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Secondary Psychopathy, but not Primary Psychopathy, is Associated with Risky Decision-Making in Noninstitutionalized Young Adults

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Abstract

Although risky decision-making has been posited to contribute to the maladaptive behavior of individuals with psychopathic tendencies, the performance of psychopathic groups on a common task of risky decision-making, the Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Anderson, 1994), has been equivocal. Different aspects of psychopathy (personality traits, antisocial deviance) and/or moderating variables may help to explain these inconsistent findings. In a sample of college students ($N = 129$, age 18 to 27), we examined the relationship between primary and secondary psychopathic features and IGT performance. A measure of impulsivity was included to investigate its potential as a moderator. In a joint model including main effects and interactions between primary psychopathy, secondary psychopathy and impulsivity, only secondary psychopathy was significantly related to risky IGT performance, and this effect was not moderated by the other variables. This finding supports the growing literature suggesting that secondary psychopathy is a better predictor of decision-making problems than the primary psychopathic personality traits of lack of empathy and remorselessness.

Keywords

primary psychopathy; secondary psychopathy; impulsivity; risk-taking; decision-making; gambling task; noninstitutionalized

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1.1 INTRODUCTION

Since Cleckley's (1941/1988) original description of the psychopathic personality, attempts have been made to distinguish "true" psychopathic personality traits from more general indices of antisocial behavior. Cleckley (1941/1988) and Karpman (1948) argued that true, or primary psychopaths, commit antisocial acts due to an idiopathic lack of empathy and fear. In contrast, secondary psychopaths share many of the antisocial behaviors of primary psychopaths, but unlike primary psychopaths are remorseful and fearful. Karpman contended that secondary psychopaths should not be considered truly "psychopathic" because their behavior is not rooted in a primary lack of empathy. Considerable support exists for the differentiation of the primary psychopathic personality traits from more general indices of antisocial behavior, and factor analysis of both interview-based and self-report measures of psychopathy have yielded separable factors which differentiate personality/affective traits from aspects of antisocial deviance (Lyken, 1995; Harpur, Hare, & Hakstian, 1989; Newman, MacCoun, Vaughn, & Sadeh, 2005; Benning, Patrick, Hicks, Blonigen, & Kruger, 2003; Levenson, Kiehl, & Fitzpatrick, 1995). Although contemporary authors disagree as to the importance that should be placed on the primary personality features as opposed to antisocial deviance in the designation of "psychopathy" (Lilienfeld, 1994), the need to differentiate the two components has been well supported.

1.2 Psychopathy and Risky Decision-Making

Damasio (1994) has noted that patients with acquired lesions of the ventromedial prefrontal cortex (PFC) appear clinically to share similar emotional and cognitive symptoms with psychopaths—poor impulse control, lack of empathy, and difficulties in decision-making. To investigate "real world" risky decision-making, Bechara, Damasio and colleagues developed the Iowa Gambling Test (IGT) which requires examinees to choose from card decks with different risk/reward ratios (Bechara, Damasio, Damasio, & Anderson, 1994). When tested on the IGT, patients with ventromedial lesions have been shown to persistently choose large immediate rewards despite the fact that such behavior results in long-term net losses. In contrast, healthy control participants learn to avoid the large but risky reward options in favor of smaller rewards which provide long-term net gains. The myopic decision-making of patients with ventromedial abnormalities has prompted the investigation of psychopathic groups on the IGT to see whether similar patterns arise.

Results from initial IGT studies with psychopathic groups have not consistently shown the expected decision-making impairments. Some studies have found psychopathic groups to display a propensity for risky deck selections (Mitchell, Colledge, Leonard, & Blair, 2002; van Honk, Hermans, Putman, Montagne, & Schutter, 2002; Blair, Colledge, & Mitchell, 2001), while other studies have found the performance of psychopathic individuals to be comparable to control subjects (Schmitt, Brinkley, & Newman, 1999; Blair & Cipolotti, 2000).

Although differences between psychopathic personality traits and antisocial deviance (secondary psychopathy) may help to explain inconsistent findings on the IGT, few studies have examined these factors separately. In a study of men with alcoholism, Miranda and colleagues (Miranda, MacKillop, Meyerson, Justus, & Lovallo, 2009) found that alcoholics with a diagnosis of antisocial personality made fewer advantageous selections on the IGT than alcoholics without antisocial personality. When a self-report measure of psychopathy (Psychopathic Personality Inventory; Lilienfeld & Andrews, 1996) was regressed onto IGT performance in the entire sample (including healthy male controls), only the antisocial deviance factor (*impulsive antisociality*) was significantly related to risky IGT responding. In contrast, the primary personality factor (*fearless dominance*) was unrelated to IGT performance.

Lösel and Schmucker (2004) examined the differential contribution of primary personality traits and antisocial behavior in an incarcerated sample by examining the first and second factors of the revised Psychopathy Checklist (PCL-R; Hare, 1991). Results from the study indicated that neither the PCL-R total score nor the individual PCL-R factors scores were related to IGT performance. The antisocial deviance factor (factor 2) was positively correlated with risky IGT selections, while the personality/affective factor (factor 1) was *negatively* correlated with risky selections, but neither correlation was statistically significant. An interaction was found between attentional abilities and the PCL-R total score on IGT performance, but the separate PCL-R factors were not evaluated in this analysis.

1.3 Impulsivity and Psychopathy

In addition to different facets of the psychopathy construct, trait impulsivity may also help to explain the inconsistent link between psychopathy and risky decision-making. Subjectively, impulsivity would seem to play a role in risky IGT performance by psychopathic individuals, in which examinees seem unable to control their impulse for large reward decks despite the fact that these decks also provide even larger losses. Impulsivity has also been hypothesized to play a central role in the psychopathic inability to delay gratification and learn from prior experience (Newman, Kosson, & Patterson, 1992). Similarly, most measures of secondary psychopathy have questions which tap an impulsive, rash style of behavior (e.g., Levenson et al., 1995; Lilienfeld & Andrews, 1996). Results from studies of the relationship between impulsivity and IGT performance in non-psychopathic subjects have been mixed, with some studies finding a relationship between impulsivity or impulsive diagnoses and risky selections (Dolan, Bechara, & Nathan, 2008; Jollant et al., 2005; Bazanis et al., 2002), while other studies have not found significant relationships between impulsivity and IGT performance (Perales, Verdejo-Garcia, Moya, Lozano, & Perez-Garcia, 2009; Overman et al., 2004). This leaves open the question of whether impulsivity would be related to IGT performance, alone or in combination with psychopathic traits, in otherwise healthy individuals.

1.4 The Current Study

Our study extended previous research on the relationship between psychopathy and decision-making by: (a) examining the main and interaction effects between primary and secondary psychopathy on IGT performance; (b) investigating the main and interaction effects between impulsivity and psychopathic features on IGT performance; and (c) utilizing a non-institutionalized sample. Although much of the research on psychopathy has been conducted in criminal settings, psychopathy is being increasingly understood as a dimensional phenomenon which is present in varying degrees in the normal population (Walters, Brinkley, Magaletta, & Diamond, 2008). Of note, two studies of the IGT which used healthy non-institutionalized participants found that psychopathic characteristics were associated with risky selections (van Honk et al, 2002; Blair et al., 2001). We extended these findings by examining the individual psychopathic factors and impulsivity in a college population. We hypothesized that secondary psychopathy, but not primary psychopathy, would be related to risky IGT performance. We also hypothesized that impulsivity would be related to IGT performance, either alone or as a moderator of the secondary psychopathy relationship.

2.1 METHOD

2.2 Participants

Demographic characteristics of the participants (n = 129) are presented in Table 1. Subjects were from a Southern US university and participated in the study in return for extra credit in their psychology class. Ten participants were dropped from the original pool due to one of

the following self-reported conditions: schizophrenia/psychosis, attention-deficit disorder, clinical depression, bipolar disorder, other mental disorder, memory problem, head injury with loss of consciousness greater than five minutes, neurological disorder or use of psychotropic medications. In addition, 8 older participants (ages 31–53) were excluded from the original pool as outliers; the rest of the participants were between 18 to 27 years old. However, we note that whether or not the older subjects were included did not change the results of the analyses.

2.3 Materials

Iowa Gambling Task—(IGT; Bechara et al., 1994). This task (see figure 1) was identical to that originally used by Bechara and colleagues. On a computer, participants are presented with four decks of cards—A, B, C, and D—displayed face down. Participants are instructed to turn over cards from the decks with a mouse click. As each card is turned over, participants find that they win and sometimes also lose computer money. Decks A and B are designed so that they produce high rewards, but at unpredictable points also produce even higher losses. Thus, overall, selections from decks A and B are risky and result in net losses. In contrast, decks C and D provide relatively smaller rewards, but even smaller losses. Selection from these decks results in advantageous net gains. One hundred total deck selections are completed and scores are tallied for the total number of choices made from decks A and B (“risky decks”) across the task. Participants were asked to treat the game as if it involved real money. As recommended by Bechara and colleagues, participants were told that some decks were worse than others prior to completing the task.

Levenson’s Primary and Secondary Psychopathy Scale—(LPSP; Levenson et al., 1995). Based on Karpman’s (1948) initial distinction, the LPSP is a self-report measure which was designed to assess primary and secondary psychopathic features in non-institutionalized populations. The Likert-scale items (“disagree strongly” [1] to “agree strongly” [4]) are phrased so as to minimize indication of disapproval for item endorsement. The primary psychopathy scale is composed of 16 items that tap core primary psychopathic personality traits such as selfishness, lack of caring, manipulation of others and callous attitudes. The secondary psychopathy scale is comprised of 10 items associated with an impulsive, volatile or self-destructive personal style. Evidence for the validity of the LPSP has been provided by factor analysis and through examination of hypothesized relationships with various affective symptoms and antisocial behaviors (e.g., Levenson et al., 1995; Lynam, Whiteside, & Jones, 1999; Brinkley, Schmitt, Smith, & Newman, 2001; Walters et al., 2008; Miller, Gaughan, & Pryor, 2008; Munoz et al., 2011).

Barratt Impulsiveness Scale-Version 11—(BIS-11; Patton, Stanford & Barratt, 1995). The BIS is a well-researched self-report measure of impulsivity consisting of 30 items answered on a four point Likert scale ranging from “rarely/never” (1) to “almost always/always” (4). Validity of the BIS has been supported by significant correlations with other measures of impulsive behaviors (Cherek, Moeller, Dougherty, & Rhoades, 1997; Hinson, Jameson, & Whitney, 2003).

2.4 Results

In order to examine the main and interaction effects of primary psychopathy, secondary psychopathy and impulsivity (independent variables) on overall IGT performance, we used stepwise multiple regression with total risky deck selections as the dependent variable. Specifically, we evaluated whether models with two-way and three-way interaction terms significantly improved model fit compared with a base main effects model. This analysis examined the independent variables (and their interactions) on a continuous basis, rather

than dichotomizing them artificially. The main effects of age, gender and ethnicity (dummy coded) were also included in all models to control for potential confounding effects.

When the main effects of primary psychopathy, secondary psychopathy and impulsivity were entered in step one, only secondary psychopathy was significantly related to risky deck selections (Beta=.24; $t=2.10$; $p=.038$; overall model $F(7, 120)=2.59$; $p=.016$), while primary psychopathy and impulsivity were not significantly related to risky selections ($t's < .50$; $p's > .05$). When all two-way interactions between primary psychopathy, secondary psychopathy and impulsivity were added to the model in step two, they did not demonstrate a significant relationship with risky deck selections, either separately or as a group (individual $p's > .05$; partial F test for model improvement: $F(3, 117)= 0.26$, $p > .05$). Similarly, when the three-way interaction between primary psychopathy, secondary psychopathy and impulsivity was added to the model in step three, it did not significantly improve model fit (partial F (1, 116)=0.33; $p > .05$).

As shown in previous research (Levenson et al., 1995), primary and secondary psychopathy were modestly correlated ($r=.24$, $p=.006$), as were primary psychopathy and impulsivity ($r=.28$, $p=.001$). As expected, secondary psychopathy and impulsivity were highly correlated ($r=.61$, $p=.000$). To ensure that the finding that secondary psychopathy but not impulsivity was related to IGT performance was not an artifact of multicollinearity, we re-ran the above models, selectively leaving out each of the independent variables. The results were unchanged: secondary psychopathy was significantly related to IGT, while the other variables and their interactions were not. This indicates that the variance in secondary psychopathy that is related to the IGT is distinct from that shared with impulsivity. In addition, in order to investigate whether gender moderates the effect of secondary psychopathy on IGT performance, we re-ran the main effects model, adding a gender by secondary psychopathy interaction. This interaction term did not significantly improve model fit ($p > .10$).

The percentages of participants who made a risky deck selection for each of the 100 trials on the IGT are presented in Figure 2. This figure illustrates that participants generally learned to avoid the risky decks over time. Across participants, generalized estimating equation (GEE) models of the probability of risky deck selection for each block of 20 trials revealed a significant effect of time ($p's < .05$) on the first two blocks, but no effect thereafter ($p's > .05$, slope not significantly different from 0). Therefore, to investigate whether secondary psychopathy was associated with increased risky deck selections during the learning phase (blocks 1 and 2), stabilization phase (blocks 3–5), or both, we re-ran the aforementioned stepwise regression analyses using two different dependent variables: a) the total number of risky deck selections from blocks 1 and 2, and b) the total number of risky deck selections from blocks 3 through 5. During the learning phase, secondary psychopathy was not significantly related to risky deck selections ($p > .05$), nor were primary psychopathy, impulsivity, or their interactions ($p's > .05$). However, during the stabilization phase, secondary psychopathy was positively related to risky deck selections (Beta=.26; $t=2.28$; $p = .024$), while primary psychopathy, impulsivity and their interactions were again unrelated to risky selections ($p's > .05$). For illustrative purposes, Figure 3 displays the performance of individuals with high and low levels of secondary psychopathy (through median split) across the IGT trial blocks.

3.1 DISCUSSION

We sought to examine the impact of primary and secondary psychopathic features on decision-making ability in a non-institutionalized sample; we also included a measure of impulsivity to determine whether impulsiveness would moderate the effect of psychopathic

features on decision-making performance. Results indicated that only secondary psychopathic features were associated with risky decision-making on the IGT. Primary psychopathy and impulsivity were not significantly related to IGT performance, either alone or in interaction analyses.

The finding that secondary psychopathy is related to risky decision-making, while primary psychopathy is not, is consistent with several other lines of evidence. For example, using a different self-report measure of psychopathy, the Psychopathic Personality Inventory (PPI), Miranda and colleagues (2009) found that only the antisocial deviance factor (*impulsive antisociality*) was related to risky selections on the IGT in a male sample including both healthy control subjects and alcoholics (with or without antisocial personality disorder). In contrast, the personality/affective factor of the scale (*fearless dominance*) was unrelated to IGT performance.

The personality/affective and antisocial deviance factors of the PCL-R have also been differentially associated with other markers of maladaptive behavior. For example, in a structural equation model of the relationship between the PCL-R factors and several measures of externalizing behavior (e.g., conduct disorder symptoms, drug abuse), only the antisocial deviance factor (factor 2) was found to be significantly related to the latent externalizing construct, while the personality/affective factor (factor 1) was not (Patrick et al., 2005). Similar findings have been revealed with self-report measures of psychopathy, in which the antisocial deviance factors of the PPI and LPSP have been shown to be more strongly related to aggression (Patrick et al., 2006) and substance abuse (Brinkley et al., 2001) than the personality/affective factor.

Evidence also suggests that antisocial deviance is more strongly related to cognitive dysfunction than are personality/affective psychopathic traits. For example, antisocial deviance has been related to executive dysfunction, both when measured by neuropsychological tests (Sellbom & Verona, 2007) and by self-report (Ross, Benning, & Adams, 2007). In contrast, some evidence in these studies suggested that the personality/affective factor was associated with *enhanced* executive functioning. Similarly, using the original PCL, Harpur and colleagues (1989) found that while the antisocial deviance factor was negatively related to educational level and crystallized intelligence, the personality/affective factor was unrelated to these variables. Together, these findings are consistent with the fact that some individuals who exhibit psychopathic personality traits may nonetheless become successful in occupational and business pursuits (Levenson, 1992).

Because participants in our study generally learned to avoid the risky decks across trials, we investigated whether secondary psychopathy was associated with increased risky deck selections during the learning phase (trials 1 to 40), stabilization phase (41 to 100), or both. The results revealed that secondary psychopathy was significantly associated with risky deck selections during the stabilization phase, but not the learning phase. This suggests that secondary psychopathy was not associated with a failure to learn which decks were risky, but rather, a failure to avoid them once the contingencies were known. Although the relationship between secondary psychopathy and risky selections during the stabilization phase may represent an *incomplete* learning of the risk/reward contingencies, the data nonetheless suggest that individuals with secondary psychopathic features tend to make risky choices even with considerable exposure to risk/reward outcomes.

Inspection of the secondary psychopathy scale used in the current study (LPSP, Levenson et al., 1995) reveals that many of the items tap impulsive, disorganized and unplanned behavior. However, the lack of a relationship between impulsivity and IGT performance (whether by itself or after adjusting for psychopathy) suggests that impulsivity does not

explain (i.e., mediate) the relationship between secondary psychopathy and risky behavior or vice versa. Similarly, the lack of a significant psychopathy-impulsivity interaction indicates that impulsivity does not moderate the secondary psychopathy/IGT relationship (i.e. the effect of secondary psychopathy on risky behavior does not depend on a person's degree of impulsivity). In addition to aspects of impulsiveness, the secondary psychopathy scale also assesses symptoms of quick temper and anger. It is possible that explosive anger has a unique relationship with decision-making ability. For example, when we summed participant responses to two anger-related items on the secondary psychopathy scale ("When I get frustrated, I often 'let off steam' by blowing my top"; and "I have been in a lot of shouting matches with other people"), this new variable trended toward a significant relationship with risky IGT selections ($p=.051$), even while controlling for impulsivity. \

Karpman (1948) strongly argued for the original distinction between primary and secondary psychopathy and expressed concerns that all individuals who committed antisocial acts were often considered to be "psychopathic", despite the fact that only a subset also expressed a lack of empathy and conscience. Because individuals can display antisocial actions for a variety of reasons (e.g., in the context of schizophrenia or bipolar disorder, to earn approval from others in gangs; Lilienfeld, 1994), Karpman argued that only those with a constitutional lack of empathy should be considered true, or primary psychopaths (i.e., anopathy). We have similar concerns for the interpretation of the current data. Because primary and secondary psychopathy are often confounded in the psychopathy literature, we worry that our data will be used to argue that those with "psychopathic features" make risky decisions. It should be underscored that secondary psychopathy is a descriptive term for a pattern of antisocial behavior that may be present in a host of other disorders (e.g., ADHD, bipolar disorder, borderline personality, primary psychopathy). Since the term "psychopathy" is commonly associated with the primary traits of poor empathy and lack of remorse, creation of a new term to replace secondary psychopathy may be desirable. At a minimum, more attention should be paid to the theoretical constructs referenced by the labels.

Because our analyses are correlational in nature, our findings may not be indicative of a causal relationship. For example, because we did not measure other cognitive functions, it is possible that the relationship between secondary psychopathy and risky decision making would be eliminated after controlling for other cognitive functions, such as reduced intellectual level. This possibility may be mitigated to some degree by the fact that all participants were college students. In addition, although the scale of psychopathy we used (LPSP) is well-known and has garnered evidence of validity from multiple sources (Levenson et al., 1995; Lynam et al., 1999; Brinkley et al., 2001; Walters et al, 2008; Miller et al., 2008; Munoz et al., 2011), some more recent evidence suggests that the PPI may have a tighter relationship with the factor structure of the PCL-R (Poythress et al., 2010). In this respect, it is noteworthy that similar findings regarding the relationship between primary and secondary psychopathy and the IGT have been provided with the PPI in alcoholics (Miranda et al., 2009). Lastly, although gender was not a significant moderator of the secondary psychopathy/IGT relationship in our study ($p>.05$), we were slightly underpowered to test this interaction, and future studies may wish to further examine this important issue.

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Highlights

- Secondary psychopathy, not primary psychopathy, is related to risky decision-making
- Impulsivity does not moderate the psychopathy/decision-making relationship
- Findings add to the divergent correlates of primary and secondary psychopathy

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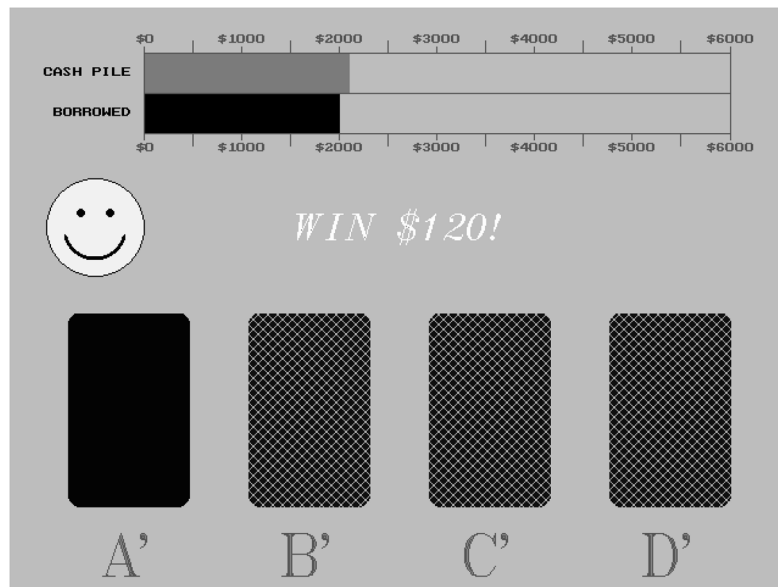


Figure 1.

Depiction of the Iowa Gambling Task (IGT).

Note: On each trial, participants select one of the card decks (A, B, C or D) to receive a win (adding to the “cash pile”) and/or a loss (adding to the “borrowed” row). Across trials, decks A and B produce large wins but even larger losses (thus are risky and produce net losses), while decks C and D produce small wins but even smaller losses (thus providing net gains).

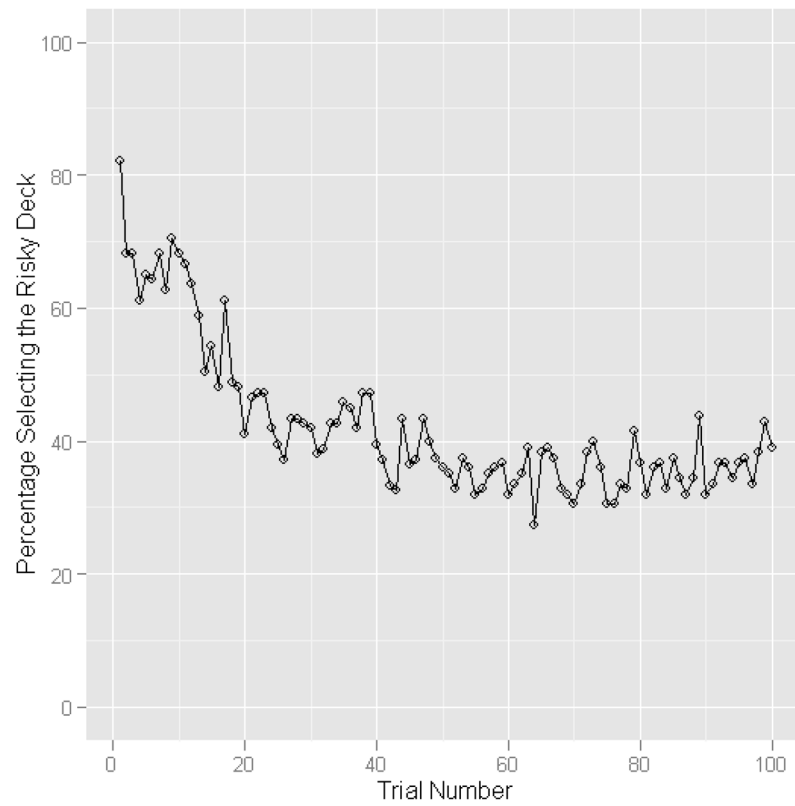


Figure 2. The percentages of study participants who made a risky deck selection on each trial of the Iowa Gambling Task (IGT).

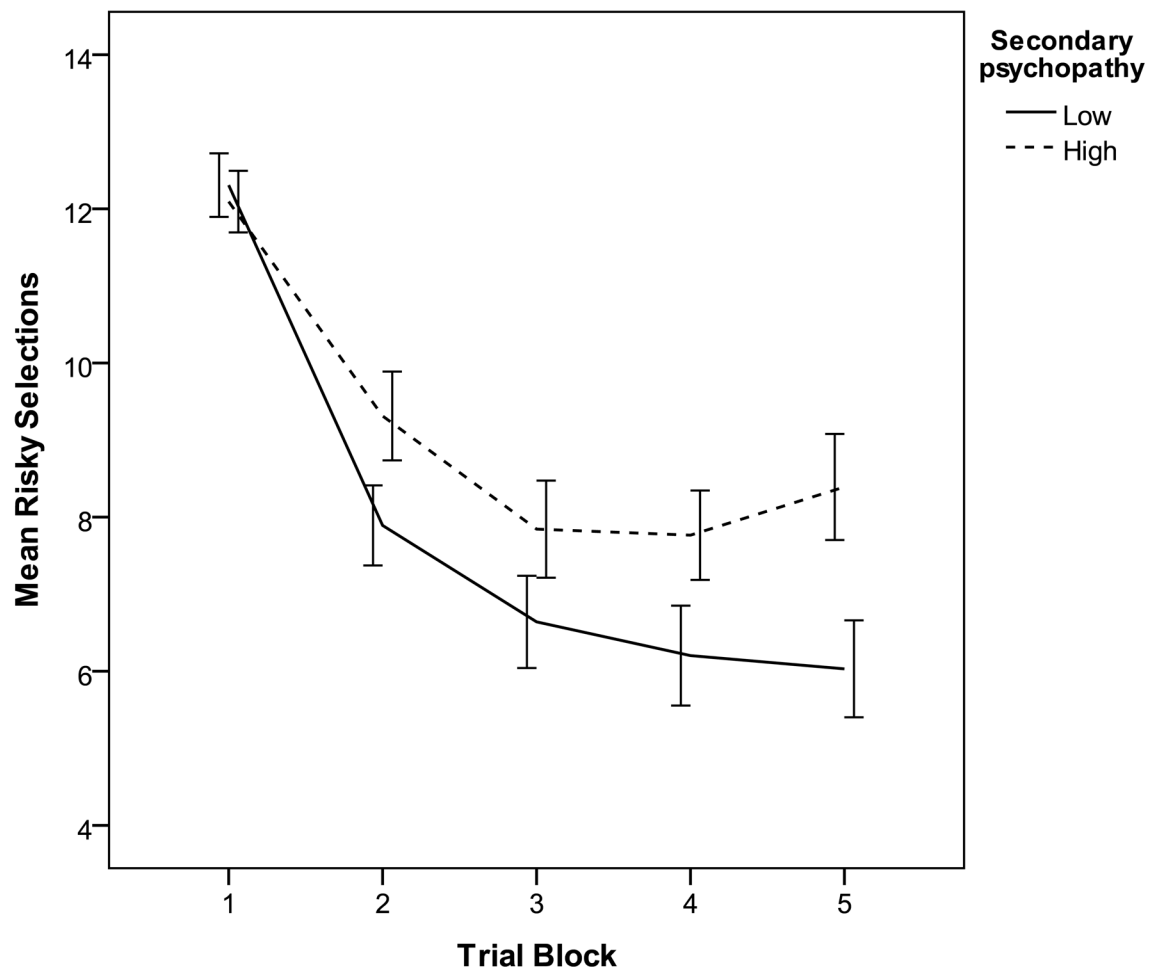


Figure 3. Mean risky deck selections across blocks (20 trials each) of the Iowa Gambling Test (IGT) for individuals with high and low levels of secondary psychopathy, as defined by median split on the Levenson Secondary Psychopathy Scale. Error bars represent $-1/+1$ SEM. In regression analyses, secondary psychopathy was not significantly related to risky selections averaged across trial blocks 1 and 2 ($p > .05$), but was positively related to risky selections averaged across blocks 3 through 5 ($p = .024$).

Table 1

Participant demographic characteristics

Sample size	129
Age (mean, SD)	19.4 ± 1.7
Age (range)	18–27
Ethnicity	
Caucasian	74
African Am.	51
Other	4
Gender	
Male	39
Female	90
Primary psychopathy (mean, SD)	30.1 ± 6.9
Secondary psychopathy (mean, SD)	19.9 ± 4.7
Impulsiveness score (mean, SD)	63.1 ± 10.2

Note: Psychopathy = Levenson's Primary and Secondary Psychopath Scale; Impulsiveness = Barratt Impulsiveness Scale.