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Mapping Gray's BIS and BAS constructs onto Factor 1 and Factor 2 of Hare's Psychopathy Checklist – Revised

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ABSTRACT

Reinforcement sensitivity theory (RST; Gray, 1987; Gray & McNaughton, 2000) has proven to be a valuable tool for understanding psychopathy (e.g., Fowles, 1980, 1988; Newman & Malterer, 2009; Poythress et al., 2008). Recent research has linked two RST constructs, the Behavioral Inhibition System (BIS) and the Behavioral Activation System (BAS), to individuals with primary psychopathy and secondary psychopathy (Lykken, 1995; Newman, MacCoon, Vaughn, & Sadeh, 2005): Primary psychopaths manifest low BIS reactivity and secondary psychopaths manifest high BAS reactivity. In the present study, we examine the relationships between the BIS/BAS constructs and Factors 1 and 2 of the Psychopathy Checklist – Revised (PCL-R) in a sample of 472 incarcerated male offenders. Paralleling their relationships with primary and secondary psychopathy, the BIS/BAS constructs were differentially related to the two PCL-R factors. Specifically, the influence of the BIS was found to be more prominent than the influence of the BAS for Factor 1, and the influence of the BAS was more prominent than that of the BIS for Factor 2.

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1. Introduction

Psychopathic individuals are known for their exceptionally poor judgment, penchant for acting in response to relatively low levels of motivation (i.e., on a whim), inability to learn from negative consequences, extreme egocentricity, and lack of remorse for misdeeds (Cleckley, 1976). Hence, these individuals are prone to engage in impulsive, maladaptive, and antisocial acts, which cause them to experience substantial marital, academic, and employment disruption. Furthermore, although the prevalence of psychopathy in the general population is only 1%, estimates of the prevalence among incarcerated offenders range from 15% to 25% (Hare, 1996), and psychopathic individuals re-offend 2–5 times more frequently than do non-psychopathic individuals (Hemphill, Hare, & Wong, 1998; Quinsey, Rice, & Harris 1995; Serin, 1996; Walters, 2003).

The use of Gray's reinforcement sensitivity theory (RST; 1975, 1987; Gray & Smith, 1969) to explain psychopathic behavior dates back nearly 30 years (e.g., Fowles, 1980). Briefly, the most recent formulation of RST (Gray & McNaughton, 2000) postulates three interacting brain systems. The Fight-Flight-Freeze System (FFFS) is activated in the presence of both conditioned and unconditioned aversive stimuli. Its activation is associated with the emotion of fear and with behaviors that diminish the perceived threat (e.g., escape or avoidance). The Behavioral Activation System (BAS) is activated in the presence of both conditioned and unconditioned appetitive stimuli (e.g., opportunities for reward). Increased BAS activity is associated with positive emotional states (e.g., optimism, hopefulness) and appetitive (e.g., approach) behavior, as well as with aggression (e.g., Carver 2004; Harmon-Jones & Peterson, 2008). Finally, the Behavioral Inhibition System (BIS) is activated when conflicts occur between concurrent goals (e.g., the classic approach-avoidance conflict); specifically, when both the BAS and the FFFS are activated (e.g., Corr, 2006). Increased activity of the BIS is associated with the emotion of anxiety, and causes the inhibition of ongoing behaviors and the initiation of information processing to resolve the conflict.

Fowles (1980,1988) proposed one of the initial explanations of psychopathy that made use of the BIS and BAS constructs, attributing psychopathy to a weak or hypo-reactive BIS (which leads to lower than normal levels of BIS activity in response to stimuli to which the BIS is sensitive). More recently, Lykken (1995) expanded upon Fowles' use of RST by focusing on the distinction between primary and secondary psychopathy (e.g., Blackburn, 1979; Hare, 1970; Skeem, Johansson, Andershed, Kerr, & Louden, 2007). Primary psychopaths are considered to be true or prototypical psychopaths (Cleckley, 1976). They are characterized by relatively low levels of anxiety, and their maladaptive, antisocial actions are considered to be the result, at least in part, of the failure to experience anxiety even when the likelihood of adverse consequences is high (e.g., Cleckley, 1976). On the other hand, secondary psychopaths experience higher-than-normal levels of negative

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emotions (e.g., anxiety), and their antisocial actions are thought to occur in response to intra-psychic conflicts or emotional distress (e.g., Cleckley, 1976).

Lykken (1995) proposed that primary psychopathy is associated with weak BIS reactivity (but normal BAS reactivity) and, in consequence, primary psychopaths are prone to experience smaller than normal reactions to BIS inputs. Conversely, secondary psychopathy is associated with strong BAS reactivity (but normal BIS reactivity); that is, secondary psychopaths are hyper-reactive to opportunities for reward. To test Lykken's hypotheses, Newman, MacCoon, Vaughn, and Sadeh (2005) administered two measures of the BIS and BAS constructs – the BIS/BAS Scales (Carver & White, 1994) and the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (Torrubia, Ávila, Moltó, & Caseras, 2001) – to a sample of incarcerated male offenders (and these same measures also were employed in the present study – see below). Consistent with Lykken's hypotheses, for individuals with primary psychopathy, the influence of low BIS reactivity predominated, whereas for those with secondary psychopathy, the influence of high BAS reactivity was most prominent.

Another way of conceptualizing the psychopathy construct (and thus the relationships between psychopathy and RST) involves the Psychopathy Checklist – Revised (PCL-R; Hare, 2003), which is the principal instrument used to identify psychopathic individuals in correctional settings. Of particular relevance to the present manuscript, factor-analytic studies have identified two broad PCL-R Factors with distinct personality, behavioral, physiological, and social correlates (e.g., Harpur, Hare, & Hakstian, 1989; Patrick, Bradley, & Lang, 1993; Ross et al., 2007). One of these factors (Factor 1), is hypothesized to reflect psychopathy's distinguishing characteristics, such as low anxiety and deficient emotion processing (e.g., Patrick, 1994; Patrick et al., 1993), whereas the second factor (Factor 2) relates to more general externalizing tendencies that are shared by persons having diagnoses such as Conduct Disorder and Antisocial Personality Disorder (Patrick, Hicks, Krueger, & Lang, 2005). Psychopathic individuals usually score above the mean on both PCL-R Factor 1 and Factor 2, although, for a particular psychopathic individual, the score on one factor may be substantially higher than the score on the other.

In this study, we examined the relationships among PCL-R Factors 1 and 2 and the BIS and BAS constructs in a large sample of incarcerated male offenders to determine whether the RST constructs are differentially related to the two principal factors derived from the PCL-R. In past research, inmates with high PCL-R scores (i.e., psychopathic individuals) displayed both lower BIS and higher BAS scores than non-psychopathic control participants (Book & Quinsey, 2004). However, paralleling results for primary and secondary psychopathy, such findings may mask the unique contributions of the two PCL-R Factors. To the extent that Factor 1, like primary psychopathy, is associated with low anxiety, we predicted that Factor 1 would be associated predominantly with low scores on measures of the BIS construct. Conversely, to the extent that Factor 2, like secondary psychopathy, is associated with general externalizing tendencies, we predicted that Factor 2 would be associated predominantly with high scores on measures of the BAS construct.

In addition to the two-factor model upon which we based our predictions, a four-factor model for the PCL-R has been proposed (see, for example, Neumann, Hare, & Newman, 2007). Hence, although comparing and contrasting the two- and four-factor models was not an aim of this study, we conducted post-hoc analyses to determine whether the two-factor results (see below) were moderated by underlying correlations involving the four-factor model.

2. Method

2.1. Participants

The sample consisted of 472 adult male offenders (13.8% African–American, 85.4% Caucasian) incarcerated in the Wisconsin prison system, ranging in age from 18 to 45 years of age (M = 31.66 years, SD = 7.38). Researchers selected potential participants from a comprehensive prison roster and screened out anyone older than 45 years, with diagnoses of Bipolar Disorder or Schizophrenia, or receiving psychotropic medication. Only participants for whom all relevant data points were available were included in this study. Hence, all correlations and analyses reported herein pertain to the same 472 participants.

2.2. Measures

2.2.1. PCL-R

The PCL-R (Hare, 1991, 2003) consists of 20 items indicative of psychopathic traits as delineated by Cleckley (1976). Each PCL-R item is scored on a 3-point scale (0 = clearly not present; 1 = may be present; 2 = clearly present), and the scores are summed to yield a total score (range 0–40). Scores are based on information derived from both a semi-structured interview and a review of institutional file information. The reliability and construct validity of the PCL-R are well established (see Hare, 1985, 1996; Hare et al., 1990). Early work with the Psychopathy Checklist revealed a replicable two-factor structure (Harpur et al., 1989) with Factor 1 assessing interpersonal and affective characteristics (e.g., pathological lying, shallow affect) and Factor 2 assessing impulsive and antisocial behavior. The internal consistency of the PCL-R Factors, as indexed by Cronbach's alpha, is reported in Table 1.

Table 1
Inter-correlations among scales and scale reliabilities.

	1	2	3	4	5	6	7	8
PCL-R F1	*0.829*							
PCL-R F2	.605**	*0.775*						
BIS	−.210**	−.181**	*0.744*					
BAS	0.068	.211**	.110*	*0.855*				
SP	−.214**	−.123**	.539**	0.071	*0.839*			
SR	.162**	.304**	0.075	.570**	0.072	*0.82*		
BIS/SP	−.242**	−.173**	.876**	.103*	.878**	0.084	*0.861*	
BAS/SR	.130**	.291**	.104*	.886**	0.081	.886**	.105*	*0.887*

Note: Values in the *diagonal* represent the internal consistency (Cronbach's alpha) of each scale. PCL-R, Psychopathy Checklist – Revised; BIS, Behavioral Inhibition System Scale; BAS, Behavioral Activation System Scale; SP, Sensitivity to Punishment Scale; SR, Sensitivity to Reward Scale.
N = 472.
* $p < .05$.
** $p < .01$.