = .13, t = 2.23, p < .05$). As shown in Figure 2, examination of simple slopes revealed that the association between Secondary Psychopathy and RA was significantly stronger for women ($\beta = .30, p < .001$) than for men ($\beta = .15, p < .05$). Thus, although higher levels of Secondary Psychopathy predicted higher levels of RA in both men and women, the magnitude of this association was stronger for women.

Discussion

Although global psychopathy has been linked to aggression, our understanding of shared versus unique correlational patterns between dimensions of psychopathy and subtypes of aggression remains limited. This gap in our knowledge is attributable at least in part to the heterogeneity of both aggression and psychopathy, the latter of which is often operationalized in different ways. In an effort to examine more than one psychopathy model, the current study used two self-report psychopathy instruments to examine how dimensions of psychopathy relate to RA and PA in a racially diverse sample of undergraduate men and women.

Consistent with meta-analytic findings (Blais et al., 2014), our results confirmed specificity in the associations between dimensions of psychopathy and subtypes of aggression. With notable

Table 3
Hierarchical Regression Results for Dimensions of LSRP Predicting Proactive and Reactive Aggression

Step	Proactive aggression				Reactive aggression			
	β	t	R^2	ΔR^2	β	t	R^2	ΔR^2
Step 1								
Gender	-.22	-7.75**	.06**		.10	3.50**	.01**	
Age	-.05	-1.70			-.05	-1.70		
Race	-.12	-4.01**			.03	1.13		
Step 2								
Gender	-.15	5.41**	.21**	.15**	.12	3.53**	.06**	.05**
Age	.02	.86			-.02	-.60		
Race	-.06	-2.22*			.03	1.14		
Primary psych.	.36	10.86**			-.12	-2.95**		
Secondary psych.	.07	2.26*			.26	7.39**		
Step 3								
Gender	-.14	-5.07**	.22**	.00	.10	3.44**	.07**	.01
Age	.02	.81			-.02	-.55		
Race	-.06	-2.09*			.03	.95		
Primary psych.	.37	6.07**			-.05	-.76		
Secondary psych.	.17	2.71**			.12	1.79		
Primary \times Gender	-.11	-1.80			.16	2.41*		
Secondary \times Gender	-.02	-.25			-.07	-1.00		

* $p < .05$. ** $p < .01$.

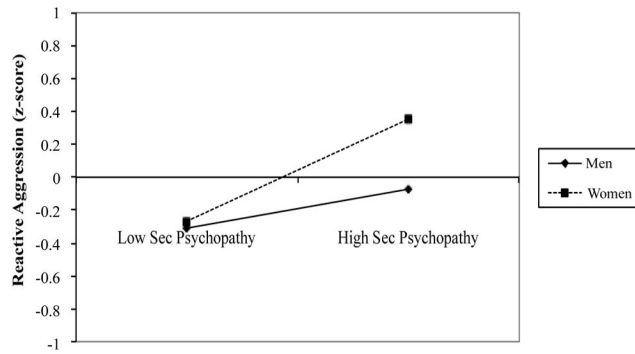


Figure 2. Moderating effect of gender on the association between LSRP Secondary Psychopathy and RA. High and low values correspond to + 1.0 and -1.0 SD from the mean, respectively. RA scores are standardized, $M = 0$, $SD = 1$.

exceptions, we found consistent associations between dimensions from differing models of psychopathy, on the one hand, and subtypes of aggression, on the other. Additionally, associations between dimensions of psychopathy and RA and PA varied in terms of raw and residual correlations, as well as by gender.

Distinct Associations Between Psychopathy and Aggression

Consistent with our hypotheses and with the findings of Blais et al. (2014), self-reported psychopathy was broadly associated with PA, and to a lesser extent, with RA. As assessed using the present two measures, psychopathy explained 15–21% of the variance in PA, whereas it explained only 5% of variance in RA. Further, psychopathy dimensions remained significantly and positively associated with PA at the bivariate level using both raw and residual PA scores. The finding that PA remained significantly positively associated with all dimensions of psychopathy even after shared variance with RA was statistically removed underscores psychopathy's association with PA, and is consistent with research indicating that psychopathy is particularly relevant to PA (e.g., Chase et al., 2001; Cornell et al., 1996; Serin, 1991; Walsh et al., 2009; Williamson et al., 1987). Further, our findings are consistent with research examining psychopathy's association with both RA and PA. Specifically, psychopathy, as assessed via the PPI-R's predecessor, the PPI (Psychopathic Personality Inventory; Lilienfeld & Andrews, 1996), is significantly positively associated with residualized proactive, but not reactive, aggression (Cima & Raine, 2009). Overall, these findings suggest that individuals high in psychopathy may be distinctive in their propensity for PA. Nevertheless, important differential associations were observed when examining specific components of psychopathy.

As expected, dimensions of psychopathy evidenced specific associations with RA and PA. As such, our results corroborate the proposition that RA and PA are distinct subtypes of aggression that exhibit differential associations with meaningful external correlates. Moreover, greater specificity in associations was observed when using residualized aggression scores. Specifically, although PA's pattern of associations with dimensions of psychopathy was largely consistent using both raw and residual PA, raw RA's

pattern of associations was quite different than residual RA. That is, once overlapping variance with PA was removed, RA exhibited greater specificity in its associations with the various psychopathy dimensions. This differentiation in associations among raw and residual scores is consistent with previous research (e.g., Miller & Lynam, 2006; Raine et al., 2006) and indicates that the associations between RA and dimensions of psychopathy are attributable, in part, to overlapping variance with PA. Once such overlapping variance was removed, "pure" RA correlated positively with impulsive dimensions of psychopathy and negatively with interpersonal and affective features. Thus, the variance that is unique to RA appears to capture the increased behavioral impulsivity that is characteristic of psychopathy, combined with a decreased cold, callous, and calculating affective and interpersonal style. On the other hand, raw and residual both PA appear to capture similar aspects of psychopathy, and at a similar magnitudes. Indeed, whereas the pattern of correlations varied between raw and residualized RA, the pattern of associations for PA using both raw and residualized scores was quite similar. Further, not all associations were attenuated when using residualized PA scores, and some associations (i.e., association with Coldheartedness) emerged as slightly numerically stronger.

Overall, result from the current study reveal that RA is associated with lower levels of certain core affective features of psychopathy, especially lack of guilt, empathy, and other social emotions, as well as higher levels of the impulsive or behavioral features. These results are consistent with findings that RA is associated with trait anxiety (Raine et al., 2006), as well as with higher levels of the broader dimension of negative emotionality (Miller & Lynam, 2006). As such, it appears that the presence of social emotions, as exemplified by reversed Coldheartedness, is associated with more impulsive and provoked acts of aggression, perhaps because social connectedness can trigger anger when one's interpersonal needs are frustrated. This conclusion is consistent with research that RA is related to increased negative emotionality and emotional dysregulation (Card & Little, 2006; Dodge et al., 1997). Moreover, the characteristic lack of social emotions among individuals with elevated levels of psychopathy may inhibit their expression of RA (Reidy, Zeichner, & Seibert, 2011), and research confirms that the interpersonal and affective features of psychopathy are negatively associated with anger responses (Reidy et al., 2013). As such, future work may want to consider the role of anger with regard to the associations between psychopathy and aggression, particularly provoked aggression.

With regard to unprovoked aggression, PA also evidenced specific associations with dimensions of psychopathy. Using both the PPI-R and LSRP, PA was associated with higher levels of all psychopathy dimensions, albeit at varying magnitudes. With regard to the PPI-R, PA was uniquely characterized by higher levels of Coldheartedness, whereas with the LSRP, PA was uniquely characterized by higher levels of Primary Psychopathy. As noted above, RA was uniquely characterized by *lower* levels of Coldheartedness and Primary Psychopathy, suggesting that some important features of psychopathy may exert a protective effect against RA. As Coldheartedness assesses the features of psychopathy tied to callousness, and Primary Psychopathy assesses the key affective features of psychopathy, these results are largely consistent with each other and indicate that PA is associated with a paucity of social emotions. Hence, our results suggest that PPI-R

Coldheartedness and LSRP Primary Psychopathy assess important, and possibly overlapping, aspects of psychopathy that are pertinent to the differentiation between RA and PA. From the perspective of the recently formulated triarchic model of psychopathy (Patrick, Fowles, & Krueger, 2009), this domain probably overlaps substantially with the construct of “meanness,” or agentic disaffiliation. It also overlaps with the recently introduced “emotional detachment” dimension of the trait model introduced in Section III of *DSM-5* (American Psychiatric Association, 2013). Taken together, our findings suggest that calculated acts of aggression committed as a means to achieve a secondary goal are associated with a coldhearted paucity of social emotions, whereas provoked or reactive acts of aggression are associated with high levels of such emotions.

PA was also uniquely associated with higher levels of Fearless Dominance, an association that was not observed for RA. This specificity is consistent with the notion that Fearless Dominance assesses an important aspect of psychopathy (see Lilienfeld et al., 2012; but see Lynam & Miller, 2012, for a dissenting view). Specifically, a lack of fear and stress reactivity appears to be particularly relevant for goal-directed acts of aggression. Such results are consistent with research that PA is associated with lower physiological arousal, autonomic reactivity, and cortisol levels (Cima et al., 2008; Hubbard et al., 2002; Stanford et al., 2003). Further, research has revealed Fearless Dominance to be associated with PA, but not RA (Cima & Raine, 2009). These results underscore the importance of considering psychopathy as a multidimensional construct, a conclusion that is consistent with recent conceptual models of psychopathy indicating that the construct may be composed of several largely distinct attributes and may not be a higher-order entity (Fowles & Dindo, 2009; Lilienfeld et al., 2012).

Common Associations Between Psychopathy and Aggression

We also found evidence for common associations across the dimensions of psychopathy. Both at the bivariate level (using both raw and residualized aggression scores) and when examining unique associations, RA and PA were significantly and positively associated with PPI-R Self-Centered Impulsivity as well as LSRP Secondary Psychopathy. Such results demonstrate that both subtypes of aggression are associated with aspects of psychopathy related to impulsive and antisocial behaviors. Further, although Self-Centered Impulsivity and Secondary Psychopathy were correlated at the bivariate level, the magnitude of their unique associations varied such that Self-Centered Impulsivity was more strongly associated with PA than RA, whereas Secondary Psychopathy was more strongly associated with RA than PA. Thus, Self-Centered Impulsivity may assess impulsive features of psychopathy that are more pertinent to PA, whereas Secondary Psychopathy may assess those more pertinent to RA.

Gender Differences in Associations Between Psychopathy and Aggression

Results from the current study suggest that associations between dimensions of psychopathy and subtypes of aggression vary by gender. Specifically, the magnitude of the associations between the

impulsive and behavioral aspects of psychopathy and RA and PA differed between men and women. This finding is consistent with research revealing varied associations between impulsivity-related personality traits and various aspects of psychopathy in men and women (e.g., Miller, Watts, et al., 2011), as well as research that RA exhibits differential correlates in males and females (Connor et al., 2003). Significant gender moderation was observed using both models of psychopathy; however, the specific associations were not consistent across models. Specifically, higher levels of PPI-R Self-Centered Impulsivity predicted higher levels of PA in men than in women, and higher levels of LSRP Secondary Psychopathy predicted higher levels of RA in women than in men. The significant gender moderation observed using both measures suggests that gender has an important effect on the associations between the impulsive/behavioral features of psychopathy and aggression. Such results are consistent with research indicating that compared with males, females exhibit higher levels of emotional distress, including negative affect, anxiety, and distress regarding social provocations (Stickle et al., 2012). Hence, the behavioral manifestation of psychopathy may vary in men versus women, such that females exhibiting higher levels of the impulsive and behavioral dimension of psychopathy may also exhibit higher levels of emotional reactivity than males, predisposing to elevated levels of RA. Conversely, males exhibiting higher levels of the impulsive and behavioral dimension of psychopathy may exhibit relatively lower emotional reactivity than females, predisposing to elevated levels of PA. Nevertheless, these interpretations are provisional, particularly given that the same gender moderation was not mirrored using both models of psychopathy. Given that these gender-related behavioral manifestations of psychopathy were not consistent across psychopathy models, the mechanism underpinning this moderation will need to be further explored. For example, the inconsistency across measures may be related to differences in the structure and functioning of the PPI-R and LSRP. Although PPI-R Self-Centered Impulsivity and LSRP Secondary Psychopathy appear to assess overlapping aspects of psychopathy composed of impulsive and behavioral features, they may function differently in males and females. Quantifying this potential measurement issue may also help to explain some of the inconsistent findings in the previous literature examining dimensions of psychopathy in relation to RA and PA. Nevertheless, given the moderate to high correlation between dimensions of psychopathy, it will be important for future research to confirm these findings through replication.

Strengths and Limitations

Given the cross-sectional, correlational nature of these data, it will be important for longitudinal studies to prospectively examine the prediction of subtypes of aggression from dimensions of psychopathic personality. Further, the use of an undergraduate sample may limit the generalizability of these findings. Although recent findings suggest consistent associations between personality traits and dimensions of psychopathy (e.g., Latzman et al., 2014), the diverse nature of our sample relative to most samples reported in the literature represents a significant strength of the current study. The inclusion of nonincarcerated males and females also represents a significant strength of the current study, as most studies in this area have focused on incarcerated males.

The current study used two well-validated self-report psychopathy instruments based on differing conceptualizations of psychopathy. Nonetheless, we did not administer psychopathy measures that drew on different modes of assessment (e.g., interview-based measures, informant reports, chart reviews). These measures may exhibit differential associations with RA and PA and will be important to examine in future studies. Moreover, self-report instruments are not without their disadvantages (e.g., reliance on insight, introspection, and other attributes that may be lacking in psychopathy), and in particular, the assessment of psychopathy with self-report has been criticized for the susceptibility to response biases and distortions (Edens et al., 2000). Nevertheless, psychopathy self-reports tend to be correlated moderately to highly with informant reports of psychopathy (e.g., Miller, Jones, & Lynam, 2011). Moreover, scores on psychopathy measures are typically negatively, not positively, associated with measures of social desirability (e.g., Ray et al., 2013), and this inverse association appears to reflect true variance in psychopathy rather than a response bias per se (Verschuere et al., 2014). Hence, impression management does not appear to be undermine the validity of self-report psychopathy measures, at least in research settings in which confidentiality is guaranteed.

In line with the aims of the study, we used residualized scores for multivariate analyses to assess the distinctive associations between dimensions of psychopathy and RA and PA, independent of overlapping variance. These “pure” RA and PA scores represent the variance that is unique to each specific subtype of aggression, such that residualized RA represents the variance specific to RA that does not overlap with PA, and vice versa. We presented bivariate correlations using both raw and residualized scores to examine the differences in the pattern of associations. Although some researchers have cautioned against the use of residualized scores (e.g., Lynam, Hoyle, & Newman, 2006; Miller & Lynam, 2006), we elected to use this approach given that we aimed to delineate the *shared* as well as *unique* associations with RA and PA. Such an approach is in line with previous investigations of RA and PA (e.g., Raine et al., 2006). Although the construct validities of residualized RA and PA have yet to be explicitly established, the current study contributes to and is consistent with this growing literature. For example, research indicates that residualized or “pure” RA is positively associated with impulsivity in the context of negative affect, and negatively associated with impulsivity in the context of positive affect, whereas “pure” PA is associated with increased impulsivity in the context of positive affect (e.g., Hecht & Latzman, 2015). Findings from the current study are consistent with this emerging research, and highlight the need for future work to fully characterize what is represented by “pure” RA and PA.

Finally, as findings from the current study were based exclusively on self-report measures, it is possible that the absolute levels of the associations were inflated because of shared method variance. Nevertheless, this explanation is unlikely to account for differences in the associations among dimensions of psychopathy and RA and PA.

Conclusions

In sum, results from the current study demonstrate that psychopathy is associated with both reactive and proactive aggres-

sive behaviors, but is more strongly associated with the latter. Further, our findings indicate that dimensions of psychopathy evidence unique associations with reactive and proactive aggression, and raise the possibility that these associations vary by gender. Indeed, our results raise the intriguing possibility of different pathways from psychopathy to subtypes of aggression that may differ for males and females. These findings contribute to our understanding of both psychopathy and aggression, and underscore the importance of considering both subtypes of aggression and multiple dimensions of psychopathy in both males and females.

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