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Examination of Intelligence as a Compensatory Factor in Non-Criminal Psychopathy in a Non-Incarcerated Sample

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Abstract The main goal of the current study was to evaluate intelligence as a compensatory factor in the expression of non-criminal psychopathy. This hypothesis was empirically tested in a moderation framework. Undergraduate students (n=372) completed the Psychopathic Personality Inventory-Revised, Shipley-2, and Antisocial Behavior Questionnaire. Results from zero-inflated Poisson regression models indicated that intelligence (particularly verbal intelligence) moderated the relationship between psychopathy and criminality, such that those higher on both psychopathy and intelligence had engaged in less criminal behavior. These findings provide preliminary evidence for the hypothesis that intelligence serves as a compensatory factor for non-criminal psychopathy.

Keywords Psychopathy · Intelligence · Criminality · Antisocial

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Psychopathic individuals are typically described as possessing a constellation of affective, interpersonal, and behavioral characteristics, including traits such as callousness, fearlessness, deceitfulness, grandiosity, impulsiveness, excitement seeking, and aggression (Hare and Neumann 2008). They have also been described by early theorists such as Pinel (1801) and Pritchard (1835) to be "morally insane" or "morally perverted." Cleckley proposed one of the most complete conceptualizations (1941/1976) in his observations of psychiatric patients. He identified 16 characteristics that separated psychopathic individuals from other patients. However, he did not describe psychopathic individuals as overly aggressive or violent. On the other hand, McCord and McCord (1964) described psychopathic individuals as vicious and cold with aggressive and dangerous motivation. Most recently, Robert Hare has moved the conceptualization to a mixed model including both personality traits and behavioral features (e.g., Hare 1996; Hare and Neumann 2008), in which overt expressions of maladaptive traits are assessed via the Psychopathy Checklist-Revised (PCL-R; Hare 2003). However, the inclusion of antisocial behavior in the conceptualization of psychopathy remains an ongoing debate (e.g., Skeem and Cooke 2010; Hare and Neumann 2010).

The most overt expressions of psychopathy involve flagrant violations of social norms and expectations. Indeed, these individuals account for a disproportionate number of incarcerated offenders (e.g., 15 % vs. 0.5-1 %; Coid et al. 2009; Hare 2003; Neumann & Hare 2008); however, most individuals with psychopathy are not incarcerated, and instead likely engage in behaviors that may be viewed as unethical or morally objectionable, but are not necessarily illegal (Hare 1996). For instance, such individuals have been described to connive, plagiarize, and cheat their way through higher education or to manipulate, flatter, and backstab their way through advancement in businesses (Babiak 1995). The presence of this latter group suggests a conceptualization of "successful" or "non-criminal" psychopathy. Because the term "successful" is unclear in the literature, we use the term "non-

criminal" in the current study as it is more descriptive and denotes those who have not engaged in criminal behavior. Research on mechanisms that may differentiate criminal and non-criminal individuals high on psychopathy is in its infancy (Hall and Benning 2006) and has primarily focused on specific neurobiological referents (Gao and Raine 2010). Research is needed to further elucidate what variables differentiate these various expressions of psychopathy. This might represent an important step in facilitating accurate risk identification and provide sound evidence for targeted prevention of violence and criminal behavior among these individuals.

Although scholars have debated the structure and nature of psychopathy in its criminal manifestations, various conceptualizations of the non-criminal psychopath have been proposed since Cleckley's (1941) original theory. The non-criminal psychopath has been conceptualized in three common themes: 1) non-criminal psychopathy as a subclinical manifestation of the disorder, 2) non-criminal psychopathy as a moderated expression of the full disorder, and 3) non-criminal psychopathy as a dual-process perspective (Hall and Benning 2006). Although these conceptualizations are driven by differing assumptions, they are not necessarily competing, mutually exclusive theories and, instead, are approaches that may merely address different issues (Hall and Benning 2006).

Hall and Benning's (2006) hypothesis that non-criminal psychopathy represents a moderated expression of the full disorder suggests that one or several compensatory processes alter the association between psychopathy and crime. The hypothesis indicates that criminal and non-criminal psychopathic individuals share both etiology and severity; however, there are intervening variables for the alternative manifestation. This theme assumes a compensatory process in which the antisocial behaviors of incarcerated psychopaths are a consequence of their psychopathic personality (Hall and Benning 2006). Possible compensatory factors include (but are not limited to) intelligence, exceptional talent, educational opportunity, socioeconomic status, highly effective socialization, or independent aspects of temperament (Hall and Benning 2006). The current study specifically focused on intelligence as one such factor. Intelligence is negatively correlated with criminality in samples of various populations (Bartels et al. 2010; Beaver and Wright 2011) and thus may serve as a protective factor in terms of overt criminality, as psychopathic individuals with high intelligence likely have skills and resources that allow them to operate and exploit society via other means.

Although no studies to date have directly tested this hypothesis, several key findings indicate the possibility that intelligence can at least partly account for the differential manifestations of criminal and non-criminal psychopaths. Widom (1977) used an approach to study non-institutionalized psychopaths in which she recruited subjects through advertisements for such traits as egocentrism, adventure seeking, and fearlessness. She found that social, demographic, and numerous antisocial characteristics of the sample were similar to those frequently associated with psychopathy. However, the sample was of higher intelligence and socioeconomic status relative to those frequently associated with the diagnosis of psychopathy in prison samples. In terms of antisociality, the sample differed not in terms of the frequency of arrests, but the frequency of convictions (Widom 1977). The non-institutionalized sample was thus fairly "successful" at avoiding extensive convictions, but critical variables such as intelligence need to be investigated further. Despite the outdated psychopathy assessment procedures used, Widom's (1977) study is still important to consider because she laid the groundwork for examining non-institutionalized psychopaths.

More recently, Ishikawa and colleagues (2001) also found that non-criminal psychopaths exhibited more intact executive functioning, which allows for better organization and problem solving, than both unsuccessful psychopaths and control subjects. Sellbom and Verona (2007) found that Psychopathic Personality Inventory (PPI; Lilienfeld and Andrews 1996) Fearless Dominance scores were preferentially related to higher intelligence and executive functioning, but Impulsive-Antisociality was uncorrelated with intelligence. Heinzen and colleagues (2011) showed that the Psychopathy Checklist Screening Version (PCL-SV; Hart, Cox, and Hare 1995) Part 2 (Social Deviance) was negatively related to IQ and the length of conviction and positively related to the number of prior convictions, which is consistent with previous findings since this PCL-SV factor includes measurement of overt criminal acts. Furthermore, Salekin and colleagues (2004) reported that psychopathic traits in youth reflecting superficiality and deceitfulness were positively related to verbal intelligence, creativity, practicality, and analytic skills.

Several studies have also reported that specific types of intelligence, particularly verbal intelligence have been found to be negatively associated with behavioral deviance (Berman and Siegal 1976; Culberton et al. 1989; Lipsitt et al. 1990; Moffitt and Henry 1991; Walsh et al. 1987). More recently, Lynam and colleagues (1993) reported that serious delinquents had lower verbal IQ scores relative to non-delinquents. Vermeiren and colleagues (2002) showed that verbal IQ scores were negatively associated with early juvenile re-offending. Finally, Barker and colleagues (2010) found a more complex association between antisocial conduct and intelligence, in that verbal IQ scores were negatively correlated with impulsive physical aggression in adolescents with severe conduct problems, but were positively associated with premeditated theft behaviors.

Because the relationship between intelligence and psychopathy is more complex relative to the association between criminal conduct and intelligence, it is important to explore intelligence as a moderating factor to better predict

criminal conduct. Although these studies demonstrate a relationship between certain psychopathic personality traits and intelligence, no study to date has directly examined whether intelligence moderates the association between psychopathy and crime. The current study was designed to directly examine this empirical question. We aimed to test intelligence as a compensatory variable to account for the non-criminal expression of psychopathic personality in a non-institutionalized sample. We examined both overall psychopathy and the three facets that have been elaborated for the Psychopathic Personality Inventory-Revised: Fearless-Dominance, Self-Centered Impulsivity, and Coldheartedness (Benning et al. 2003; Lilienfeld and Widows 2005). We specifically hypothesized, based on the literature just reviewed, that intelligence would moderate the relationship between psychopathy and overt criminality in that this association would become weaker as intelligence scores increased (Ishikawa et al. 2001; Salekin et al. 2004; Sellbom and Verona 2007); however, given the scarcity of research in this area, we did not establish a priori hypotheses about specific psychopathy facets.

Method

Participants and Procedures

Three hundred and eighty-eight students were recruited from the undergraduate introductory psychology subject pool at a Southeastern university in the United States. Participants completed the study questionnaires via computer in groups of up to ten participants. Sixteen participants who scored above 44 on the PPI-R Inconsistency scale (based on Lilienfeld and Widows 2005) were excluded from the analysis due to excessive random responding. The final sample consisted of 91 men and 281 women ranging in age from 17 years to 32 years with a mean of 18.72 years (SD=1.56). Participants were primarily Caucasian (78.8 %) or African American (17.2 %) and were single or had never been married (98.7 %).

Measures

Table 1 includes means, standard deviations, internal consistency reliability (Cronbach's alpha), and inter-correlations for all scale scores used in the current study. As evident from this table, the mean PPI-R T-scores in the current sample fall in the average range using the college student normative sample reported in the PPI-R manual (Lilienfeld and Widows 2005).

Antisocial Behavior Questionnaire (ABQ; Sellbom and Verona 2004; Sellbom et al. 2012). The ABQ is a 16-item self-report inventory inspired by other questionnaires to reliably assess delinquency and antisocial conduct in juveniles and college students, respectively (Hirschi et al. 1980; Lynam et al. 1999). Our version lists 16 behaviors that would be considered "criminal" in nature, including theft, assault, vandalism, drunk driving, fraud, drug-related offenses, and domestic violence (see Table 2 for all items). Participants respond as to whether they had acted in the manner described in each question on a scale of three response options ("1" = no; "2" = yes, but only once; and "3" = yes, more than once). The ABQ serves as an external criterion for criminal history. The ABQ correlates strongly with PPI Total (r=.49 to .63) and PPI Impulsive-Antisociality (r=.52 to .69) scores (Sellbom and Verona 2004; Sellbom et al. 2012).

Psychopathic Personality Inventory- Revised (PPI-R; Lilienfeld and Widows 2005). The PPI-R is a 154-item self-report inventory, which was developed particularly for use with non-institutionalized samples. Like the original PPI (Lilienfeld and Andrews 1996), it measures psychopathic personality traits present in individuals among a variety of settings. In the current study, we focused on the three factors on which the eight PPI-R subscales load: Fearless-Dominance (Social Potency, Fearlessness, & Stress Immunity), Self-Centered Impulsivity (Machiavellian Egocentricity, Rebellious Nonconformity, Blame Externalization, & Carefree Nonplanfulness), and Coldheartedness. The PPI and PPI-R have received substantial empirical support as a measure of psychopathy in non-institutionalized samples (Lilienfeld and Fowler 2006; cf. Marcus, Fulton, and Edens 2013).

Shipley-2 (Shipley et al. 2009). The Shipley-2 is a self-report measure of cognitive functioning and impairment that provides a good estimation of Wechsler Adult Intelligence Scale (WAIS-III) IQ scores, as well as verbal and non-verbal reasoning ability (Shipley et al. 2009). The verbal portion is a vocabulary test in which the respondent has to select the closest synonym (from four options) for 40 words. The non-verbal portion requires the participant to solve 25 abstract patterns (e.g., A, B, C, D, ___) of increasing difficulty. There is a 10-min time limit for each portion. Concurrent validation evidence shows that the Shipley-2 correlates strongly with the WAIS-III (r=.45 to .87) and the Wonderlic Personnel Test (r=.47 to .64) (Shipley et al. 2009). Per the manual, test-retest reliability ranges from r=.87 to .94.

Results

ABQ Item Analysis

As a preliminary analysis, we examined the specific items of the ABQ to elucidate the prevalence of various criminal behaviors in the current sample. Given the ABQ items' general

Table 1 Descriptives, Internal Consistency Reliabilities, and Intercorrelations for all study measures

	M (SD)			1	2	3	4	5	6	7	8
	Total	Women	Men								
1. ABQ	2.33 (3.85)	1.62 (2.67)	4.52 (5.69)	(.84)							
2. PPI-R Total [a]	52.02 (11.05)	52.43 (11.27)	50.78 (10.32)	.48*	(.93)						
3. PPI-R FD [a]	49.84 (10.97)	49.56 (10.88)	50.70 (11.28)	.34*	.82*	(.91)					
4. PPI-R ScI [a]	51.32 (10.76)	51.73 (11.25)	50.05 (9.02)	.42*	.75*	.27*	(.91)				
5. PPI-R Cold [a]	46.99 (11.11)	46.58 (11.22)	48.25 (10.75)	.23*	.49*	.24*	.28*	(.80)			
6. Shipley-2 Total	43.93 (5.67)	43.30 (5.49)	45.84 (5.78)	−.02	−.01	.03	−.02	−.08	(.77)		
7. Shipley-2 Verbal	28.48 (3.89)	28.11 (3.80)	29.87 (3.80)	−.01	.06	.12	−.02	−.02	.75*	(.70)	
8. Shipley-2 Abstract	15.44 (3.03)	15.20 (2.96)	15.98 (3.22)	−.03	−.06	−.04	−.02	−.11	.87*	.33*	(.70)

ABQ antisocial behavior questionnaire, *PPI-R* psychopathic personality inventory-revised, *FD* fearless-dominance, *ScI* self-centered impulsivity, *Cold* coldheartedness

[a] Expressed in T-scores based on the College Student normative sample from PPI-R manual (Lilienfeld and Widows 2005)

*$p<.007$ (Bonferroni correction .05/7 other variables)

reliance on criminal conduct, it was not unexpected for a college sample that driving while intoxicated was the most frequently endorsed item (32.5 % reported doing so at least once in the overall sample) followed by possession/trafficking of drugs (23.7 %). In addition, petty theft, breaking and entering, fraud, physical fighting, and domestic violence were endorsed with 10 % or greater frequency, and possession of a weapon, property destruction, and monetary gain via illegal means were endorsed with a least 6 % or greater frequency.[1] To test for gender differences, we examined the relative frequency of responses to ABQ items using likelihood ratio tests and corresponding Cramer's phi effect sizes. To correct for family-wise error, we applied a Bonferroni corrected alpha of .003 (.05/16 tests). These results are reported in Table 2. Men and women scored significantly differently on seven of the sixteen antisocial behaviors, with effect sizes ranging from small to moderate. More specifically, men reported a significantly greater frequency of breaking and entering, robbery, assault, and possession or trafficking of drugs, which were associated with small effect sizes (Cramer's phi≥.10), as well as a greater frequency of possession of weapons, physical fighting, and making money through illegal activities at a moderate effect size level (Cramer's phi≥.30). As expected for overall ABQ scores, men engaged in more overt criminal behavior than women (t [370]=6.62, $p<.001$, $d=.80$), with a large effect size associated with this difference. In sum, there was substantial prevalence of criminal history in general, with expected gender differences.

[1] If the driving while intoxicated item were removed from the ABQ total scores, 42.2 % of the sample would still endorse engaging in some other criminal behavior at least once.

Correlations

We next examined zero-order correlations between PPI-R, ABQ, and Shipley-2 scores. Again, given the number of correlations (7 for each variable), we applied a Bonferroni corrected alpha of .007 (.05/7). Table 1 shows these results. As expected, the psychopathy total score and all three factor scores were all significantly and moderately correlated with the number of self-reported criminal activities. There were no significant correlations between intelligence and the other variables.

Moderation Analysis

To test whether intelligence moderates the association between psychopathy and criminal behavior, we estimated a series of zero-inflated Poisson regression models. The distribution of the ABQ scores indicated a count (Poisson) distribution with an excess of zero occurrences (50 % of the sample reported no criminal acts), and Voung tests ($zs>6.42$, $p<.001$) supported a zero-inflated over a standard Poisson model for all analyses. A zero-inflated model has the advantage of accommodating for the multiple possibilities of excess zeros, including (in this study) that participants had not engaged in criminal behavior ("certain zero") as opposed to the possibility that they did not have sufficient opportunities to engage in criminal behavior (not "certain zero"). To test for moderation effects, we entered the PPI-R score, Shipley-2 score, and a mean-centered product (i.e., interaction) term of psychopathy and intelligence into the regression equation predicting ABQ scores. A significant interaction term would provide evidence of moderation. We estimated 12 regression models (testing all combinations of PPI-R scores [Total, Fearless Dominance, Self-Centered Impulsivity, Coldheartedness] and Shipley-2 [Total, Verbal, and Non-Verbal] scores) in predicting number of self-reported criminal acts.

Table 2 Antisocial behavior questionnaire item analyses

	%							
	Women			Men				
ABQ Item	Never	Once	More than once	Never	Once	More than once	χ^2	Φ
1. Theft over $50	91.5	5.0	3.6	85.7	7.7	6.6	2.62	.08
2. Breaking and entering	92.2	6.1	1.8	76.9	13.2	9.9	18.31*	.22
3. Robbery	98.6	0.7	0.7	91.2	7.7	1.1	14.35*	.20
4. Drug possession or trafficking	88.3	3.9	7.8	69.2	12.1	18.7	18.46*	.23
5. Fraud	88.3	8.9	2.9	83.5	7.7	8.8	5.94	.12
6. Assault	94.0	4.6	1.4	75.8	12.1	12.1	27.84*	.27
7. Forced sexual activity	99.3	0.0	0.7	97.8	2.2	0.0	6.83	.14
8. Possessed weapon	97.2	1.1	1.8	79.1	6.6	14.3	33.30*	.30
9. Arson	99.6	0.4	0.0	95.6	1.1	3.3	10.08	.16
10. Vandalism	94.7	4.3	1.1	89.0	4.4	6.6	8.91	.15
11. Violated probation or court order	98.9	0.7	0.4	96.7	1.1	2.2	3.05	.09
12. Driven drunk or high	71.5	13.2	15.3	55.0	15.4	29.7	10.59	.17
13. Engaged in physical fights	85.8	12.1	2.1	47.3	23.1	29.7	77.71*	.46
14. Made money through illegal activities	96.4	2.5	1.1	73.6	11.0	15.4	45.63*	.35
15. Car theft or hijacking	100.0	0.0	0.0	97.8	2.2	0.0	6.21	.13
16. Domestic violence	87.5	7.8	4.6	93.4	4.4	2.2	2.43	.08

Φ = effect size estimate (.10 = small; .30 = medium; .50 = large; see Cohen 1992) , *ABQ* Antisocial behavior questionnaire

*p<.003 (Bonferroni correction .05/16 variables)

Table 3 shows the results from the zero-inflated Poisson regression models. As evident from this table, there were significant moderation effects for intelligence on the association between all PPI-R scores and criminal activity. These were generally associated with modest effect sizes (i.e., a one SD increase in the predictor [i.e., moderation] variables is associated with 8–16 % likelihood of a unit increase in the count variable), which is commonplace for interaction effects in regression models (e.g., Fairchild and MacKinnon 2009). More specifically, for PPI-R Total scores, both total and verbal intelligence moderated their association with criminal activity, in that higher intelligence scores were associated with a weaker correlation between psychopathy and antisocial behavior. In the zero-inflation model (which indicates whether a person is a certain criminal activity abstainer ["0"] vs. not ["1"]), a moderation effect was only present for verbal intelligence, which indicates that higher scores on verbal intelligence were associated with high psychopathy scorers having a greater likelihood of being a "certain zero" with respect to antisocial behavior. In terms of PPI-R Fearless-Dominance scores, significant moderation effects were demonstrated for total, verbal, and non-verbal intelligence in the same direction as presented earlier, but only for the count models. Furthermore, the results indicated a significant moderation effect for verbal intelligence on the association between Self-Centered Impulsivity and criminality in the zero-inflation model only; in other words, Self-Centered Impulsivity is associated with a greater likelihood of being a "certain zero" on criminal activity as verbal intelligence scores increase. Surprisingly, and inconsistent with the other findings, there was also a significant moderation effect for non-verbal intelligence in the count model, which suggested a *strengthening* of the association between Self-Centered Impulsivity and criminality as non-verbal intelligence scores increased. Finally, for PPI-R Coldheartedness, there were no significant interaction effects. Figure 1 provides an example of an interaction effect for the count regression model for PPI-R Fearless-Dominance predicting ABQ scores, with total intelligence as the moderator.

Discussion

The goal of the current study was to examine intelligence as a compensatory variable to account for the non-criminal expression of psychopathic personality in a non-incarcerated sample. The main findings indicate that intelligence, and in particular verbal intelligence, moderates the relationship between psychopathy and criminality such that those high on psychopathy who are also of higher intelligence engage in less criminal behavior. This was particularly the case for the Fearless Dominance facet of psychopathy.

Table 3 Regression weights from zero-inflated Poisson models predicting antisocial behavior

	Count Model			Zero-Inflated Model			
	b	StdX	z	b	OR	z	R^2_{model}
PPI-R Total	.012	1.62	12.98***	−.022	0.43	−5.98***	.47***
Shipley-2 Total	−.005	0.95	−1.01	−.002	0.98	−0.15	
Interaction	−.001	0.92	−1.96*	−.001	0.81	−1.51	
PPI-R Total	.014	1.71	13.57***	−.022	0.45	−5.61***	.50***
Shipley-2 Verbal	−.029	0.90	−2.07*	−.010	0.96	−0.33	
Interaction	−.001	0.89	−2.49*	−.002	0.73	−2.15*	
PPI-R Total	.012	1.58	12.65***	−.022	0.43	−6.15***	.45***
Shipley-2 Abstract	.005	1.01	0.30	.005	1.02	0.14	
Interaction	−.001	0.97	−0.63	−.001	0.94	−0.49	
PPI-R Fearless Dominance	.020	1.49	10.34***	−.020	0.66	−3.38**	.31***
Shipley-2 Total	.001	1.01	0.19	.002	1.02	0.22	
Interaction	−.001	0.83	−4.06***	−.001	0.90	−0.89	
PPI-R Fearless Dominance	.020	1.48	10.26***	−.019	0.69	−3.11**	.31***
Shipley-2 Verbal	−.012	0.95	−0.96	−.020	0.93	−0.70	
Interaction	−.002	0.88	2.89**	−.003	0.79	−1.89	
PPI-R Fearless Dominance	.018	1.43	10.05***	−.022	0.64	−3.74***	.29***
Shipley-2 Abstract	.017	1.05	1.20	.024	1.08	0.66	
Interaction	−.003	0.86	−3.61***	.001	1.04	0.74	
PPI-R Self-Centered Impulsivity	.016	1.45	9.64***	−.037	0.42	−6.35***	.35***
Shipley-2 Total	−.011	0.88	−2.83**	−.003	0.88	−0.27	
Interaction	.001	1.09	1.84	−.001	0.80	−1.69	
PPI-R Self-Centered Impulsivity	.016	1.47	9.93***	−.037	0.42	−6.28***	.36***
Shipley-2 Verbal	−.043	0.85	−3.57***	−.007	0.97	−0.23	
Interaction	.001	1.04	0.86	−.004	0.73	−2.32*	
PPI-R Self-Centered Impulsivity	.016	1.45	9.54***	−.036	0.44	−6.31***	.34***
Shipley-2 Abstract	−.026	0.92	−1.66	−.074	0.99	0.94	
Interaction	.002	1.12	2.46*	−.001	0.91	−0.69	
PPI-R Coldheartedness	.033	1.25	7.23***	−.041	0.75	−2.56**	.15***
Shipley-2 Total	−.001	0.98	−0.34	−.001	0.99	−0.11	
Interaction	−.001	0.99	−0.31	.001	1.03	0.25	
PPI-R Coldheartedness	.034	1.25	7.41***	−.042	0.75	−2.65**	.16***
Shipley-2 Verbal	−.007	0.97	−0.68	−.025	0.91	−0.91	
Interaction	−.001	0.97	−0.74	.003	1.11	0.92	
PPI-R Coldheartedness	.033	1.25	7.07***	−.040	0.76	−2.51*	.15***
Shipley-2 Abstract	.007	1.02	0.51	.011	1.04	0.32	
Interaction	−.001	0.98	−0.52	−.001	0.98	−0.18	

PPI-R psychopathic personality inventory-revised. *StdX* change in expected count for SD increase on predictor, *OR* odds ratio, R^2 Nagelkerke estimated R^2 effect size for overall model

*$p<05$, ** $p<.01$, *** $p<.001$

These findings shed light on Hall and Benning's (2006) hypothesis indicating that criminal and non-criminal psychopathic individuals share both etiology and severity, but intervening variables account for the alternative manifestation. Based on the current results, intelligence, particularly verbal intelligence, is potentially one such intervening variable that accounts for the non-criminal manifestation, especially in those individuals high on the Fearless-Dominance facet. This finding can be interpreted in light of Hicks and colleagues' (2004) research, which elaborated on two types of psychopathic individuals: emotionally stable and aggressive. The "emotionally stable" psychopath is characterized by low stress, social domination, low social closeness, elevated strategic action, and high risk-taking, but not by significant levels of impulsivity. This is also representative of individuals high on Fearless-Dominance. Thus, for these emotionally stable, or primarily Fearless-Dominant psychopathic individuals, intelligence is a potential compensatory factor.

A somewhat paradoxical set of findings indicated that non-verbal intelligence moderated the relationship between

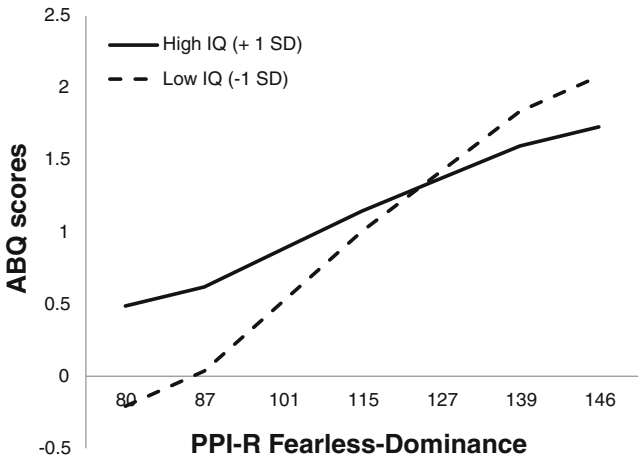

Fig. 1 Prediction of ABQ scores from PPI-R Fearless-Dominance scores for individuals with high and low intelligence (+/− 1 SD)

Self-Centered Impulsivity and criminality such that those who are of higher non-verbal intelligence engaged in *more* criminal behavior, whereas individuals high on both verbal intelligence and Self-Centered Impulsivity were more likely to be non-criminal. Although no current empirical research with adult populations can directly resolve this finding, it can be potentially understood in light of juvenile delinquency research. This literature indicates a negative association between delinquency/antisocial behavior and intellectual deficits, particularly verbal deficits (Berman and Siegal 1976; Culberton et al. 1989; Lipsitt et al. 1990; Moffitt and Henry 1991; Walsh et al. 1987), which is consistent with the results of the zero-inflation model. On the other hand, Muñoz et al. (2008) found that callous-unemotional psychopathy traits and verbal ability interacted to predict violent offending in a sample of young boys. Barker et al. (2010) found that certain pre-meditated criminal behaviors (e.g., theft) were associated with higher verbal intelligence, and while the current results are not directly consistent with these outcome, Barker et al. and Muñoz et al.'s findings leave open the possibility that abstract reasoning skills in general might potentiate a positive association between psychopathy and certain criminal behaviors.[2] Of course, a competing explanation is that our result represents a Type I error (see limitations below); thus, replication in independent studies is warranted before substantial attention is directed towards elucidating this unexpected moderation effect.

The findings for Coldheartedness also warrant some discussion. This PPI-R factor exhibited a small correlation with criminal behavior and was not part of any significant interaction effects with intelligence in predicting such behaviors. These findings are generally consistent with recent research that have found that this psychopathy factor is weakly correlated to uncorrelated with externalizing proclivities in both correctional and university student samples (Kastner et al. 2012). Indeed, most research indicates that Coldheartedness is specifically associated with callous affect/low empathy (Kastner et al. 2012; Sandoval et al. 2000; Sellbom 2011) and unemotionality (Marcus et al. 2013), which at least per the current results confers a small risk for overt criminal activities regardless of intelligence.

The current findings also have some implications for the role of the Fearless-Dominance facet in understanding psychopathy. There is disagreement among psychopathy scholars on whether this facet is a key component of the construct (Lilienfeld et al. 2012; Miller and Lynam 2012; Lynam and Miller 2012). Miller and Lynam (2012) argued in their meta-analytic review of the PPI/PPI-R that Fearless Dominance is a protective factor against psychopathology and a measure of stable extraversion. Consequently, they object to the inclusion of Fearless Dominance as a central component of psychopathy since they claim it exhibits limited convergent validity with respect to criterion variables they deemed central to psychopathy. Lilienfeld and colleagues (2012) countered by stating that Fearless Dominance is central to understanding psychopathy and is consistent with most classical clinical descriptions of psychopathy (e.g., Cleckley 1941/1976). They demonstrated that Miller and Lynam's (2012) assertions are sharply at odds with evidence that shows the importance of Fearless Dominance in identifying subtypes of psychopathy and that psychopathy is associated with adaptive behaviors. The current findings are supportive of the Fearless-Dominance construct as a component of psychopathy from Miller and Lynam's own perspective. In the current study, which is consistent with other research (e.g., Sellbom et al. 2012), this psychopathy facet is moderately and uniquely associated with criminal behavior, particularly for those individuals low on intelligence. This adds to the growing literature on interaction effects among PPI/PPI-R psychopathy facets, which generally show that Fearless-Dominance exponentiates the association between Impulsive-Antisociality and maladaptive behavior (Kastner and Sellbom 2012; Rock et al. 2013).

Our results must be considered in light of several limitations. First, we did not include a Bonferroni correction for the regression analyses, so there is possibility for Type I errors given the overall number of analyses conducted. A Bonferroni corrected alpha level for these analyses would have increased the possibility of making a substantial amount of Type II errors due to insufficient statistical power, and thus, could have masked potentially important findings. Indeed, with the

[2] Given the low prevalence rate of individual ABQ items in the current study, such specific analyses could not be conducted here.

current sample size, we only had sufficient statistical power at an alpha level of .05 given the small effect sizes typically associated with moderation analyses (e.g., Fairchild and MacKinnon 2009).[3] We chose this strategy due to the novelty of the research topic and to highlight potential findings that need to be replicated in future research. Second, a predominantly female undergraduate sample may not be generalizable to other populations, such as community residents or prison inmates, as it is a homogeneous population. Indeed, Muñoz et al. (2008) did find that callous-unemotional traits and high verbal ability interacted to predict violent offending, which is inconsistent with the current findings; their study focused on a sample of delinquent boys. However, a large amount of psychopathy research has been conducted with college samples, and as Salekin and colleagues (2004) pointed out, many "successful" psychopaths are typically drawn to careers that require college degrees. Although no research to date has systematically evaluated this notion, scholars such as Hare (1999) and Cleckley (1941/1976) have offered a variety of professional careers in which psychopathic individuals intuitively might thrive, and those types of careers would require a college degree. Research has also shown that psychopathy findings in college samples many times parallel those in prison settings (e.g., Benning et al. 2005; Sellbom 2011; Sellbom et al. 2012). Third, the sample was predominately female. Women tend to engage in fewer antisocial behaviors than men (Verona and Vitale 2006), which is consistent with the current analyses. Furthermore, even when female individuals do engage in antisocial behavior, their antisocial behavior is typically manifested differently than males (Verona and Vitale 2006). For example, women are more likely than males to utilize covert forms of aggression such as gossip, refusal of friendship, and ostracism. It is possible that the ABQ may not have effectively captured the true nature of female antisocial behavior, as it reflects more overt actions. Unfortunately, the sample size for men in the current study (n=91) was too small to examine the results separately for genders (or for sufficient power to calculate three-way interaction terms). Finally, all measures used in the current study were self-report questionnaires, which introduces mono-method variance and thus likely inflates the observed effect size magnitudes. Therefore, these findings need to be replicated in a different sample with different measurement modalities.

Despite these limitations, the current investigation is associated with some significant strengths. This research question is novel and our study represents a good initial addition to this emerging research literature. The measures of psychopathy and intelligence have substantial psychometric support, especially for use with undergraduate samples (e.g., Lilienfeld and Fowler 2006). In addition, we employed sophisticated quantitative analyses to combat the limitation of extremely skewed and leptokurtic count data, which are rarely employed in personality and psychopathology research.

Future research should extend this investigation to different populations, such as individuals recruited from more diverse age ranges and various socioeconomic statuses. Also this study should be replicated in more distinct subgroups such as forensic and non-forensic populations. Optimally, a future study would involve individuals who score high on psychopathy in prison and compare them to matched controls in the community who do not have criminal histories. Also, future research should examine gender differences in the expression of psychopathy, as well as how gender and other demographic variables might differentially explain criminal versus non-criminal psychopathy, especially since we were unable to formally do so in the current study due to the low number of male participants. Finally, a few studies have found executive functioning to be negatively related to psychopathy factors (Ishikawa et al. 2001; Ross et al. 2007; Sellbom and Verona 2007), and it is therefore important to determine whether specific cognitive abilities, beyond global intelligence, may be moderating factors in the non-criminal expression of psychopathic personality traits. Specific cognitive abilities related to the organization of problem solving and decision-making might be associated with even stronger moderation effects and should be emphasized in future studies.

[3] For standard ordinary least squares (OLS) regression analysis, quantitative reviews have indicated that the average effect size of an interaction effect using continuous variables is approximately .001 to .003 in R^2 change (e.g., Aiken and West 1991; Fairchild and MacKinnon 2009; McClelland and Judd 1993), which requires a large sample size for adequate statistical power. Further compounding this issue is that we are using a non-linear regression model, which requires even more power than standard linear OLS regression.

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