

## Psychopathy and the Five-Factor Model of Personality: A Replication and Extension

Joshua D. Miller and Donald R. Lynam

*Department of Psychology  
University of Kentucky*

It has recently been argued that psychopathy can be understood and represented using common dimensions of personality taken from the Five-factor model (FFM). In this research, we examined this possibility by using the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 1992) to assess psychopathy in an undergraduate sample. Specifically, we matched individuals' NEO-PI-R profiles with an expert-generated psychopathy prototype to yield a psychopathy score. These scores were correlated with self-reports of drug use, delinquency, risky sex, aggression, and several laboratory tasks. FFM psychopathy was significantly related to all forms of deviance, although the effects tended to be small in size. Moreover, individuals who more closely resembled the prototypic FFM psychopath were more aggressive in a laboratory aggression task, less willing to delay gratification in a time discounting task, and demonstrated a preference for aggressive responses in a social information-processing paradigm.

Psychopathy is a maladaptive personality disorder characterized by such traits as a lack of remorse, manipulateness, egocentricity, superficial charm, and shallow affect (Cleckley, 1941; Hare, 1991). Correlates of psychopathy include high rates of both violent and nonviolent offending, violent and nonviolent recidivism, and substance use problems. For example, psychopathic criminals tend to commit more crimes, as well as a wider variety of crimes, as compared to nonpsychopathic criminals (Hare, McPherson, & Forth, 1988). In addition, once arrested, psychopathic individuals are more likely to recidivate following release from jail and more likely to do so by committing a violent offense (Hart, Kropp, & Hare, 1988). Meta-analytic research has supported the consistency of this finding; Psychopathy Checklist-Revised (Hare, 1991) scores predicted violent ( $d = .79$ ) and general recidivism ( $d = .55$ ; Salekin, Rogers, & Sewell, 1996). Similarly, Hemphill, Hare, and Wong (1998) found that psychopaths were three times more likely to recidivate following release as compared to nonpsychopaths. Finally, psychopathy is also related to higher rates of alcohol and drug use, abuse, and dependence among incarcerated offenders (Hemphill, Hart, & Hare, 1994; Smith & Newman, 1990).

Recently, it has been argued that psychopathy can be understood as a configuration of personality traits from a model of general personality functioning (Lynam, 2002; Miller, Lynam, Widiger, & Leukefeld, 2001; Widiger & Lynam, 1998). Using the Five-factor model of personality (FFM) as a framework, these researchers have argued that psychopathy

can be understood as a mixture of low Agreeableness and Conscientiousness, high Extraversion, and a combination of low and high Neuroticism (low anxiety, depression, vulnerability to stress, and self-consciousness; but high angry hostility and impulsiveness). One benefit of this model is its ability to resolve several important issues in the psychopathy literature, including the underlying factor structure of the Psychopathy Checklist-Revised (Hare, 1991), the patterns of comorbidity surrounding psychopathy, the variety of conceptualizations of successful psychopathy, and the diversity of putative psychopathic deficits (for a complete discussion, see Lynam, 2002).

With regard to the two-factor structure of psychopathy (Harpur, Hakstian, & Hare, 1988; Harpur, Hare, & Hakstian, 1989), the FFM account of psychopathy argues that the factor structure is due to different personality dimensions being assessed by items in each factor. That is, Factor 1 items, such as grandiose self-worth, pathological lying, and lack of remorse or guilt, are argued to reflect primarily an interpersonal style characterized by low Agreeableness (e.g., deceitfulness, manipulateness, egocentricity). Similarly, Factor 2 items, such as irresponsibility, parasitic lifestyle, and impulsivity, are argued to represent combinations of low Agreeableness and low Conscientiousness. On this account, the two factors covary because both factors assess low Agreeableness but are differentiated because Factor 2 items also assess low Conscientiousness (e.g., impulsiveness, unreliability, inability to delay gratification, lack of persever-

ance). A similar logic explains the comorbidity of psychopathy with other personality disorders (see Lynam & Widiger, 2001); psychopathy will co-occur with other personality disorders to the extent that they share common FFM facets. For example, based on facet overlap, psychopathy is expected to be highly comorbid with antisocial personality disorder (APD) because both are characterized by low Agreeableness and low Conscientiousness (Lynam & Widiger, 2001). In contrast, psychopathy is expected to be negatively related to dependent personality disorder (DPD), which is characterized by high levels of Agreeableness (Lynam & Widiger, 2001). This is exactly what was observed; Hare (1991) reported a correlation of .71 between psychopathy and APD and a correlation of  $-.27$  between psychopathy and DPD.

According to the FFM account, the variety of conceptualizations of the “successful” psychopath (e.g., Babiak, 2000; Gustafson & Ritzer, 1995; Hare, 1993; Lykken, 1982) all represent incomplete manifestations of the psychopathic prototype, with various theorists focusing on different subsets of the FFM facets that characterize psychopathy. For example, the psychopathic doctors, lawyers, and stock brokers discussed by Hare (1993) are clearly deceptive, exploitive, arrogant, and callous (i.e., low in Agreeableness) but having frequently obtained advanced degrees and notable career advancement would seem to lack other important characteristics possessed by the prototypic psychopath such as unreliability, aimlessness, and poor impulse control (i.e., low Conscientiousness). Similarly, Lykken’s (1982) discussion of the hero as the successful variant of psychopathy focuses on the facets of low Neuroticism but ignores other psychopathy-defining facets associated with Agreeableness and Conscientiousness.

Finally, the FFM account posits that the diversity of putative psychopathic deficits is due to the multifaceted nature of psychopathy; different investigators are studying processes associated with different facets of the FFM. For example, low fear conditioning may be linked to the broader dimension of Neuroticism, which measures adjustment and emotional stability (Costa & McCrae, 1992); that is, psychopathic individuals tend to be low in Neuroticism and are characterized by a lack of anxiety, fear, depression, and vulnerability to stress. Emotional detachment may be due to a combination of low Neuroticism and low Agreeableness. That is, these individuals lack a general concern for the welfare of others. Poor response modulation, which represents the difficulty psychopathic individuals have in shifting attention away from a dominant response pattern to evaluate new information regarding the success of this response pattern, is consistent with the personality domain of low Conscientiousness.

In an effort to test the idea that psychopathy can be understood as a constellation of traits from the FFM, Miller et al. (2001) examined the ability of an FFM assessment instrument, the Revised NEO Personality Inventory (NEO-PI-R; Costa &

McCrae, 1992), to assess psychopathy. Specifically, Miller et al. matched individual participants’ FFM personality profiles against an expert-generated prototype (given in Table 1); this resultant similarity index served as a measure in subsequent analyses. Miller et al. found that individuals who more closely matched the psychopathy prototype demonstrated behavioral patterns consistent with psychopathy such as increased rates and/or variety of (a) criminal/delinquent behavior, (b) symptoms of APD, (c) alcohol and drug use, and (d) an earlier onset of substance use. Furthermore, as expected, the FFM-psychopathy scores were negatively correlated with symptoms of depression and anxiety.

This study represents a replication and extension of this previous work on the FFM and psychopathy. Specifically, we used the prototype-matching approach employed by Miller et al. (2001) to assess psychopathy using the NEO-PI-R. We then examined the relations between psychopathy assessed using the FFM and measures of delinquency, substance use, and aggression. Next, we examined the relations between FFM psychopathy and performance on three laboratory tasks assessing behavioral and cognitive patterns that are expected to be characteristic of psychopathy. Finally, we examined the ability of FFM psychopathy to predict these outcomes above and beyond a measure of antisocial behavior.

Psychopathy has been linked not only to higher rates of general delinquency, but also to higher rates of violent offending. Thus, in addition to a standard measure of general offending, we also examine the degree to which FFM psychopathy is related to three types of aggression: proactive, reactive, and relational. *Proactive aggression* refers to aggressive behavior that is instrumentally motivated (e.g., assaulting someone to steal their wallet), whereas *reactive aggression* refers to aggression that is primarily motivated by negative emotions such as feeling threatened, hurt, or angry and is aimed less at achieving an explicit goal. Cornell et al. (1996) found that psychopathy scores distinguished between instrumental violent, reactive violent, and nonviolent offenders who were incarcerated. Psychopathy scores were significantly higher for offenders rated as instrumental violent (which meant they could have also committed reactive crimes) than those rated as reactive violent (only reactive violence, no instrumental violence) or nonviolent offenders. A third form of aggression, *relational aggression* (Werner & Crick, 1999), refers to behavior such as gossiping, rumor spreading, and other forms of behavior in which the intent is to hurt the other person’s reputation or damage social relationships. Relational aggression has been found to be more characteristic of women than men (Crick & Grotpeter, 1995). In this study, we examined the relation between psychopathy and relational aggression and the degree to which these relations differ by gender.

We also employed three laboratory tasks. The first task examined the relation between FFM psychopathy and aggression using a laboratory paradigm. Although the relation

**TABLE 1**  
**Expert-Generated FFM-Psychopathy Prototype and Descriptive FFM Data for the Sample**

	Expert Prototype <sup>a</sup>			Current Data <sup>b</sup>			Ratio <sup>c</sup>
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>	
Neuroticism							
Anxiety	3.7	4.1	0 to 8	16.6	5.5	5 to 31	1.1
Angry hostility	22.9	5.1	16 to 32	13.9	5.7	1 to 28	1.1
Depression	3.2	4.1	0 to 8	14.0	6.6	0 to 32	1.2
Self-consciousness	0.5	2.1	0 to 8	15.5	5.4	1 to 31	1.1
Impulsiveness	28.3	5.9	16 to 32	11.2	4.6	5 to 31	1.1
Vulnerability	3.7	4.1	0 to 8	17.6	5.0	0 to 24	1.1
Extraversion							
Warmth	5.9	8.8	0 to 32	25.3	4.7	13 to 32	1.1
Gregariousness	21.3	4.9	16 to 32	20.5	6.6	2 to 32	1.3
Assertiveness	27.7	4.1	24 to 32	17.8	6.4	0 to 32	1.3
Activity	21.3	7.8	8 to 32	19.4	4.6	4 to 31	1.2
Excitement seeking	29.9	3.7	24 to 32	24.1	4.9	6 to 32	1.2
Positive emotions	12.3	7.3	0 to 24	23.6	5.1	4 to 32	1.2
Agreeableness							
Trust	5.9	6.4	0 to 16	19.0	6.1	1 to 32	1.4
Straightforwardness	1.0	2.8	0 to 8	19.0	5.7	3 to 31	1.2
Altruism	2.7	4.9	0 to 16	25.2	5.0	3 to 32	1.4
Compliance	2.7	3.9	0 to 8	16.3	6.0	0 to 28	1.4
Modesty	0.0	0.0	0 to 0	18.2	5.9	3 to 31	1.3
Tendermindedness	2.1	3.7	0 to 8	21.0	3.9	6 to 32	1.2
Conscientiousness							
Competence	25.6	8.1	0 to 32	21.7	4.4	10 to 32	1.5
Order	12.8	4.1	8 to 16	16.4	6.1	3 to 30	1.5
Dutifulness	1.6	6.2	0 to 24	21.5	4.8	3 to 32	1.2
Achievement striving	16.5	9.3	0 to 32	19.3	5.4	3 to 31	0.94
Self-Discipline	6.9	6.7	0 to 24	17.7	6.2	0 to 32	1.3
Deliberation	4.8	8.4	0 to 24	16.2	5.2	3 to 31	1.0
Openness to Experience							
Fantasy	16.5	7.1	8 to 24	21.5	6.0	5 to 32	1.3
Aesthetics	10.7	4.9	0 to 16	19.4	7.3	0 to 32	1.3
Feelings	6.4	6.9	0 to 24	23.2	4.8	8 to 32	1.1
Actions	26.1	4.7	16 to 32	15.3	4.6	0 to 32	1.3
Ideas	20.3	8.5	0 to 32	20.9	6.6	0 to 32	1.2
Values	14.9	7.9	0 to 16	20.6	4.5	8 to 32	1.4

Note. FFM = Five-factor model of personality.

<sup>a</sup>Although experts rated only a single-item description of each facet on a 5-point scale, scores were made to run from 0 to 32, the possible values for the sum of items on a facet. <sup>b</sup>Each facet score is calculated as the sum of eight items that range from 0 (*strongly disagree*) to 4 (*strongly agree*). <sup>c</sup>Ratio equals current sample *SDs* divided by the college-age normative sample *SDs* (Costa & McCrae, 1992).

between psychopathy and laboratory aggression has not been previously examined, the well-established link between psychopathy and aggression (Salekin et al., 1996) suggests that such a relation should exist. The second task examined the relations between FFM psychopathy and social information processing. Widiger and Lynam (1998) suggested that social information-processing deficits might explain psychopathic behavior. Using a model of social information processing developed by Dodge and colleagues (Crick & Dodge, 1996; Dodge & Schwartz, 1997), Widiger and Lynam (1998) argued that psychopathic individuals may display many of the same biases and processing difficulties found in aggressive children. In this study, we examined whether psychopathic individuals are more likely to make hostile attributions, generate aggressive responses, and choose to enact an aggressive response. Finally, we examined the relations between psychopathy and *behavioral discounting*, which refers to the tendency to prefer smaller but more immediately available

rewards over larger but more distant rewards. Several studies have demonstrated a link between discounting and substance use and abuse (Odum, Madden, Badger, & Bickel, 2000; Crean, de Wit, & Richards, 2000). It is hypothesized that this preference will be related to FFM psychopathy given the central role of traits such as impulsivity, irresponsibility, and a lack of long-term goals in the psychopathy construct.

The use of laboratory tasks is important in that it allows for an assessment of actual behavior rather than a potentially faulty recollection of previous behaviors or tendencies. Such tasks also provide more objective assessments of constructs that are independent of self-report, thus eliminating common method variance and reducing the possibility that response sets or self-presentation styles are driving observed results. Finally, such tasks provide only brief glimpses into participants' overall behavioral patterns, unlike reports of behavioral tendencies that aggregate behavior across time and settings. Thus, it should be even more

compelling to find hypothesized relations between predictors and laboratory tasks.

## METHOD

### Participants

All students enrolled in an introductory psychology course took part in a mass screening ( $N = 1,271$ ) at the beginning of the semester. During this screening session, all potential participants completed items assessing the domains of Agreeableness and Conscientiousness using the Five Factor Inventory (Costa & McCrae, 1992), a brief measure of the FFM. Individuals were selected into the laboratory protocol, separately by gender, on the basis of having scores in the top and/or bottom one third on Agreeableness and Conscientiousness such that four groups were constructed: individuals low in both Agreeableness and Conscientiousness, individuals high in both, individuals low in Agreeableness and high in Conscientiousness, and individuals high in Agreeableness and low in Conscientiousness.

### Procedure

Participants were 105 men and 106 women with a mean age of 18.6 years ( $SD = 1.94$ ), drawn from an introductory psychology participant pool. One hundred and ninety individuals rated themselves as White (90%), 12 as African American (6%), 1 as Hispanic (.5%), 1 as Asian (.5%), and 7 as Other (3%). The protocol consisted of completing three laboratory tasks (money withdrawal aggression paradigm [MWAP], social information-processing vignettes, hypothetical money choice task [HMCT; Rachlin, Raineri, & Cross, 1991]) as well as self-report measures of personality, antisocial behavior, aggression, substance use, and sexual behavior. The entire protocol, including the self-report measures, was administered via computer with the ordering of the tasks rationally chosen such that consecutive tasks did not assess similar constructs:

1. MWAP
2. HMCT
3. NEO-PI-R
4. Social information-processing vignettes
5. Crime and Analogous Behavior Scale (CAB; Lynam, Whiteside, & Jones, 1999)
6. Reactive and Proactive Aggression Questionnaire (Raine et al., 2002)
7. Revised Self-Report of Aggression and Social Behavior (Morales & Crick, 1999)

### Measures

**NEO-PI-R.** The NEO-PI-R (Costa & McCrae, 1992) is a self-report questionnaire developed to assess normal personality dimensions based on the FFM. It consists of 240

items, which are rated on a 5-point scale ranging from 0 (*strongly disagree*) to 4 (*strongly agree*). The NEO-PI-R provides a score for all five domains based on 48 questions per domain as well as assessing six facets within each domain using eight items per facet. The many studies using the NEO-PI-R have consistently shown good reliability and validity. In this study, coefficient alphas for the facets ranged from .53 to .84 and from .90 to .93 for the five broader domains.

Despite using the aforementioned criteria to select the participants, the full FFM domains and facets as measured by the NEO-PI-R, which was administered during the laboratory protocol, appeared to have a normal distribution. Using Curran, West, and Finch's (1996) guidelines for deciding what levels of skewness or kurtosis represent a departure from normality (skewness  $\geq 2.0$  and/or kurtosis  $\geq 7.0$ ), these personality data appeared to be normally distributed in that all skewness and kurtosis values for men were less than .90 and 1.6, respectively. For women, the skewness and kurtosis values were less than 1.6 and 5.2, respectively (and the next highest kurtosis value was 1.07). Descriptive data for the NEO-PI-R facets are provided in Table 1, along with ratios examining the standard deviations from the current NEO-PI-R facets and the college-aged normative sample collected by Costa and McCrae (1992, Table B-3). The ratios demonstrated that there was some increase in the overall variability of our sample's facets as compared with the normative sample, which may be due to the extreme groups design used here. However, the ratios are, for the most part, close to one, which indicates relative consistency between the two samples' variabilities. Once it was determined that the distributions for the NEO-PI-R facets were not substantially non-normal, the full NEO-PI-R profile was used to calculate the FFM-psychopathy score.

**FFM psychopathy.** Psychopathy scores were calculated as intraclass correlations between individuals' NEO-PI-R scores and an expert-generated psychopathy prototype (Miller et al., 2001). The prototype was developed by asking prominent psychopathy researchers to rate the "prototypical" psychopath on the 30 facets of the FFM. This prototype is also provided in Table 1. Similarity between the Miller et al. (2001) expert consensus FFM description of prototypical psychopathy and individuals' raw NEO-PI-R facet scores was calculated using an intraclass Q correlation for each of the participants. As an intraclass correlation, the index assesses the similarity between an individual's NEO-PI-R profile and the expert consensus profile in terms of both shape and magnitude. The mean NEO-PI-R FFM-psychopathy index score for this sample was  $-.13$  ( $SD = .22$ , range =  $-.66$  to  $.65$ ).

**FFM DPD.** In an effort to demonstrate discriminant validity, DPD scores were calculated in the same fashion as the psychopathy scores. Using the expert-generated prototype for this personality disorder (see Lynam & Widiger, 2001),

an intraclass correlation was calculated between each participant's NEO-PI-R profile and the expert-generated prototype. The mean NEO-PI-R FFM DPD score for this sample was  $-.06$  ( $SD = .25$ , range =  $-.67$  to  $.61$ ).

**MWAP.** In the MWAP, participants were told that they were competing against a same-sex opponent in a series of reaction time trials. Each participant was told that he or she would be allowed to subtract money from his or her opponent on trials that he or she won and would have money subtracted by their opponent when he or she lost. The participants were told that they had \$10 to begin the task and could keep whatever amount remained at the end. They were also informed that they would not be able to keep the money subtracted from their opponent. The amount of money that could be subtracted on any given trial ranged from \$0.00 to \$0.50. Outcomes were predetermined ( $N = 30$ ; 15 wins, 15 losses) such that each participant won and lost the same amount. The dependent variables were the amounts of money subtracted from the opponent in each of three conditions of provocation. In the low-provocation condition, which corresponded to the first 5 losses, the participants lost between \$0.05 and \$0.15 on each loss. In the medium-provocation condition, which corresponded to the sixth through tenth loss, the participants lost between \$0.20 and \$0.35 on each loss. Finally, in the high provocation condition, which corresponded to the final 5 losses, the participants lost between \$0.40 and \$0.50 on each loss.

In the analyses related to the MWAP, 12 (6%) participants were excluded due to an extremely high level of suspiciousness about the reality of this task as ascertained by an exit interview. Supporting this exclusion, there was a negative relation between suspiciousness and money taken from the opponent,  $r = -.15$ ,  $p < .05$ .

This aggression paradigm was modeled after several well-validated laboratory aggression paradigms. Using the Point Subtraction Aggression Paradigm (Cherek, 1981), Cherek, Schnapp, Moeller, and Dougherty (1996) found that violent male parolees behaved more aggressively than similarly matched nonviolent male parolees. The Taylor Aggression Paradigm (Taylor, 1967) has shown that shock intensity is related to self-report measures of hostility, anger, disinhibition, and boredom susceptibility (Giancola & Zeichner, 1995). Finally, using a similar task, Murphy, Pelham, and Lang (1992) found that aggressive attention deficit hyperactivity disorder (ADHD) children performed more aggressively on the task than nonaggressive ADHD children.

**Social information-processing vignettes.** Each participant heard four vignettes, two of which were previously rated in a pilot study ( $N = 50$ ) as ambiguous in nature and two of which were previously determined to be hostile in nature. After listening to the vignettes, the participants were asked a number of questions that aimed at assessing three of the major steps of the social information-processing model. These

steps included (a) interpretation of cues, (b) generation of behavioral responses, and (c) choice of a response. The participants' responses regarding attribution style (hostile vs. nonhostile) and potential responses (aggressive vs. nonaggressive) were content coded by two raters. All kappas were above .68. In cases in which there was initial disagreement, a consensus was reached via a reexamination of the ratings criteria. The use of vignettes to assess social information-processing constructs such as attribution style and response enactment is well-validated and frequently used (Dodge & Frame, 1982; Dodge & Tomlin, 1987; Lochman & Dodge, 1994; Milich & Dodge, 1984).

**HMCT.** In this task, participants were informed that they would be asked to repeatedly choose between a larger amount of money available after a delay and a smaller amount of money that was available immediately. Participants were informed prior to the task that the money being discussed was hypothetical. Each participant completed three blocks of trials, which varied the length of the delay for the larger award; the delay periods included 1 month, 6 months, and 1 year. Within each block, the amount of money available after a delay remained fixed (\$1,000), whereas the immediately available amount was varied on each trial. In each trial, the participant chose between the larger, delayed reward (\$1,000) and the immediately available reward, which varied in 30 increments from \$1 to \$1,000. Each of these blocks with a fixed delay occurred twice; in one series the amount of money for the immediate reward increased throughout the block (ascending), and in the other series the amount of money for the immediate reward decreased throughout the block (descending). The two amounts were shown simultaneously on a computer screen and the participants were asked to press one of two buttons to indicate their preference (less money, immediately vs. more money, time delayed). The dependent variable is the equivalence point, which was calculated by averaging the ascending and descending values for each time period. The first value is the point at which the participant switched preference from the immediate rewards to the delayed rewards when the immediate rewards were presented in the descending order. The second value was taken from the point at which the participant switched from the delayed rewards to the immediate rewards when the immediate rewards were presented in ascending order. This resulted in three equivalence points, which can be examined individually or combined as an overall equivalence point. Because results are virtually identical across each of the three individual equivalence points, we present the results using the composite to reduce redundancy and increase the reliability of the measure.

The HMCT (Rachlin et al., 1991) is a well validated instrument for assessing the construct of discounting. Several studies (e.g., Crean et al., 2000; Odum et al., 2000) have used this task to document the relation between discounting and

substance use. For example, Vuchinich and Simpson (1998) found that both social and problem drinkers have a tendency to prefer smaller, immediate rewards over delayed, larger rewards when in a laboratory setting.

**CAB.** The CAB is a 55-item self-report inventory that asks the respondent about more and less serious criminal behavior (i.e., stealing, driving while under the influence, fighting), substance use (i.e., cigarette, alcohol, marijuana, other drug use), and sexual experience (i.e., ever had intercourse, and lifetime number of partners). Five composite variables were created from this measure. An alcohol/drug use variable was created by giving participants a "1" for every drug they endorsed using including alcohol (72% endorsement), marijuana (55%), cocaine (6%), psychedelics (13%), and other hard drugs (8%);  $M = 1.43$ ,  $SD = 1.04$ . Next, a property crime/delinquency composite variable was created by giving participants a 1 for every relevant act they reported engaging in, including stealing less than \$50 (40%); stealing more than \$50 (8%), breaking into a house or building to steal or vandalize (6%), and stealing a car (8%);  $M = .63$ ,  $SD = .87$ . A violent crime/delinquency variable was composed of the following four items: ever been in a fight (47%); ever attacked someone with intent to injure, rape, or kill (2%); ever hurt someone badly enough to need medical attention (16%); and ever used a knife or gun on someone (1%). The mean for this composite was  $.66$ ,  $SD = .79$ . A total crime/delinquency variable was created that included the aforementioned eight variables plus two others including (a) ever drive drunk or high (31%) and (b) ever been arrested (12%) The mean for this variable was  $1.64$ ,  $SD = 1.61$ . Finally, a risky sexual behavior composite was created by giving individuals a 1 for behaviors including ever having sex (69%), having sex at or before age 15 (23%), having three or more partners (of the people who had sex, 29% had three or more partners), and using condoms "never" or "infrequently" (which was limited to individuals who had engaged in sexual intercourse;  $n = 133$ ; 20%). The mean for this variable was  $1.83$ ; with a  $SD$  of  $.95$ .

Variables assessing the variety of different types of antisocial acts are useful for several reasons: (a) involvement in different types of crimes is highly reliable predictor of later antisocial behavior (ASB; Robins, 1978), (b) they are less positively skewed than frequency scores, and (c) they give equal weight to all acts unlike frequency scores that tend to overweight minor but frequently committed acts. In general, self-report measures of delinquency have been shown to have strong psychometric properties (for a review, see Hirschi, Hindelang, & Weiss, 1980).

**Reactive and Proactive Aggression Questionnaire.** This scale consists of 23 self-report items assessing two aggression scales: Proactive Aggression and Reactive Aggression (Raine et al., 2002). The Proactive Aggression scale consists of the total score for 12 of the items. Similarly, the Reactive Aggression scale consists of the total score for

the remaining 11 items. All of the items are scored in the following manner: 0 (*never*), 1 (*sometimes*), and 2 (*often*). In this study, the coefficient alphas for the Proactive and Reactive scales were  $.74$  and  $.78$ , respectively.

**Revised Self-Report of Aggression and Social Behavior.** This 56-item self-report scale was designed to assess several different forms of aggression and victimization (Morales & Crick, 1999). For this study, only the 15 items that pertain to relational aggression were included. These items were summed to form a relational aggression score ( $\alpha = .87$ ).

## RESULTS

### FFM Psychopathy and Externalizing Problems

The analyses were conducted in two steps. First, replicating previous research, bivariate correlations between FFM-assessed psychopathy and externalizing problems were examined. The correlations are presented in Table 2 with the results combined for men and women unless there was a significant difference in the relations. With regard to substance use, psychopathy scores were significantly related to the variety of drugs used across one's lifetime as well as the amount of alcohol used over the past year. Psychopathy was also significantly correlated with the variety of property crimes/delinquent activities (e.g., stealing a car), the variety of violent criminal/delinquent activities (e.g., attacking someone with intent to injure), and the total variety of criminal/delinquent acts (including driving drunk and ever being arrested). Additionally, psychopathy was significantly related to a composite of potentially risky sexual behaviors such as having multiple sex partners, infrequent condom use, and an early sexual debut. Finally, psychopathy was significantly related to all forms of self-reported aggression (i.e., reactive, proactive, and relational). However, as found in previous studies, the relation between psychopathy and proactive aggression was significantly higher than the relation between psychopathy and reactive aggression,  $t(207) = -2.65$ ,  $p < .01$ . In addition, the relation between psychopathy and relational aggression differed as a function of gender with the relation being stronger for women,  $t(204) = 2.53$ ,  $p < .05$ .

### FFM Psychopathy and Laboratory Tasks

Next, the relations between FFM psychopathy and three laboratory tasks were examined. Among men but not women, psychopathy was significantly positively related to acting aggressively on the laboratory aggression task across both low and medium levels of provocation (see Table 2). In addition, psychopathy was significantly negatively related to the discounting task such that the more closely an individual's NEO-PI-R profile approximated the psycho-

**TABLE 2**  
**Correlations Between FFM Psychopathy,**  
**FFM DPD, Externalizing Problems,**  
**and Laboratory Tasks**

	FFM		Comparison
	Psychopathy	FFM DPD	
Variety of drugs used in a lifetime	.38**	-.33**	a
Alcohol use in the past year	.26**	-.29**	a
Marijuana use in the past year	.18	-.13	a
Variety of property crimes/delinquency	.14*	-.04	
Variety of violent crimes/delinquency	.30**	-.25**	a
Variety of total crimes/delinquency	.34**	-.24**	a
Risky sexual behavior	.19*	-.30**/-.02	b
Reactive aggression	.27**	-.20**	a
Proactive aggression	.43**	-.29**	a
Relational aggression	.19*/.42**	-.17*	a
Laboratory tasks			
Aggression, low provocation	.21*/-.13	-.14	c
Aggression, medium provocation	.25*/-.06	-.16*	c
Aggression, high provocation	.04	-.07	
HMCT (discounting)	-.25**	.22**	a
Social Information Processing			
Hostile attribution	.08	-.05	
% Aggressive responses	.26**	-.20**	a
Enact aggressive response	.24**	-.19**	a

*Note.* Gender differences in the relations between the outcome variables and FFM-psychopathy and DPD scores were examined using a series of hierarchical regression equations with gender and FFM psychopathy (or FFM DPD) entered in the first step and the interaction term between gender and FFM psychopathy (or FFM DPD) entered in the second step. In the face of a significant interaction, zero-order correlations were reported separately for men and women separated by a slash. FFM = Five-factor model of personality; DPD = dependent personality disorder; HMCT = hypothetical money choice task.

<sup>a</sup>Indicates that the correlation was significantly different for FFM psychopathy and FFM DPD. <sup>b</sup>Indicates that the overall correlation for FFM psychopathy was significantly different from the FFM DPD correlation for men. <sup>c</sup>Indicates that the FFM psychopathy correlation for men was significantly different from the overall FFM DPD correlation.

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

pathic prototype, the more likely that individual was to choose a smaller but immediately available reward over a larger one, available at a later time. Finally, psychopathy was related to two different steps in the social information-processing model. Psychopathy scores were significantly related to the generation of a higher percentage of aggressive responses and choosing to enact an aggressive behavior in response to the vignette. Although these relations were significant, the effect sizes were small to medium in nature (Cohen, 1992).

## Specificity of the Results

To demonstrate that relations observed previously were specific to psychopathy and not due to general personality pathology, we also examined the correlations between FFM DPD and these same variables. As can be seen in the third column of Table 2, FFM DPD demonstrated a divergent pattern of relations. Unlike psychopathy, FFM DPD was negatively correlated with substance use, risky sexual behavior (for men only), violent crime, and aggression. FFM DPD was also unrelated or negatively related to laboratory aggression, generating aggressive responses, and enacting aggressive responses in the social information processing. Finally, DPD was positively related to being able to bypass smaller, immediate rewards for larger, delayed rewards. In almost every case, the relations between the two personality profiles and the variety of outcome variables were in the opposite direction and, in most cases, significantly different from the correlation observed for FFM psychopathy.

## FFM Psychopathy and Incremental Validity

Finally, we examined whether our measure of psychopathy, based solely on personality descriptors without regard for antisocial behavior, could account for variance in these outcomes and task behaviors beyond that accounted for by antisocial behavior. Using hierarchical regression analyses, antisocial behavior was entered at the first step followed by FFM psychopathy at step two for substance use, risky sexual behavior, each type of aggression, and each task outcome that was significantly correlated with FFM psychopathy in the bivariate correlations. Results are presented in Table 3. FFM psychopathy accounted for additional significant variance in substance use as well as proactive, reactive, and relational aggression. Additionally, FFM psychopathy accounted for additional significant variance for four of the five laboratory task outcome variables including aggression (low and medium provocation), discounting, and percentage of aggressive responses generated. However, for the variable of enacting an aggressive response, only the measure of antisocial behavior accounted for a significant amount of variance.

## DISCUSSION

In this study, we sought to replicate and extend research by Miller et al. (2001) using a measure of the FFM, the NEO-PI-R, to assess psychopathy. As with the original study, the similarity between an individual's NEO-PI-R personality profile and an expert-generated FFM-psychopathy prototype served as a measure of psychopathy. In this study, as expected, significant relations were found between psychopathy and the following constructs: substance use, criminal/delinquent behavior, sexual activity, proactive aggression, reactive aggression, and relational aggression.

**TABLE 3**  
**Hierarchical Regression Analyses Predicting**  
**Laboratory Tasks and Outcomes With FFM**  
**Psychopathy**  
**and Delinquency**

	<i>B</i>	<i>SE</i>	<i>sr</i> <sup>a</sup>	<i>p</i>
Substance use in a lifetime				
1. Crime/delinquency	0.28**	0.04	.44	.44 .001
2. FFM psychopathy	1.2**	0.30	.26	.25 .001
Risky sexual behavior				
1. Crime/delinquency	0.29**	0.04	.54	.54 .001
2. FFM psychopathy	0.17	0.34	.04	.04 <i>ns</i>
Proactive aggression				
1. Crime/delinquency	0.72**	0.09	.49	.49 .001
2. FFM Psychopathy	3.3**	0.67	.30	.29 .001
Reactive aggression				
1. Crime/Delinquency	0.68**	0.14	.33	.33 .001
2. FFM psychopathy	2.9**	1.1	.19	.18 .01
Relational aggression				
1. Crime/delinquency	1.42*	0.55	.18	.18 .05
2. FFM psychopathy	14.5**	4.2	.25	.23 .001
Aggression Task, low provocation (men only)				
1. Crime/delinquency	-2.1	4.6	-.05	.05 <i>ns</i>
2. FFM psychopathy	83.6*	36.9	.23	.22 .05
Aggression task, medium provocation (men only)				
1. Crime/delinquency	0.43	4.2	-.06	.01 <i>ns</i>
2. FFM psychopathy	90.2**	33.5	.27	.26 .01
Discounting, HMCT				
1. Crime/delinquency	-27.2	13.84	-.14	.14 .05
2. Psychopathy	-330.5**	107.28	-.23	.21 .01
% Aggressive responses in SIP				
1. Crime/delinquency	0.03**	0.01	.30	.30 .001
2. FFM psychopathy	0.12*	0.05	.18	.17 .05
Enact an aggressive response in SIP				
1. Crime/delinquency	0.08**	0.01	.47	.47 .001
2. FFM psychopathy	0.11	0.08	.09	.09 <i>ns</i>

*Note.* The crime/delinquency variable is a count variable assessing an individual's lifetime participation in any of 10 criminal or delinquent acts as assessed by the Crime and Analogous Behavior scale. FFM Five-factor model of personality; HMCT = hypothetical money choice task; SIP = social information process.

<sup>a</sup>*sr* refers to the semipartial correlation. For crime/delinquency at the first step, *sr* is simply the zero-order correlation.

\**p* < .05. \*\**p* < .01.

Interestingly, and consistent with previous research (Cornell et al., 1996), FFM psychopathy was more strongly related to proactive than reactive aggression.

In addition, this study also examined the relation between FFM psychopathy and task behavior in the laboratory. The inclusion of such laboratory tasks represented an important extension of previous work by Miller et al. (2001); these tasks provided glimpses into actual behavior, avoiding problems of shared method variance, eliminating predictor-criterion overlap, and diminishing concerns about self-presentational styles.

Specifically, we examined, as hypothesized by Widiger and Lynam (1998), whether psychopathic individuals demonstrated the same information processing seen in aggressive children (Dodg & Schwartz, 1997). We found that although psychopathic individuals did not display a hostile

attributional bias, they did generate more aggressive responses and more often chose to enact aggressive responses. In addition, we examined the relation between FFM psychopathy and discounting—the tendency to choose immediately available, smaller rewards over larger, delayed rewards. Given characterizations of psychopathic individuals as “living in the moment,” lacking realistic long-term goals, being irresponsible, and being impulsive (Hare, 1991), we expected and found that psychopathic participants were less willing or able to forgo a smaller but immediately available reward for a larger delayed reward. These findings are consistent with those of Newman, Kosson, and Patterson (1992) who found that psychopathic offenders were less likely than nonpsychopathic offenders to delay gratification. Finally, we tested the relation between psychopathy and behaving aggressively in a laboratory paradigm of aggression. Again, as expected, higher FFM-psychopathy scores were associated with greater aggression under conditions of low and medium provocation. Two caveats are important to note. First, the relation held only for men; there was no relation between FFM psychopathy and aggression for women under any level of provocation, perhaps due to women's preference for more indirect or relational forms of aggression that attempt “to harm others through the manipulation and damage of relationships and feelings of social inclusion” (Werner & Crick, 1999, p. 615). Such an interpretation is consistent with our finding that relational aggression was more strongly related to FFM psychopathy among women than among men. The second limitation is that, even for men, there was no relation between psychopathy and aggression under conditions of high provocation. The strong situational demands of this condition likely wiped out individual differences in aggression observed at lower levels of provocation.

We also tested the relations between DPD, also assessed via the FFM, to examine the specificity of our findings. That is, we examined whether the relations were specific to FFM psychopathy or due to more general personality pathology. The results were clear. In almost every instance, the direction of the relations was opposite for psychopathy and DPD. This suggests that the pattern of results indicating that psychopathic individuals are more likely to act aggressively in the real world and in the laboratory, use higher rates of alcohol and marijuana, have difficulty delaying gratification, and engage in risky sexual behavior are specific to this personality profile.

Finally, because this assessment of psychopathy relied solely on personality questions that do not directly address antisocial behaviors, we tested whether our measure of psychopathy could account for variation in the laboratory tasks above that accounted for by a composite of criminal/delinquent acts. FFM psychopathy demonstrated incremental validity for four of the five laboratory tasks including laboratory aggression, discounting, and percentage of aggressive responses generated. In addition, FFM psychopathy was able to account for additional variance for lifetime substance use as well as reactive, proactive, and relational ag-

gression. It did not account for more variance in risky sexual behavior or enacting an aggressive response. The hierarchical regression analyses we used provided a more stringent test for the measure of psychopathy because it required psychopathy to predict the task behaviors after a portion of the variance had already been removed. However, despite this, the purely personality-based measure of psychopathy still provided significant additional information.

### Implications

We believe these results have implications for both theory and assessment. Theoretically, they provide additional support for the idea that psychopathy can be understood as a constellation of personality traits from a general model of personality functioning, namely the FFM. Previous research has shown that experts can reliably describe the personality disorders, including psychopathy, through the use of the FFM (Lynam & Widiger, 2001; Miller et al., 2001). Although such research is an important first step in validating the idea of personality disorders as dimensional variants of normal personality functioning, a necessary second step is to use these expert-based prototypes to “reproduce the nomological networks surrounding” (Lynam & Widiger, 2001, p. 410) these personality disorders. The results from this study, along with the original Miller et al. (2001) findings, suggest that an FFM-based representation of psychopathy can adequately recreate the nomological network. The two studies have shown that FFM psychopathy is related, in predicted directions, to substance use, criminal behavior, risky sex, aggression (in and outside the laboratory), temporal discounting, and social information processing. Importantly, these findings, even the ones using self-reports, are relatively uncontaminated by predictor-criterion overlap. Unlike most measures of psychopathy that explicitly ask about previous criminal or aggressive behavior, the FFM assessment of psychopathy avoids predictor-criterion overlap almost entirely.

Results also underscore the importance of examining psychopathic individuals' information processing. The model articulated by Dodge and colleagues (Crick & Dodge, 1996; Dodge & Schwartz, 1997) has been useful in the study of child and adolescent aggression (e.g., Dodge, Price, Bachorowski, & Newman, 1990; Guerra & Slaby, 1989; Milich & Dodge, 1984), increasing understanding of the cognitive processes underlying aggression and leading to the development of interventions. In this research, we found that individuals who more closely resembled the prototypic psychopath generated more aggressive responses and were more likely to say they would enact an aggressive response in the situation. Both findings are consistent with research on aggressive children and suggest that the aggression scripts (Huesmann, 1988) of psychopathic individuals may be more salient and easily activated and may steer the individuals' behavior toward the generation and activation of aggression in interpersonal situations. In contrast, unlike aggressive children, psychopathic partici-

pants were not more likely to display a hostile attributional bias. These findings suggest, consistent with descriptions of psychopathy, that the information processing of psychopathic individuals is relatively intact. Moreover, the lack of a hostile attributional bias is consistent with psychopathic individuals' reliance on instrumental rather than reactive aggression (Dodge & Coie, 1987).

### Limitations

Despite our enthusiasm for these results, there are several limitations that must be noted. There are always concerns when using a college sample that the results may not generalize to other populations. For example, the base rates of psychopathic traits are almost certainly lower in a college sample than in a forensic sample. As such, the next step for the FFM model of psychopathy will be application of this model in a forensic or psychiatric setting. However, due to the costliness in terms of time and money of using laboratory assessments, a college sample is generally considered a good sample in which to test initial hypotheses.

Another potential problem with our sample is that the individuals were chosen on the basis of being in the top or bottom one third on scores of Agreeableness and/or Conscientiousness. As a result, this procedure might have resulted in a non-normal distribution for those personality dimensions. In addition, it was not clear how these selection procedures might affect the distributions for the other three personality dimensions. However, an examination of the skewness and kurtosis scores for all five dimensions suggests that the distributions were relatively normal. Despite the apparent normality of the sample, the use of an extreme groups design may have led to an unknown degree of inflation in the relations between variables of interest due to the increased variability in the standard deviations of these two personality domains. Future studies should include participants who fall along all points of the personality continuum.

Finally, although most of the predicted relations were found, effect sizes tended to be small to medium at best. However, the size of these relations is consistent with those found in a number of studies of psychopathy (see Kosson, Smith, & Newman, 1990; Levenson, Kiehl, & Fitzpatrick, 1995; Lynam, Whiteside, & Jones, 1999), particularly those using laboratory tasks as outcome variables. Additionally, such laboratory tasks may be prime examples of situations in which small effects are impressive; as noted by Prentice and Miller (1992), small effects in ongoing processes or frequently encountered situations may accumulate over time to become large effects when viewed in the aggregate (p. 163). In this study, FFM psychopathy was associated with choosing to enact a hostile response to an interpersonal situation. Although this effect size was small, over time and the numerous interpersonal interactions humans have in the course of a day, week, month, year, or lifetime, the effects of this psychopathic personality style may be substantial if it increases

the likelihood that this person will interact with his or her social surroundings in a hostile and aggressive manner.

## Conclusions

This study supports the finding that psychopathy can be understood as a configuration of normal personality dimensions as represented by the FFM. Individuals with a personality profile composed of very low Agreeableness and Conscientiousness and high Extraversion, along with both elevations and depressions on Neuroticism (high impulsiveness and angry hostility, low anxiety, depression, self-consciousness, and vulnerability), behave in a manner consistent with psychopathy. That is, these individuals use a greater variety of substances more intensely; engage in a wider variety of both property-related and violent criminal acts such as driving drunk, stealing, and fighting; initiate sex at an earlier age, have more sexual partners; and are less likely to use condoms. In addition, we found that psychopathy was related to several steps of the social information-processing model. In particular, psychopathic individuals generate a higher percentage of aggressive solutions in response to an interpersonal situation and are more likely to enact an aggressive response. These findings may help account for why psychopathic individuals tend to behave so aggressively. If an individual tends to generate primarily aggressive solutions to social problems, it reduces the probability that the individual may choose to act out a nonaggressive solution. Finally, psychopathic individuals demonstrated a tendency to choose smaller, immediately available rewards rather than waiting for a larger reward available at a later time. This response style may account for many of the characteristic behavioral patterns demonstrated by psychopathic individuals such as promiscuous sex, substance use, irresponsibility, and parasitic lifestyles.

## ACKNOWLEDGMENTS

This study was supported by grants from the University of Kentucky Center on Drug and Alcohol Research to Joshua Miller and from the National Institute of Mental Health to Donald R. Lynam (MH60104).

## REFERENCES

- Babiak, P. (2000). Psychopathic manipulation at work. In C. B. Gaconco (Ed.), *The clinical and forensic assessment of psychopathy: A practitioner's guide* (pp. 287–312). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Cherek, D. (1981). Effects of smoking different doses of nicotine on human aggressive behavior. *Psychopharmacology*, *75*, 339–345.
- Cherek, D., Schnapp, W., Moeller, F., & Dougherty, D. (1996). Laboratory measures of aggressive responding in male parolees with violent and non-violent histories. *Aggressive Behavior*, *22*, 27–36.
- Cleckley, H. (1941). *The mask of sanity*. St. Louis, MO: Mosby.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155–159.
- Cornell, D. G., Warren, J., Hawk, G., Stafford, E., Oram, G., & Pine, D. (1996). Psychopathy in instrumental and reactive violent offenders. *Journal of Consulting and Clinical Psychology*, *64*, 783–790.
- Costa, P. T., & McCrae, R. R. (1992). *Professional manual: Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI)*. Odessa, FL: Psychological Assessment Resources.
- Crean, J. P., de Wit, H., & Richards, J. (2000). Reward discounting as a measure of impulsive behavior in a psychiatric outpatient population. *Experimental and Clinical Psychopharmacology*, *8*, 155–162.
- Crick, N. R., & Dodge, K. A. (1996). Social information-processing mechanisms in reactive and proactive aggression. *Child Development*, *67*, 993–1002.
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development*, *66*, 710–722.
- Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to nonnormality and specification error in confirmatory factor analysis. *Psychological Methods*, *1*, 16–29.
- Dodge, K. A., & Coie, J. D. (1987). Social-information processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, *53*, 1146–1158.
- Dodge, K., & Frame, C. (1982). Social cognitive biases and deficits in aggressive boys. *Child Development*, *53*, 620–635.
- Dodge, K., Price, J., Bachorowski, J., & Newman, J. (1990). Hostile attribution biases in severely aggressive adolescents. *Journal of Abnormal Psychology*, *99*, 385–392.
- Dodge, K., & Schwartz, D. (1997). Social information processing mechanisms in aggressive behavior. In D. Stoff, J. Breiling, & J. Maser (Eds.), *Handbook of antisocial behavior* (pp. 171–180). New York: Wiley.
- Dodge, K. A., & Tomlin, A. M. (1987). Utilization of self-schemas as a mechanism of interpretational bias in aggressive children. *Social Cognition*, *5*, 280–300.
- Giancola, P., & Zeichner, A. (1995). Construct validity of a competitive reaction-time measure of aggression paradigm. *Aggressive Behavior*, *21*, 199–204.
- Guerra, N., & Slaby, R. (1989). Evaluative factors in social problem solving by aggressive boys. *Journal of Abnormal Child Psychology*, *17*, 277–289.
- Gustafson, S. B., & Ritzer, D. R. (1995). The dark side of normal: A psychopathy-linked pattern called aberrant self-promotion. *European Journal of Personality*, *9*, 147–183.
- Hare, R. D. (1991). *The Hare Psychopathy Checklist—Revised*. Toronto, Ontario, Canada: Multi-Health Systems.
- Hare, R. D. (1993). *Without conscience: The disturbing world of the psychopaths among us*. New York: Pocket.
- Hare, R. D., McPherson, L. M., & Forth, A. E. (1988). Male psychopaths and their criminal careers. *Journal of Consulting and Clinical Psychology*, *56*, 710–714.
- Harpur, T. J., Hakstian, A. R., & Hare, R. D. (1988). Factor structure of the Psychopathy Checklist. *Journal of Consulting and Clinical Psychology*, *56*, 741–747.
- Harpur, T. J., Hare, R., & Hakstian, A. R. (1989). Two-factor conceptualization of psychopathy: Construct validity and assessment implications. *Psychological Assessment*, *1*, 6–17.
- Hart, S. D., Kropp, P. R., & Hare, R. D. (1988). Performance of male psychopaths following conditional release from prison. *Journal of Consulting and Clinical Psychology*, *56*, 227–232.
- Hemphill, J. F., Hare, R. D., Wong, S. (1998). Psychopathy and recidivism: A review. *Legal and Criminological Psychology*, *3*, 139–170.
- Hemphill, J. F., Hart, S. D., & Hare, R. D. (1994). Psychopathy and substance use. *Journal of Personality Disorders*, *8*, 169–180.
- Hirschi, T., Hindelang, M. J., & Weiss, J. G. (1980). The status of self-report measures. In M. W. Klein & K. S. Teilman (Eds.), *Handbook of criminal justice evaluation* (pp. 473–488). Beverly Hills, CA: Sage.
- Huesmann, L. R. (1988). An information processing model for the development of aggression. *Aggressive Behavior*, *14*, 13–24.

- Kosson, D. S., Smith, S. S., & Newman, J. P. (1990). Evaluating the construct validity of psychopathy in black and white male inmates: Three preliminary studies. *Journal of Abnormal Psychology, 99*, 250–259.
- Levenson, M. R., Kiehl, K. A., & Fitzpatrick, C. M. (1995). Assessing psychopathic attributes in a noninstitutional population. *Journal of Personality and Social Psychology, 68*, 151–158.
- Lochman, J. E., & Dodge, K. A. (1994). Social-cognitive processes of severely violent, moderately aggressive, and nonaggressive boys. *Journal of Consulting and Clinical Psychology, 62*, 366–374.
- Lykken, D. T. (1982, September). Fearlessness. *Psychology Today, 6*–10.
- Lynam, D. R. (2002). Psychopathy from the perspective of the five-factor model of personality. In P. T. Costa & T. A. Widiger (Eds.), *Personality disorders and the Five-factor model of personality* (pp. 325–348). Washington, DC: American Psychological Association.
- Lynam, D. R., Whiteside, S., & Jones, S. (1999). Self-reported psychopathy: A validation study. *Journal of Personality Assessment, 73*, 110–132.
- Lynam, D. R., & Widiger, T. A. (2001). Using the Five-factor model to represent the *DSM-IV* personality disorders: An expert consensus approach. *Journal of Abnormal Psychology, 110*, 401–412.
- Milich, R., & Dodge, K. (1984). Social information processing in child psychiatric populations. *Journal of Abnormal Child Psychology, 12*, 471–490.
- Miller, J. D., Lynam, D. R., Widiger, T. A., & Leukefeld, C. (2001). Personality disorders as extreme variants of common personality dimensions. Can the Five-factor model of personality adequately represent psychopathy? *Journal of Personality, 69*, 253–276.
- Morales, J. R., & Crick, N. (1999, April). *Hostile attribution and aggression in adolescent peer and romantic relationships*. Poster session presented at the biennial meeting of the Society for Research in Child Development, Albuquerque, NM.
- Murphy, D., Pelham, W., & Lang, A. (1992). Aggression in boys with attention deficit-hyperactivity disorder: Methylphenidate effects on naturalistically observed aggression, response to provocation, and social information processing. *Journal of Abnormal Child Psychology, 20*, 451–466.
- Newman, J. P., Kosson, D., & Patterson, C. M. (1992). Delay of gratification in psychopathic and non-psychopathic offenders. *Journal of Abnormal Psychology, 101*, 630–636.
- Odum, A., Madden, G., Badger, G., & Bickel, W. (2000). Needle sharing in opioid-dependent outpatients: Psychological processes underlying risk. *Drug and Alcohol Dependence, 60*, 259–266.
- Prentice, D. A., & Miller, D. T. (1992). When small effects are impressive. *Psychological Bulletin, 112*, 160–164.
- Rachlin, H., Raineri, A., & Cross, D. (1991). Subjective probability and delay. *Journal of the Experimental Analysis of Behavior, 55*, 233–244.
- Raine, A., Dodge, K., Loeber, R., Kopp, L., Lynam, D., Reynolds, C., et al. (2002). *Proactive and reactive aggression in adolescents*. Manuscript submitted for publication.
- Robins, L. (1978). Aetiological implications in studies of childhood histories relating to antisocial personality. In R. D. Hare & D. Schalling (Eds.), *Psychopathic behavior: Approaches to research* (pp. 255–271). New York: Wiley.
- Salekin, R. T., Rogers, R., & Sewell, K. W. (1996). A review and meta-analysis of the Psychopathy Checklist and Psychopathy Checklist-Revised: Predictive validity of dangerousness. *Clinical Psychology: Science and Practice, 3*, 203–215.
- Smith, S. S., & Newman, J. P. (1990). Alcohol and drug abuse-dependence disorders in psychopathic and nonpsychopathic criminal offenders. *Journal of Abnormal Psychology, 4*, 430–439.
- Taylor, S. (1967). Aggressive behavior and physiological arousal as a function of provocation and the tendency to inhibit aggression. *Journal of Personality, 35*, 297–310.
- Vuchinich, R., & Simpson, C. (1998). Hyperbolic temporal discounting in social drinkers and problem drinkers. *Experimental and Clinical Psychopharmacology, 6*, 292–305.
- Werner, N. E., & Crick, N. R. (1999). Relational aggression and social-psychological adjustment in a college sample. *Journal of Abnormal Psychology, 108*, 615–623.
- Widiger, T. A., & Lynam, D. R. (1998). Psychopathy and the five-factor model of personality. In T. Millon, E. Simonsen, M. Birket-Smith, & R. D. Davis (Eds.), *Psychopathy: Antisocial, criminal, and violent behaviors* (pp. 171–187). New York: Guilford.

Donald R. Lynam  
 Department of Psychology  
 University of Kentucky  
 Lexington, KY 40506–0044  
 E-mail: dlynal@uky.edu

Received July 29, 2002  
 Revised March 26, 2003