Probing the Link between Narcissism and Gambling: The Mediating Role of Judgment and Decision-Making Biases

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ABSTRACT

In this paper, three studies link narcissism to gambling in general, and gambling-related problems in particular, and the predictive link is shown to be mediated by judgment and decision processes. In Study 1, we demonstrate that narcissism relates to greater self-reported gambling frequency and gambling-related monetary expenditures in two samples. We extend these initial findings in Study 2 by showing that narcissism predicts higher reports of gambling-related pathology, as measured with a DSM-IV-based pathological gambling (PG) screen. Finally, we demonstrate in Study 3 that the link between gambling pathology and narcissism is partially mediated by narcissists' overconfidence, heightened risk acceptance, and myopic focus on reward, as measured by participants' behavioral performance on the Georgia Gambling Task (GGT) and Iowa Gambling Task (IGT). Discussion focuses on the empirical validation of the long-assumed narcissism–gambling link, the decision processes that underlie this link, and relations between narcissists' self-perceptions and their self-defeating behavior, especially in risk-relevant contexts. Copyright © 2007 John Wiley & Sons, Ltd.

KEY WORDS   narcissism; gambling; overconfidence; risk-taking; Georgia Gambling Task; Iowa Gambling Task

INTRODUCTION

Narcissism, gambling, and the disordered risk-taking behaviors associated with pathological gambling (PG) have long been theoretically linked, especially in the clinical literature. This theoretical linkage, however, has received mixed and inconsistent empirical support. The first purpose of this paper is to present evidence to support the widespread supposition that gambling behavior and gambling-related problems are associated with narcissism. A second purpose is to suggest a partial process model of the link between narcissism and the severity of gambling outcomes based on judgment and decision-making processes. In this model, an

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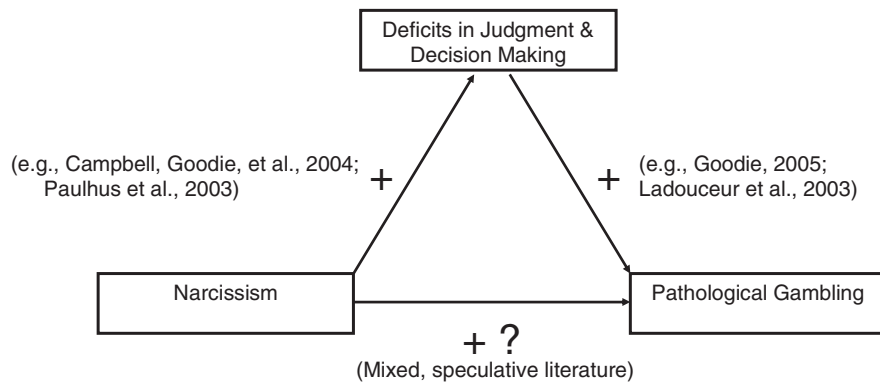E-mail: celakey@uga.edu

Figure 1. Proposed model taken from the state of the literature linking narcissism, deficits in judgment and decision-making, and gambling problems

association exists between narcissism and three judgment and decision tendencies: overconfidence, risk-taking as a function of confidence, and myopic focus on reward. Each of these tendencies, in turn, is linked to gambling problems. There is reason to predict that, should an association be established between narcissism and PG, it might be productively explained by biases inherent to narcissists' judgment and decision-making. The outlines of this model and some examples of its existing support are provided in Figure 1.

Before detailing the present studies that might substantiate this proposed model, we begin by defining narcissism. Next, we discuss gambling and PG, and thereafter provide a review of the literature concerning links between the constructs of narcissism and gambling. Finally, we describe how the possible relation between narcissism and gambling may be explained by these constructs' respective interrelations with deficits in judgment and decision-making.

Narcissism

Narcissism is a form of self-love that is inflated, perhaps untenable and vulnerable, and thus grandiose. It comprises three major components that distinguish it from general high self-esteem (cf. Campbell, Rudich, & Sedikides, 2002). First, narcissists (i.e., individuals with relatively high levels of trait narcissism) possess an overly positive self-concept (Morf & Rhodewalt, 2001; Rose, 2002), leading to beliefs that they are better or more effective on various measurable dimensions than they actually are (e.g., Gabriel, Critelli, & Ee, 1994; John & Robins, 1994). This propensity toward the better-than-average effect, and the chronic ego-involvement that accompanies it, is especially evident on traits reflecting agency, such as status, importance, intelligence, and physical attractiveness (Campbell et al., 2002; Campbell, Bosson, Goheen, Lakey, & Kernis, 2007; Morf, Weir, & Davidov, 2000). For example, narcissists' positive self-views generally reflect feelings of inherent personal uniqueness or specialness (Emmons, 1984) and entitlement (Campbell, Bonacci, Shelton, Exline, & Bushman, 2004). Second, narcissism is associated with lower levels of interpersonal warmth or intimacy. This can be seen in narcissists' lower scores on the need for intimacy and affiliation (Carroll, 1987), lower self-views on communal traits (Campbell et al., 2002, 2007), lower levels of relational commitment (Campbell & Foster, 2002) and agreeableness (Miller & Campbell, 2007), tendencies toward dominance (Bradlee & Emmons, 1992; Brown & Zeigler-Hill, 2004) and Machiavellianism (McHoskey, 1995), and their willingness to exploit others for personal gain (Campbell, Bush, Brunell, & Shelton, 2005).

Third, narcissists display a range of self-regulation efforts aimed at bolstering their positive self-view. Some of these self-regulatory strategies are interpersonal in nature. For example, narcissists strive to gain attention (Buss & Chiodo, 1991) and to appear entertaining, colorful and extraverted (Paulhus, 1998). They want to associate with other individuals who have high social status (Campbell, 1999) and attain public glory for their successful performances (Wallace & Baumeister, 2002). Not surprisingly, when these performances are not successful, narcissists deny personal responsibility and instead, attribute blame to others or their situation for their failures (Campbell, Reeder, Sedikides, & Elliot, 2000; Gosling, John, Craik, & Robins, 1998; John & Robins, 1994). Other such efforts are more intrapersonal. For example, narcissists' fantasy lives include visions of fame and dominance (Raskin & Novacek, 1991), and they are likely to self-aggrandize successes while downplaying failures (e.g., Farwell & Wohlwend-Lloyd, 1998; Rhodewalt & Morf, 1998). Although many early psychoanalytic theories (e.g., Freud, 1914/1949; Kernberg, 1975; Kohut, 1977) posited narcissism as stemming from cold and dismissive parenting, recent empirical evidence (e.g., Ottway & Vignoles, 2006; Twenge, Konrath, Foster, Campbell, & Bushman, 2007) suggests that trait narcissism also is linked to parental overvaluation, excessive praise, and even broader cultural changes.

Gambling

Gambling has existed since antiquity, but gambling activity appears to have expanded greatly in the past 30 years with gambling-related tax revenues in the US growing 16-fold between 1976 and 1997 (National Gambling Impact Study Commission, 1999). This expansion has been attributed to a number of factors, including, for example, efforts by governments to increase revenue through gambling, the expansion of tourism opportunities that involve gambling, and the availability of new technologies, such as children's video game machines and the Internet, that may serve to propagate future gambling activity (Griffiths & Wood, 2000; Korn & Shaffer, 1999). It seems the gambling industry provides unprecedented access to gambling opportunities, as evidenced by the ever-increasing number of state supported lotteries, Internet gambling sites, and gambling-related television programming and advertisements. Moreover, despite legal age restrictions, underage participants have relatively easy access to Internet gambling sites, or even opportunities to play the lottery (Felsher, Derevensky, & Gupta, 2004). The steady increase in gambling activity has led to a corresponding increase in research interest in the topic. Researchers, however, have demonstrated that gambling activity does not necessarily lead to gambling-related problems for all individuals; indeed, many people gamble only as a means of entertainment without experiencing gambling-related ills (Neighbors & Larimer, 2004). For others, however, extensive evidence supports the conclusion that gambling can lead to a variety of intra- and interpersonal problems, and this is the essence of PG.

PG is a clinical condition characterized by continual engagement in maladaptive gambling behaviors, even in the face of pernicious personal consequences (American Psychiatric Association, 2000). Symptoms of PG include preoccupation with gambling, needing to gamble with increasing amounts of money to achieve the desired excitement, unsuccessful efforts to control or reduce gambling, restlessness or irritability when attempting to reduce gambling, lying to conceal gambling involvement, 'chasing' losses (i.e., gambling with the explicit purpose of wining back prior losses), and exploiting others or engaging in illegal activities to finance gambling experiences or alleviate gambling-related financial harms. Five out of 10 such criteria are required for the diagnosis (APA, 2000). The prevalence of clinically significant PG in the US is estimated generally to be between 1 and 3% (e.g., APA, 2000; Volberg, 1994; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2002). The APA classifies PG as an impulse control disorder; however, evidence suggests that high degrees of judgmental biases and intemperate risk-attitudes characterize many individuals with PG, and that these contribute to the development and maintenance of gambling behavior and gambling-related problems, including those noted to be particularly reminiscent of addictive disorders (Bechara, 2003; Ladouceur, 2004; Ladouceur & Walker, 1996; Petry, 2001, 2005; Toneatto, 1999). For example, the need to gamble with increasing amounts of money is equivalent to tolerance, and the irritability gamblers experience when

attempting to reduce gambling is comparable to withdrawal symptoms. Accordingly, prominent treatment approaches have been modeled on those applied to addictive disorders, such as 12-step Gamblers Anonymous programs and cognitive-behavioral therapies (Petry, 2005). With the range of deleterious consequences that accompany PG, and the recent expansion of opportunities for individuals to gamble (e.g., Internet gambling sites), it is important to understand specific individual difference variables such as narcissism that might undermine adaptive decision-making and thereby promote severe gambling outcomes.

The association between narcissism and gambling

Clinical scholarship on gambling, and especially PG, has long asserted, and theorized about, the role of narcissism in gambling pathology. For example, several researchers have concluded on the basis of clinical observation that narcissism, particularly in the form of narcissistic personality disorder (NPD), is closely related to gambling pathology (e.g., Livingston, 1974; Rosenthal, 1986; Taber & Chaplin, 1988). Indeed, NPD is included in the DSM-IV as a disorder associated with PG (APA, 2000), and in developing and updating the PG diagnostic criteria for inclusion in the DSM-IV, Lesieur and Rosenthal (1991) noted that pathological gamblers often display a narcissistic personality organization, and as a group show 'possibly high incidence of narcissistic personality disorder' (p. 28). Moreover, researchers have demonstrated that certain individual difference traits that characterize narcissism, including an especially high degree of egotism (e.g., Morf et al., 2000) and impulsivity, particularly in the form of tendencies for sensation-seeking and reward sensitivity (e.g., Rose & Campbell, 2004),[1] also relate to gambling involvement and gambling-related problems (e.g., Blaszczynski, Steel, & McConaghy, 1997; Breen & Zuckerman, 1999; Coventry & Constable, 1999; Kuley & Jacobs, 1988; McCormick & Taber, 1987).

Despite the theoretical interest in the association between narcissism and PG, however, the empirical data on the matter are mixed, with some researchers documenting higher rates of NPD among pathological gamblers (e.g., Blaszczynski & Steel, 1998) and others finding no association (e.g., Specker, Carlson, Edmonson, Johnson, & Marcotte, 1996). A review of the psychiatric symptoms associated with PG (Crockford & el-Guebaly, 1998) noted that there is a surprising lack of research findings documenting a link between narcissism and PG. Part of the difficulty in establishing such an empirical link between narcissism and PG might be attributable to the operationalization of narcissism as meeting NPD diagnostic criteria, which carries two particular difficulties. First, the DSM-IV estimates the base rate of NPD at less than 1%, and the base rate of PG at 1–3%. Hence, even if every individual with NPD also had PG, NPD could only account for a fraction of PG cases. Second, like personality disorders as a class, the NPD diagnosis is burdened by issues of reliability and specificity, although this has improved with changes in the DSM (e.g., Holdwick, Hilsenroth, Castlebury, & Blais, 1998).

One goal of this research is to obtain a clear assessment of the link between narcissism, gambling behavior, and gambling pathology. We conceptualize and operationally measure narcissism as an individual difference variable that varies by degree rather than as a disorder with a low base rate, dichotomous classification (i.e., NPD). One advantage of this approach is that narcissism, as an individual difference variable, falls on a continuous scale without categorical cut points (Foster & Campbell, 2007). This permits a far greater likelihood of detecting a narcissism–gambling link. A second advantage is that this approach allows for the integration of research on narcissism and gambling into the burgeoning body of research on narcissism,

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[1] Recent theory and research suggest that the construct of impulsivity is heterogeneous and can manifest in different forms. For example, one manifestation of impulsivity reflects low inhibitory self-control (i.e., disinhibition), which is perhaps the view most classically associated with impulsivity. Another manifestation of impulsivity reflects tendencies for sensation seeking as a function of general reward sensitivity (i.e., decisions guided by the prospect of immediate reward). For greater detail regarding the distinction concerning the heterogeneity of impulsivity, see, for example, Crone, Vendel, and van der Molen (2003), Farmer and Nelson-Gray (1995), Franken and Muris (2005), Lynam, Smith, Whiteside, and Cyders (2006), Lynam and Widiger (2001), as well as Quilty and Oakman (2004).

judgment and decision-making biases (Campbell, Goodie, & Foster, 2004), and self-defeating behavior (for a review see Morf & Rhodewalt, 2001). The primary disadvantage of this approach is that, while it facilitates theoretical statements about narcissism, it clearly limits clinical conclusions regarding NPD. Nonetheless, the individual difference variable of narcissism shares many of the most central characteristics of NPD, such as grandiosity (Miller & Campbell, 2007; Prifitera & Ryan, 1984), but occurs in a relatively dimensional and normally distributed manner across the population (Foster & Campbell, 2007).

Decision processes and the link between narcissism and PG

Extensive empirical evidence supports the links between deficits in judgment and decision-making and PG. For example, cognitive biases, such as illusory beliefs concerning control over chance occurrences, or other erroneous perceptions, such as the belief that luck, perseverance, or both will eventually lead to positive gambling outcomes, occur especially frequently among problem gamblers, and are pivotal in determining the severity of gambling outcomes (Baboushkin, Hardoon, Derevensky, & Gupta, 2001; Bechara, 2003; Goodie, 2005; Ladouceur, 2004; Ladouceur, Sylvain, Boutain, Lachance, Doucet, & Leblond, 2003; Lakey, Goodie, & Campbell, 2007; Petry, 2005; Raylu & Oei, 2002; Steenbergh, Meyers, May, & Whelan, 2002; Toneatto, 1999; Toneatto & Ladouceur, 2003; Toneatto & Millar, 2004; Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997). In particular, PG relates to biases of judgment and decision-making reflected in the Georgia Gambling Task (GGT; Goodie, 2003), which measures overconfidence and risk acceptance as a function of confidence, and the Iowa Gambling Task (IGT; Bechara, Damasio, Damasio, & Anderson, 1994), which measures myopic focus on reward reflecting a general insensitivity for future consequences. For example, Lakey, Goodie, and Campbell (2007) found that among frequent poker and other card players, poorer performance on these two tasks related to more severe gambling outcomes as indicated by higher reports of PG. Moreover, individuals who opted for the risky decks on the IGT also exhibited greater overconfidence and a higher willingness to accept bets, and ultimately earned fewer points on the GGT.

In part because of narcissists' inflated self-views and related self-regulation efforts, narcissism also is accompanied by various deficits in decision-making. Specifically, research suggests that narcissists exhibit at least two characteristics that are pertinent to biases of judgment and potential risk-taking behaviors that may contribute to the development of PG. First, narcissists' judgments are skewed in the direction of inflated beliefs regarding their abilities. For example, researchers have shown that narcissists overestimate their future grades (Farwell & Wohlwend-Lloyd, 1998), and that narcissism relates with the overclaiming bias, such that narcissists report more knowledge than they actually have (Paulhus, Harms, Bruce, & Lysy, 2003). Likewise, in research using the GGT, Campbell, Goodie et al. (2004) demonstrated that narcissists overestimate their ability to answer general knowledge questions, which translates to dispositional overconfidence. This overconfidence predicts risk-taking such that narcissists, relative to non-narcissists, make large bets based on their knowledge and, in a fair betting situation, underperform in the bottom-line sense of earning fewer points. Furthermore, Campbell, Goodie et al. (2004) found that narcissists indicated that they would perform better than others on the task prior to completing it, and even after objectively performing worse than non-narcissists, narcissists reported that they would outperform others on a similar task in the future.

Second, narcissists' decisions often reflect their markedly strong approach orientation, sensitivity to reward, and disinhibition. Indeed, Rose and Campbell (2004) reviewed a variety of evidence suggesting that narcissism is associated with a motivational orientation toward high-yield and immediate gains, such as those brought forth from environmental stimuli that may prove affectively pleasing or that may satiate some appetitive desire. For example, narcissists bear especially strong proclivities for sensation-seeking behaviors (Emmons, 1981), excessive spending practices (Rose, 2007), excessive alcohol use and abuse (Luhtanen & Crocker, 2005), sexual infidelity (Buss & Shackelford, 1997) and promiscuity (Foster, Shrira, & Campbell, 2006), and zeal toward extrinsic aspirations such as financial success (Kasser & Ryan, 1996). In related

research, Campbell et al. (2005) employed a Tragedy of the Commons paradigm, and found that, when compared to non-narcissists, narcissists harvested more community resources in early rounds, and depleted the resources more rapidly in subsequent rounds, even when such behavior yielded negative long-term consequences for both the individual and the community. These lines of evidence concerning narcissists' motivations toward immediate, short-term gains suggest that narcissists might also display a myopic focus on reward as measured with the IGT. Moreover, when taken together, the available evidence suggests that in the face of goal impediments and maladaptive consequences, narcissists persist in their goal pursuits as a function of their inflated self-beliefs and reward sensitivity, even when such risk-taking is counter-productive. This has clear implications for their gambling behavior, and especially for the extent to which their gambling activities might result in PG.

The present studies

In the present research, we examined the relationships between narcissism and both gambling frequency and gambling-related pathology, as well as the link between narcissism and the judgment and decision processes that contribute to gambling pathology. Study 1 examined the link between narcissism and self-reports of gambling frequency and the amount of money spent gambling. In Study 2, we tested the association of narcissism with gambling-related pathology using a sample of frequent gamblers. Finally, in Study 3, we examined the extent to which overconfidence, risk-taking, and myopic focus on reward mediate the link between narcissism and PG. Given the longstanding clinical observation of an association between narcissism and PG, as well as the personality research linking narcissism to self-defeating behaviors and poor decision-making across manifold domains, we hypothesized that, when compared to their non-narcissistic counterparts, narcissists would gamble more frequently and spend greater amounts of money gambling (Study 1) and evince greater gambling-related pathology among frequent gamblers, even when controlling for gambling frequency (Study 2). Furthermore, we predicted that narcissists' biased cognitive processes of judgment and decision-making would partially account for the higher levels of PG (Study 3).

STUDY 1: NARCISSISM AND GAMBLING ACTIVITY

The purpose of Study 1 was to assess the link between narcissism and frequency of gambling and amount spent gambling. Data were collected from two samples of participants using slightly different assessment methods. Given existing evidence that individuals with high self-esteem may be more prone to risk-taking than those with low self-esteem (Baumeister, 1997; Baumeister, Heatherton, & Tice, 1993; Josephs, Larrick, Steele, & Nisbett, 1992; Larrick, 1993), and demonstrations of the importance of controlling for self-esteem when examining narcissism (e.g., Campbell et al. 2002), where applicable, we isolate the effects of narcissism by controlling for self-esteem in analyses.

METHOD

Participants

Two samples of undergraduates were recruited from the research participant pool at Union College. Participants received credit toward partial fulfillment of their course research requirement. In *Sample A*, 102 individuals (58 female) participated. Ages ranged from 18 to 37 ($M = 20.16$, $SD = 2.89$). In *Sample B*, 174 individuals (84 female) participated. Ages ranged from 18 to 23 ($M = 19.46$, $SD = 1.30$). After providing informed consent, participants in both samples completed questionnaire packets that included a measure of narcissism, self-esteem, and questions concerning their gambling involvement.

Measures and procedure
Sample A
Sample A completed the 37-item, true–false version of the Narcissistic Personality Inventory (NPI; Rhodewalt & Morf, 1995), a well-validated measure of individual differences in narcissism that is suitable for non-clinical populations. Scores to the 37 items (e.g., *I know that I am good because everyone keeps telling me so.*) were summed so that higher scores reflect greater narcissism. Participants also completed the Rosenberg (1965) Self-Esteem Scale (RSES), a well-validated measure of global feelings of self-worth (Blascovich & Tomaka, 1991). Participants responded to the 10 RSES items (e.g., *On the whole, I am satisfied with myself.*) using a five-point Likert-scale (1 = *strongly disagree*, 5 = *strongly agree*). Scores were summed so that higher totals reflect higher self-esteem.

Because this study focused on gambling frequency rather than pathology, we used a measure developed through pilot testing to assess reported gambling frequency and the amount of money spent on gambling in the last 6 months. The questionnaire was designed to assess gambling activities previously found to be common within this student population and was pilot tested for clarity and comprehensiveness. Participants reported how many times in the last 6 months they had: bet on games of personal skill, sporting events, or dares; played games of chance for money in formal gambling establishments, outside of formal gambling establishments, or on gambling web sites; bought lottery or raffle tickets; and participated in gambling activities not otherwise specified. (The final question captured rare forms of gambling not identified in pilot research.) Participants also reported the total amount of money they had spent or bet in the last 6 months on each of these activities. The instructions provided examples of each activity and emphasized that no single activity or expenditure should be counted in more than one category. We computed a reported gambling frequency score (*Frequency*) by adding the total number of times participants reported engaging in these activities, and we computed a reported gambling amount score (*Amount*) by adding the total amount participants reported spending on these activities.

Sample B
Sample B participants completed the 40-item forced-choice version of the NPI (Raskin & Terry, 1988), which is a well-validated measure of trait narcissism. Sample B participants also completed a revised version of the gambling measure used in Sample A. This revised version assessed only the amount of money participants reported spending (*Amount*) on each of the gambling activities described above because the Sample A data revealed that frequency was largely redundant with amount spent ($r = .85$). The revised questionnaire administered to Sample B also included a question about the amount of income participants reported earning (*Income*) in the last 6 months. In light of the fact that individuals with greater income have more money with which to gamble, we added this variable to control statistically for income when predicting the amount gambled (cf. Neighbors, Lostutter, Larimer, & Takushi, 2002).

RESULTS AND BRIEF DISCUSSION

Descriptive statistics
Sample A
The mean on the 37-item version of the NPI was 18.86 ($SD = 6.47$). The mean for the RSES was 40.51 ($SD = 6.03$). Participants reported gambling a mean number of 8.36 times ($SD = 17.02$; range = 0–110; Mdn = 2.50) in the last 6 months. They also reported spending US \$86.87 ($SD = 222.94$; range = 0–1210; Mdn = 10.00) on gambling in the last 6 months.

Sample B

The mean score on the 40-item version of the NPI was 17.41 ($SD = 6.13$). The participants in this sample reported spending US \$126.68 ($SD = 319.53$; range $= 0$–2642; Mdn $= 20.00$) on gambling in the last 6 months, while earning US \$1590.09 ($SD = 1581$; range $= 0$–10 000; Mdn $= 1200.00$) over the same period.

The measures of reported Frequency, Amount, and Income in both Samples did not have an inherently restricted range, and not surprisingly, this resulted in strongly positively skewed (L-shaped) data (all ps $< .001$ using Kolmogorov–Smirnov tests of non-normality). Accordingly, prior to the analyses reported below, we subjected Frequency, Amount, and Income to an inverse transformation (Tabachnik & Fidell, 1996). Transformed scores were then multiplied by -1 to ensure that larger numbers represented larger amounts.

Primary analyses

Sample A

Consistent with the hypotheses, narcissism positively related to both reported Frequency of gambling ($r = .26$, $p < .05$) and Amount gambled in the last 6 months ($r = .25$, $p < .05$). Consistent with past research (e.g., Campbell et al., 2002), NPI and RSES scores positively correlated ($r = .22$, $p < .05$). However, neither Frequency nor Amount correlated with RSES (ps $> .69$). We expected the relations between narcissism, Frequency, and Amount to remain significant when self-esteem was controlled. As hypothesized, in a hierarchical regression in which RSES was entered at the first block and NPI was entered at the second, NPI scores significantly predicted Frequency ($\beta = .25$, $t = 2.34$, $p < .05$), even when controlling for RSES. In a similar hierarchical regression using Amount as the dependent variable, NPI scores also significantly predicted Amount ($\beta = .23$, $t = 2.20$, $p < .05$), even when controlling for RSES.

Sample B

Consistent with the hypotheses, narcissism positively related to the reported Amount gambled in the last 6 months ($r = .22$, $p < .01$). We expected the relation between narcissism and gambling Amount to remain significant when Income was controlled. To test this possibility, we hierarchically regressed Amount onto Income (first block) and NPI (second block). As predicted, NPI scores remained a significant predictor of Amount ($\beta = .23$, $t = 2.98$, $p < .01$), even when controlling for reported Income.

The combined results of Study 1 establish that narcissism predicts the frequency with which individuals gamble and the amount of money spent while gambling. Moreover, these results demonstrate that these relationships are independent of self-esteem and income.[2]

STUDY 2: NARCISSISM AND GAMBLING PATHOLOGY

Given that narcissists' higher reports of gambling activity may not inevitably translate into greater gambling-related problems resulting from these activities (Neighbors & Larimer, 2004), it was important to

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[2]The gambling means in Studies 1 and 2 should be cautiously interpreted because participants were asked to recall retrospectively their behavior over a 6 month period and were free to interpret the 'how many times' and 'how much spent' questions as they saw fit (cf. Blaszczynski, Dumlao, & Lange, 1997). Moreover, and as pointed out by a reviewer, we did not collect data concerning the amount of money *lost* from gambling endeavors, which would have provided other useful information concerning the detrimental effects that might arise among narcissists. Nevertheless, the aim of these studies was to reveal associations (not averages) and the fact that significant associations emerged suggests that participants responded to the measures in a reasonably accurate way to reveal their relative standing on these variables.

examine narcissism in relation to both gambling activity and the severity of gambling outcomes, such as those exhibited in gambling pathology. Accordingly, in Study 2 we sought evidence regarding whether narcissists evince more gambling pathology than non-narcissists. In order to obtain a robust sample of individuals with active gambling-related pathology and thereby increase the ecological validity of the research, we recruited self-described frequent gamblers.

METHOD

Participants

Undergraduate participants ($N = 182$, including 59 females) from the Psychology research pool at the University of Georgia completed this study for partial fulfillment of their course research requirement. Ages ranged from 18 to 23 years ($M = 19.43$; $SD = 1.24$). They responded to a recruiting notice seeking participants who gamble at least weekly. This recruiting method increased the representation of active problem and pathological gamblers in the sample, but it carried the risk of lowering the correlations with narcissism by restricting variance.

Measures and procedure

After providing informed consent, all participants completed a basic demographic questionnaire asking for their age and gender, followed by measures to assess narcissism (the 40-item ipsative version of the NPI) and trait self-esteem (the RSES). All measures were computer-administered. After the completion of these three measures, all participants completed the Diagnostic Interview for Gambling Severity (DIGS; Winters, Specker, & Stinchfield, 2002).

The DIGS is a well-validated PG screen designed to assess individuals' gambling involvement and the severity of gambling outcomes with questions that correspond directly with the 10 DSM-IV criteria. Specifically, the DIGS includes two questions relating to each DSM-IV criterion. For example, one of the questions concerning the chasing criterion is, *When you had a large gambling debt, did you gamble more and more frequently in the hopes of winning back your money?*, while one question designed to assess the extent to which an individual has relied on others to relieve gambling-related financial burdens is, *Have you had to approach other people and ask them to lend you money because of your financial problems due to gambling?*. Participants respond to questions with one of three response options (*Very True*, *Somewhat True*, or *False*). Exploratory (Stinchfield, Govoni, & Frisch, 2005; Winters et al., 2002) and confirmatory (Lakey, Goodie, Lance, Stinchfield, & Winters, 2007) factor analyses support that the DSM-IV PG criteria assessed by the DIGS are distinct but interrelated, and that these interrelationships are dependent upon an overarching PG factor. Accordingly, we added one point to the total score for a response of *Very True* or *Somewhat True* for either or both of the two questions referencing a particular DSM-IV criterion. Possible scores ranged from 0 to 10, with higher summed values reflecting more severe gambling pathology.

The DIGS also includes questions concerning the frequency with which participants engage in gambling via 11 specific gambling modalities (e.g., *Bowled, shot pool, or played golf for money?*). These items reference participation in the past year, and responses are made on a five-point scale (ranging from *Never* to *Daily*). We summed these responses such that higher totals reflect greater frequency of overall gambling activity. Because these reports of Frequency, unlike those in Study 1, were constrained by the use of a Likert-type reporting format, we did not transform the scores in the following analyses.

<div align="center">RESULTS AND BRIEF DISCUSSION</div>

Descriptive statistics

The mean score on the NPI was 18.39 ($SD = 7.28$). The mean score on the RSES was 39.62 ($SD = 5.78$). As before, NPI and RSES scores correlated with each other ($r = .33$, $p < .01$), such that higher scores of narcissism related to higher self-esteem. Also as in Study 1, Frequency correlated positively with NPI ($r = .15$, $p < .05$), but not with RSES ($p > .85$). One hundred twenty-six participants (69.2%) scored 0–4 on the DIGS, indicating non-PG; the remaining 56 participants (30.8%) scored 5 or higher, indicating PG (Winters et al., 2002). Participants also reported a mean of 92.66 ($SD = 135.82$) gambling experiences in the previous year. Hence, we obtained a robust range of degrees of active gambling involvement and gambling problems. However, because we deliberately sought frequent gamblers, we cannot infer prevalence rates from our observed pathology distribution.

Primary analyses

Consistent with our hypotheses, narcissism significantly related to DIGS ($r = .26$, $p < .01$), as did Frequency ($r = .23$, $p < .01$). RSES, however, did not significantly correlate with DIGS ($p > .48$). Most importantly, we expected the relation between NPI and DIGS scores to remain significant even when controlling for RSES and Frequency. We tested this possibility by hierarchically regressing DIGS onto the covariates, RSES and Frequency, and then in a model including NPI scores. As hypothesized, narcissism significantly predicted DIGS ($\beta = .26$, $t = 3.26$, $p < .01$), even with RSES and Frequency in the model. The effect of Frequency was also significant ($\beta = .18$, $t = 2.59$, $p < .01$), while the effect of RSES was statistically non-significant ($p > .24$).

Building on Study 1, the results of Study 2 demonstrate that narcissism does, in fact, predict higher degrees of gambling-related pathology among frequent gamblers. This association was independent of gambling frequency and self-esteem. As such, these results provide empirical evidence to support clinical intuitions concerning the link between narcissism and PG.

<div align="center">STUDY 3: NARCISSISM, PG, AND THE ROLE OF JUDGMENT
AND DECISION-MAKING BIASES</div>

The reliable associations between narcissism and gambling frequency and amount (Study 1), and between narcissism, gambling frequency, and gambling pathology (Study 2) raise important questions about the processes that drive these relations and that may contribute to heightened reports of gambling-related pathology. We propose that narcissists' judgment and decision-making biases may contribute to their heightened reports of PG. Previous scholarship has indeed supported the notion that judgment and decisional biases contribute to PG as a whole. As noted earlier, illusory beliefs regarding, for example, control over chance occurrences are more common among problem gamblers, which contributes substantially to the severity of gambling outcomes (Ladouceur et al., 2003). In particular, biases of judgment and decision-making that are reflected in the GGT (Goodie, 2003), which measures overconfidence and risk acceptance, and the IGT (Bechara et al., 1994), which measures myopic focus on reward, have demonstrated relevance in their associations with PG (Bechara, 2003; Goodie, 2005; Lakey, Goodie, & Campbell, 2007). Campbell, Goodie, et al. (2004) also provide evidence that narcissism positively relates to judgment and decision-making deficits. Specifically, Campbell et al. demonstrate that when compared to individuals low in narcissism, narcissists are more overconfident, accept more bets, and consequently earn fewer points on the GGT. They also have poor meta-knowledge, falsely believing that they perform better than others and will outperform others in the future (Campbell, Goodie, et al., 2004). Moreover, given narcissists' especially

strong reward sensitivity (Rose & Campbell, 2004), there is reason to believe that they will demonstrate a behavioral tendency for maintaining an indiscriminate focus on reward in the IGT.

The GGT (Goodie, 2003) begins with an assessment of confidence calibration. Participants answer two-alternative multiple-choice trivia questions and assess their confidence in each answer on a scale from 50 to 100%, such that, for example, among answers in which one expresses 80% confidence, 80 out of 100 should turn out to be correct. If this is achieved, the average confidence assessed over all trials equals the proportion of questions answered correctly. Subsequent to answering all of the questions, participants are offered a bet on each answer that is fair (having zero average value) if confidence is well calibrated (confidence equal to accuracy), negatively valued if they are overconfident (confidence greater than accuracy), and positively valued if they are underconfident (confidence less than accuracy). Generally, participants are overconfident, with the consequence that accepting bets systematically results in negative point totals. Empirical research has demonstrated that the overconfidence bias and proclivities for bet acceptance assessed in the GGT relate positively to both real-world gambling (Goodie, 2005) and narcissism (Campbell, Goodie, et al., 2004).

The IGT assesses another decisional bias, namely, risk acceptance as a function of myopic focus on potential gain to the exclusion of objective recognition of potential loss. The IGT is a contingency card choice task in which, over 100 trials (i.e., five 20-trial blocks), participants choose from among four simulated decks of cards that offer various schedules of reward and punishment in an effort to gain as much simulated money as possible. Two decks provide large immediate gains, but these are sometimes coupled with even larger losses, resulting in a negative expected value. Conversely, the safer, more advantageous decks provide smaller immediate gains that intermittently are combined with even smaller losses, and therefore have a positive expected value. Performance on this task is contingent upon learning these reward and loss patterns and enacting behaviors that minimize risk and maximize reward. Initially, Bechara et al. (1994; see also Bechara, 2003; Bechara, Damasio, & Damasio, 2000; Bechara, Tranel, & Damasio, 2000) designed the IGT to observe maladaptive behavioral choices evidenced by patients with damage to their ventromedial prefrontal cortex, who, despite generally intact intellectual abilities, displayed decision-making impairments such as behaving abnormally in relation to social norms and conventions. This area of the prefrontal cortex allows for successful somatic feedback resulting from a large loss, which among non-lesioned participants generally serves to preclude future behaviors that would elicit similar aversive responses. Accordingly, whereas non-lesioned controls gradually shift to the more advantageous decks, lesioned patients persevere in choosing from the risky, disadvantageous decks throughout the course of the IGT and thereby fail to postpone their immediate gratification as a function of myopic focus on immediate reward. More recently, researchers have employed the use of the IGT, and its simulation of real-life decision-making under uncertainty with various reward and punishment contingencies, to capture a similar indiscriminate focus on reward among individuals demonstrating heightened propensities for risky behaviors, such as those with substance addiction disorders (e.g., Bechara & Damasio, 2002), HIV patients who contracted the disease through intravenous drug use or risky sexual behaviors (e.g., Hardy, Hinkin, Levine, Castellon, & Lam, 2006), and those high in general reward sensitivity (e.g., Franken & Muris, 2005).

Both the GGT and IGT are designed to assess individual differences in judgmental realism and risk-taking propensities that underlie both real-world gambling and other risky behaviors (Bechara, 2003; Bechara & Damasio, 2002; Goodie, 2005; Hardy et al., 2006; Yechiam, Busemeyer, Stout, & Bechara, 2005). Moreover, as noted earlier, recent research has demonstrated a relation between GGT performance, IGT performance, and PG among frequent poker players (Lakey, Goodie, & Campbell, 2007). Importantly, Lakey, Goodie, and Campbell's findings highlight the role of judgment and decision-making biases in PG, indicate that the GGT and IGT are distinct risk-taking paradigms with unique predictive utility for predicting gambling-related pathology, and further validate both the GGT and IGT as assessment tools capable of detecting individual differences in overconfidence and risk-willingness. To date, however, there has been no research documenting the links between narcissism, the judgmental biases assessed by performance on the GGT and

IGT, and PG. As such, in Study 3, we explored whether these judgment and decision-making biases may mediate the link between narcissism and gambling pathology.

METHOD

Participants

As in Study 2, participants ($N = 351$, of whom 101 were female) at UGA were recruited from the undergraduate research pool for partial fulfillment of their course research requirement. They responded to a recruiting notice seeking individuals who gamble frequently. Ages ranged from 18 to 25 years ($M = 19.27$; $SD = 1.27$).

Measures and procedures

After providing informed consent, all participants completed computer-administered versions of a basic demographic questionnaire, the NPI, RSES, and DIGS. Participants then completed the GGT and IGT in counterbalanced order across the participant set. To assess performance on the GGT, we used participants' overconfidence (GGT overconfidence) and the proportion of times they accepted bets based on their confidence (GGT bet acceptance) as the variables of interest. As the gage of performance on the IGT (i.e., risk-taking as a result of reward focus), we used the total number of times participants chose from the risky, disadvantageous decks over the course of 100 trials (IGT risk-taking). (See Goodie, 2003; and Bechara, Tranel, et al., 2000, respectively, for complete details of these tasks.)

RESULTS AND BRIEF DISCUSSION

Descriptive statistics

The mean narcissism score was 18.19 ($SD = 7.30$), and the mean RSES was 40.32 ($SD = 5.66$). NPI scores significantly correlated with RSES ($r = .29$, $p < .01$) as well as gambling frequency ($r = .18$, $p < .01$). Of the 351 participants, 240 (68.4%) scored 0–4 on the DIGS, indicating non-PG; the remaining 111 (31.6%) participants scored 5 or greater, indicating PG (Winters et al., 2002). Participants also reported gambling 124.79 times on average in the previous year ($SD = 149.92$). As such, again we were able to sample a broad spectrum of degrees of gambling involvement and gambling-related pathology. See Table 1 for the matrix of correlations among the relevant Study 3 variables.

Primary analyses

First, as hypothesized, and consistent with the results of Study 2, narcissism related to higher reports of PG ($r = .31$, $p < .01$). The correlation between Frequency and DIGS was again significant ($r = .37$, $p < .01$). The correlation between RSES and DIGS was .00. As a more stringent test of the relationship between NPI and DIGS scores, and to replicate the results of Study 2, we conducted a hierarchical regression analysis in which we regressed DIGS onto RSES and Frequency (block 1), and then in a model including NPI scores (block 2). As before, in this final model, NPI significantly predicted DIGS scores ($\beta = .33$, $t = 6.63$, $p < .01$), as did Frequency ($\beta = .32$, $t = 6.57$, $p < .01$), whereas RSES was again statistically non-significant ($p > .24$). As in Study 2, these findings indicate that narcissists exhibit significantly higher levels of gambling-related pathology, even when controlling for the frequency with which they gamble and self-esteem.

Next, we examined the association between narcissism and the proposed mediating variables, namely, participants' judgment and decision-making biases assessed by the GGT (i.e., overconfidence and bet

Table 1. Study 3 variable correlations and descriptive statistics

Measure	1	2	3	4	5	6	7	8	9	10	*M*	*SD*
1.NPI	—										18.19	7.30
2.RSES	.29**	—									40.32	5.66
3.DIGS	.31**	.00	—								3.68	2.50
4.GGT confidence	.14**	−.03	.17**	—							0.80	0.07
5.GGT accuracy	.06	−.01	−.04	.55**	—						0.73	0.08
6.GGT overconfidence	.20**	−.01	.20**	.28**	−.65**	—					0.06	0.07
7.GGT bet acceptance	.18**	−.01	.23**	.51**	.33**	.09†	—				0.64	0.16
8.GGT points	−.24**	−.03	−.25**	−.29**	.28**	−.59**	−.32**	—			−25 415	24 310
9.IGT risk-taking	.21**	.04	.24**	.04	−.11*	.17**	.17**	−.19**	—		43.48	17.31
10. Gambling frequency	.18**	−.04	.37**	.12*	.07	.03	.18**	−.04	.03	—	124.79	149.92

Note: N, 351; NPI, Narcissistic Personality Inventory; RSES, Rosenberg (1965) Self-Esteem Scale; DIGS, Diagnostic Interview for Gambling Severity; GGT, Georgia Gambling Task; IGT Risk-Taking, total risky decks chosen on IGT out of 100 trials.
†$p < .10$; *$p < .05$; **$p < .01$.

acceptance) and IGT (i.e., myopic focus on reward). As hypothesized, narcissism significantly related to poorer performance on the GGT. Specifically, higher scores on the NPI related to greater GGT overconfidence ($r = .20$, $p < .01$). Recall that overconfidence is the difference between confidence and accuracy, and the contributions of these elements to the link between narcissism and overconfidence can be assessed. Individuals higher in narcissism were more confident in their answers ($r = .14$, $p < .01$), but this confidence was not justified by greater accuracy ($p > .27$). Indeed, as depicted in Figure 2, narcissists revealed calibration curves consistently farther from the normative identity line where confidence equals accuracy. Narcissists also demonstrated greater GGT bet acceptance ($r = .18$, $p < .01$). As a consequence of being more overconfident and more risk-taking, narcissists also scored fewer points on the task ($r = −.24$, $p < .01$). These results replicate those of Campbell, Goodie et al. (2004).

Narcissism likewise related to poorer performance on the IGT. Specifically, more narcissistic individuals chose significantly more from the risky, disadvantageous decks than their less narcissistic counterparts ($r = .21$, $p < .01$), which demonstrates that narcissists' decisions are guided by the immediate prospect of
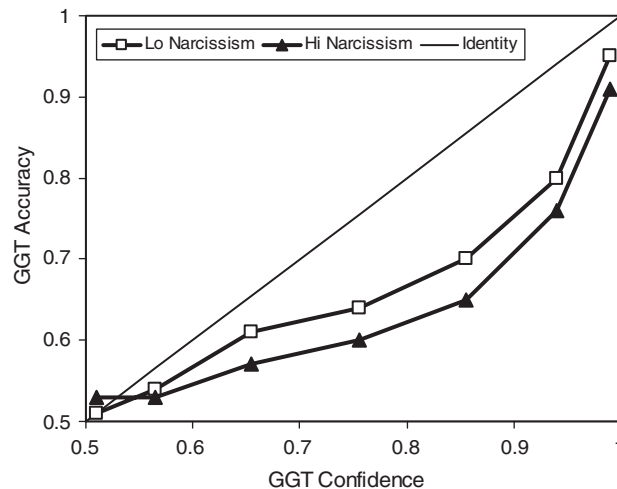

Figure 2. Results using a median split of high and low narcissism scores for GGT confidence calibration, showing accuracy as a function of confidence
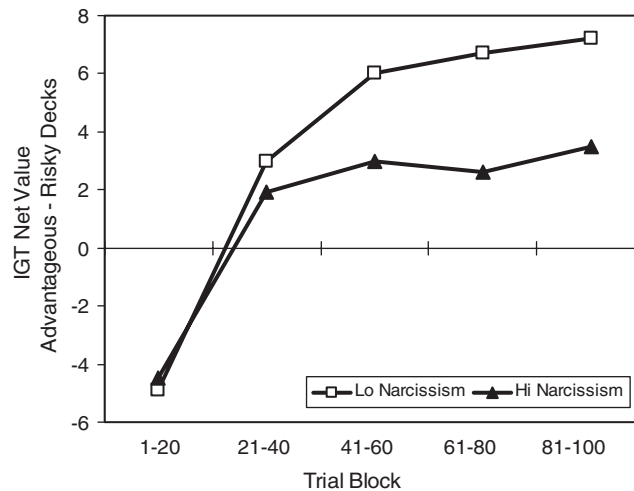
Figure 3. Results using a median split of high and low narcissism scores for IGT deck choice, showing the average difference between advantageous and risky choices for each block of 20 trials

reward more than non-narcissists. As illustrated in Figure 3, narcissists and non-narcissists chose similarly in the first 40 selections of the IGT; however, throughout the remainder of IGT selections, narcissists consistently chose more from the less advantageous, risky decks. Moreover, as opposed to the continually increasing number of selections from the safe decks among non-narcissists, narcissists appear to have reached relative stability in the second block.

Next, we conducted a number of regression analyses to confirm that the predictive power of narcissism on these judgment and decision-making biases remained significant even controlling for the effects of self-esteem and gambling frequency. First, we hierarchically regressed GGT overconfidence onto RSES and Frequency, and then in a model including NPI scores. In this final model, the effects of RSES and Frequency were statistically non-significant ($ps > .24$), while NPI significantly predicted GGT overconfidence ($\beta = .23$, $t = 4.01, p < .01$). We followed this same procedure with GGT bet acceptance. Again, the effect of RSES was statistically non-significant ($p > .33$), while Frequency did relate to GGT bet acceptance ($\beta = .15, t = 2.81$, $p < .01$); importantly, NPI scores significantly predicted GGT bet acceptance, as well ($\beta = .21, t = 3.06$, $p < .01$). To establish the relation between narcissism and IGT risk-taking, we performed a similar regression analysis in which we hierarchically regressed IGT risk-taking onto RSES and Frequency, and then in a model including NPI scores. As expected, NPI significantly predicted the total IGT risky deck choices ($\beta = .21$, $t = 3.85, p < .01$), while the effects of RSES and Frequency were statistically non-significant (both $ps > .83$).

We then examined the relations between participants' behavioral performance on the GGT and IGT with reports of gambling pathology on the DIGS. As predicted, individuals scoring higher on the DIGS were more overconfident ($r = .20, p < .01$). As with narcissism, and replicating the findings of Goodie (2005), this relation was a consequence of gambling pathology being associated with greater confidence ($r = .17, p < .01$) but not with any greater accuracy ($p > .49$). Higher DIGS scores also related to greater GGT bet acceptance ($r = .23, p < .01$) and thereby, also fewer GGT total points ($r = -.25, p < .01$). Also as predicted, performance on the IGT related to greater gambling-related pathology as assessed by the DIGS ($r = .24, p < .01$).

The model described earlier suggests that overconfidence, willingness to accept bets based on confidence, and a myopic focus on reward may mediate the association between narcissism and PG. As such, having established the requisite interrelations among NPI scores, DIGS scores, GGT overconfidence, GGT bet
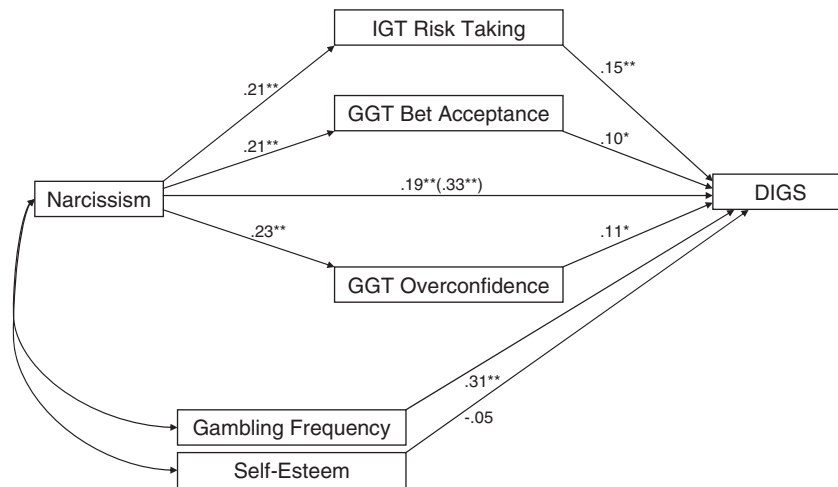
Figure 4. Path model of the relations between narcissism (NPI), overconfidence (GGT overconfidence), risk-taking as a function of confidence (GGT bet acceptance), and myopic focus on reward (IGT risk-taking), and PG (DIGS), controlling for gambling frequency and self-esteem. *Note*: Path values represent standardized regression coefficients. Value in parentheses represents the direct effect of narcissism on PG prior to the inclusion of the mediating variables. $^*p < .05$, $^{**}p < .01$

acceptance, and IGT risk-taking, as the final step, we examined the potential mediating role of GGT and IGT performance between narcissism and gambling pathology. To determine whether each of these variables accounted for a significant portion of the shared variance between narcissism and PG, we regressed DIGS onto NPI scores, all three of the posited mediating variables simultaneously, and the covariates Frequency and RSES. Importantly, in this analysis, the effects of GGT overconfidence ($\beta = .11$, $t = 2.37$, $p < .05$), GGT bet acceptance ($\beta = .10$, $t = 2.00$, $p < .05$), and IGT total risky deck choices ($\beta = .15$, $t = 3.15$, $p < .01$) all remained significant predictors of gambling-related pathology. The direct effect of NPI also remained significant ($\beta = .19$, $t = 3.63$, $p < .01$). See Figure 4 for the mediation model and results.

Because of concerns regarding mediation tests that do not use formal significance tests of mediation effects (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002; Preacher & Hayes, 2004), we tested the significance of both the total direct effect of narcissism, as well as the specific indirect effects of GGT overconfidence, GGT bet acceptance, and IGT risk-taking using the Preacher and Hayes (2006) bootstrapping technique for multiple mediator models. In comparison to other proposed mediation methods (e.g., Baron & Kenny, 1986; Sobel, 1982), this method has greater power to detect significant effects while allowing for the control of covariates, without imposing any questionable distributional assumptions on the data (see MacKinnon et al., 2002; MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2004; Shrout & Bolger, 2002). To reveal the precise nature of the mediation, Preacher and Hayes' (2006) technique produces point estimates and bias-corrected and accelerated (BCA) confidence intervals (see Efron, 1987) for each of the proposed indirect effects, as well as a point estimate of the remaining direct effect. For the indirect effects tests, confidence intervals that do not include zero demonstrate significant mediation.

The total indirect effect of narcissism on DIGS through all three of the mediating variables was significant, with a point estimate of .0254 (95% BCA-CI: .0124–.0413). Importantly, examinations of the specific indirect effects revealed that all three mediating variables also were uniquely significant. More specifically, the point estimate of GGT overconfidence was .0088 (95% BCA-CI: .0014–.0209). The point estimate of GGT bet acceptance was .0056 (95% BCA-CI: .0010–.0154). The point estimate for IGT risky deck choice was .0110 (95% BCA-CI: .0039–.0237). Although significantly reduced, the direct effect of NPI also

remained significant (point estimate of .0902). Collectively, these results indicate statistically significant and unique effects for each of the proposed mediators as well as partial mediation for this set of variables.

GENERAL DISCUSSION

In three studies, we sought evidence linking narcissism to gambling activity and related pathology, using the well-validated NPI as a measure of narcissism. The benefit of using the NPI is that we were able to measure narcissism as a dimensional construct, rather than a dichotomous diagnosis with a very low base rate, as is the case with NPD. Thus, through a programmatic approach, our goal was to provide more solid empirical evidence than has previously emerged to support the widely and long-held theoretical position that narcissism is linked with gambling behavior, gambling pathology, and the deficits in judgment and decision-making processes that underpin severe gambling outcomes.

In Study 1, we found that narcissists gamble more frequently and spend more money gambling than non-narcissists, and that these relations remained significant even when controlling for participants' self-esteem and income. These results furnished preliminary evidence that narcissists engage in risk-taking behavior (in this case, gambling) significantly more than their non-narcissistic counterparts. We extended these findings in Study 2, in which only self-identified frequent gamblers participated to provide robust sub-samples of individuals with a range of active gambling-related pathology. Two important findings emerged. First, we replicated the results of Study 1 in linking narcissism with gambling *activity* among frequent gamblers. Second, narcissism also significantly predicted gambling *pathology*, even controlling for gambling frequency and self-esteem. In addition to verifying the long-held assumption that narcissism is associated with gambling behavior and gambling-related pathology, these first two studies add to the growing body of literature concerning the negative outcomes associated with the inflated self-perceptions that accompany narcissism. Given this link between narcissism and PG, these studies also pointed to the possibility that the self-regulatory strategies used by narcissists are not successful at buffering the deleterious effects of their gambling behavior. Study 3 addressed this possibility more closely.

In Study 3, we sought evidence regarding cognitive processes of judgment and decision-making that may underlie the link between narcissism and gambling pathology. To this end, we examined the extent to which participants' behavioral performance on the GGT and IGT mediated this relation. Previous research and theory have tied these two tasks to gambling pathology (Bechara, 2003; Goodie, 2005), and GGT performance to narcissism, as well (Campbell, Goodie, et al., 2004). Importantly, this study revealed three potential mechanisms by which narcissism may lead to the development of severe gambling outcomes. First, in addition to simply gambling more frequently than those low in narcissism, narcissists reported significantly higher confidence in their knowledge as a function of their inflated, but unfounded, beliefs about their own abilities. That is, narcissists exhibited significantly poorer calibration between their confidence assessments and overall accuracy, or greater overconfidence. There is strong evidence that population-level overconfidence varies with context (Klayman, Soll, Gonzales-Vallejo, & Barlas, 1999), and may disappear (Gigerenzer, 1991), decrease (Björkman, Juslin, & Winman, 1993), or even increase (Yates, Lee, & Shinotsuka, 1996) in varying situations and populations. At an individual level, however, we found that overconfidence is meaningfully linked to a stable personality trait that is reliably associated with gambling activity and gambling pathology.

Second, in this study, narcissists coupled their more pronounced overconfidence with a heightened propensity to accept bets. Narcissists' inflated self-beliefs (i.e., overconfidence) most likely prevented them from processing risk-relevant stimuli in an objective manner, bolstering their rates of bet acceptance. In contexts where accepting bets results in better performance, such behavior might be adaptive, a possibility to which we turn shortly. However, when compared to their non-narcissistic counterparts, narcissists objectively

underperformed in terms of total points earned on the GGT, which is a direct result of their overconfidence and willingness to accept bets.

Third, the IGT results demonstrate that narcissists are myopically focused on reward, which biases their appraisals of reward and loss likelihoods and impedes their adaptive decision-making. Specifically, when compared to their non-narcissistic counterparts, narcissists chose significantly more from the less adaptive, risky decks, which provided large immediate returns but rendered long-term net losses, instead of employing a strategy to choose from the safer decks, which provided a smaller immediate reward yet would have resulted in a long-term net gain. These results are well explained as a function of the reward sensitivity and risk-attitudes of narcissistic individuals. Indeed, the choice to return to the risky decks more frequently than non-narcissists, and the general reward sensitivity this reflects, presumably relates to narcissists' overconfidence in their own abilities and their willingness to take risks, even when such risk-taking is counterproductive. The correlations among the IGT and the GGT overconfidence bias and bet acceptance parameters speak to this possibility. Importantly, however, while interrelated (as expected; cf. Stanovich & West, 2000), the three fundamental measures on the GGT and IGT each significantly mediated the link between narcissism and gambling pathology. This finding supports their standing as discrete judgment and decision-making biases with unique predictive utility in relation to the association between narcissism and PG.

Taken together, these results furnish evidence that, when compared to non-narcissists, narcissists are more myopically focused on reward, overconfident, and willing to take risks based on their confidence. Moreover, these judgment and decision-making deficits contribute to an apparent discord between narcissists' behaviors and the objective, and in this case maladaptive, consequences that are associated with them. Accordingly, these results make evident that inflated and imbalanced self-perceptions coupled with a heightened approach orientation toward immediate gratification of desires set the stage for intemperate risk-attitudes and negative outcomes. Indeed, it seems that narcissists' self-absorption stemming from their investment in self-view maintenance, and their apparent reactivity to negative self-relevant information (e.g., 'I'm losing'), leads to relatively inflexible patterns of thoughts and behaviors, which impairs their responding to situational information concerning risk and obscures the recognition and enactment of behavioral strategies to maximize reward while mitigating potential loss.

In the case of PG, it might be informative to look at some of its diagnostic symptoms as a gage of how this happens. Certain PG symptoms, such as tendencies to chase losses and general preoccupation with gambling, suggest that imbuing gambling experiences with heightened self-relevance may result in especially strong attachment and egotistic reactions to gambling outcomes (cf. Morf et al., 2000), which in turn renders gambling a potentially pernicious form of entertainment. If this is the case, then our results suggest that the judgment and decisional biases captured in the GGT and IGT undermine narcissists' success during gambling experiences, which thereafter may promote symptoms of psychological distress as a function of the emotional, in addition to the financial, investment in the outcomes. Because cognitive-behavioral therapies for PG aim to attenuate the cognitive biases that exacerbate gambling problems (Ladouceur, Sylvain, Letarte, Giroux, & Jacques, 1998; Petry, 2005; Toneatto & Ladouceur, 2003), our results may be helpful in identifying judgment and decision-making biases that may be usefully targeted during therapy. Indeed, tailoring treatment efforts towards the biases measured by the GGT and IGT might be beneficial in helping narcissists to manage their gambling behavior. One potential means to this end would be to specifically address with narcissists how, for example, confidence bears upon relative rates of winning, and how risky betting strategies compare with more advantageous choices.

Other potential mediators

Taken together, these studies demonstrated that narcissism is associated with more severe gambling involvement and gambling outcomes, and revealed that poorly attuned risk-taking judgments and decisions

helped to explain this relation. However, given that the relation between narcissism and gambling pathology was only partially mediated by overconfidence and risk-taking behaviors, it will be important to further explore other potential explanatory mechanisms accounting for this association. There are a number of possibilities, some of which we briefly discuss in this section.

Narcissists often are hypercompetitive (Campbell et al., 2005; Morf & Rhodewalt, 2001; Ryckman, Thornton, & Butler, 1994) and highly reactive to situations that may degrade their generally positive feelings of self-worth, especially in social situations (e.g., Twenge & Campbell, 2003). Given their chronic ego-involvement, narcissists' dispositional competitiveness might play an integral role in the development of PG, even if this competitiveness is referenced internally against an objectively inflated and unfounded personal standard (Morf et al., 2000). Gambling, however, is often a group activity (e.g., poker games), rather than something done in isolation from others. Accordingly, it is also possible that the judgment and decision-making biases evidenced by narcissists would be heightened if the GGT or IGT were administered, even ostensibly, as interpersonally competitive tasks. Second, an examination of other PG symptoms, such as the willingness to use others to relieve financial harms associated with gambling endeavors, suggest that narcissists' generally low communal qualities may reflect their resistance to accept interpersonal feedback concerning problems related to their gambling behavior and their willingness to manipulate and exploit others in an effort to alleviate their own gambling-related losses. Moreover, to the extent that such exploitation occurs, narcissists' gambling behaviors could work in conjunction with their feelings of personal entitlement (cf. Campbell, Bonacci, et al., 2004). As a result, narcissists' pervasive feeling of entitlement (e.g., 'I'm due.') might relate to judgmental biases, such as illusory beliefs regarding chance occurrences, which contribute to persistent gambling even in the face of mounting financial losses (Ladouceur et al., 2003; Toneatto, 1999; Toneatto & Ladouceur, 2003; Toneatto et al., 1997). Finally, mechanisms related more directly to narcissists' impulsivity (Vazire & Funder, 2006), in the form of poor inhibitory self-control, may play an integral role in narcissists' development of compulsive gambling and thereby gambling-related pathology. In this vein, Rose (2007) demonstrates that poor impulse control related to consumer spending practices is one mechanism that explains the relation between narcissism and compulsive buying.

These possibilities may bolster the judgmental biases and intemperate risk-attitudes that typify narcissists, or they may relate directly to the impulsive and addictive responses captured in the narcissism-to-PG link. Collectively, however, they all point to narcissists' self-regulatory deficiencies and their subsequent self-defeating behaviors, whereby narcissists appear led by automatic thoughts and motivational patterns that serve to undermine their adaptive behavioral regulation.

Limitations and other future research

Our results demonstrate that narcissists are more likely than non-narcissists to evidence more severe gambling behavior tendencies and gambling-related problems, and that gambling's ill effects are partially explained by their tendencies for judgment and decision-making biases. There are limitations to the conclusions that can be drawn from this research, however, as well as a number of important avenues for future examination. First, given the cross-sectional nature of the current studies, we cannot be certain of the causal relation between narcissism and gambling pathology. However, it is more plausible that narcissism as an enduring, broad-based individual difference trait would influence a specific behavioral tendency such as gambling than the converse case (i.e., that gambling frequency or pathology leads to narcissism). Likewise, propensities toward judgment and decision-making biases, such as those measured by the GGT and IGT, would arguably be more likely to influence the severity of gambling outcomes than the reverse (cf. Ladouceur et al., 2003). Nonetheless, future longitudinal examinations of narcissism, judgment and decision-making deficits, and PG would be a valuable addition to the literature. Second, this research treats narcissism as a general, rather than pathological, individual difference trait. While this conceptualization of narcissism is

closely related to NPD (Miller & Campbell, 2007), this research does not speak directly to clinical NPD, which necessitates diagnostic procedures that cannot be replicated simply by administering the NPI. Accordingly, because the focus of our investigations was on trait narcissism, we cannot firmly conclude from the results of these studies that there is a link between NPD and gambling. Third, we do not have evidence that narcissists who do not gamble frequently also evidence a myopic focus on reward, and it is possible that that this bias exists only among narcissists who gamble. However, given the previous demonstration of the overconfidence bias and especially strong willingness to accept bets among non-gambling narcissists (Campbell, Goodie, et al., 2004), using a sample not limited to frequent gamblers would most likely *increase* the magnitude of the relation between these variables. This possibility awaits future research. Finally, the tasks we employed in Study 3 (i.e., the GGT and IGT) clearly are not designed to assess gambling *per se*, as neither task involves wagers for real money. These tasks do, however, mimic real-world risk-taking and decisions under uncertainty in important ways, and capture differences in basic cognitive processes that underlie gambling and other risky activities. Indeed, in our view, adding a monetary outcome to these tasks would likely serve to exacerbate the judgment and decision-making biases revealed by narcissists. Moreover, to the extent that these measures mediate the link between narcissism and PG, they should affect both gambling behavior as well as risky behavior in other environments. We now turn to this possibility.

Implications for narcissism and risk-taking in other risk-relevant domains

The observed relations between narcissism, gambling frequency, and PG suggest that narcissistic tendencies for overconfidence, risk-taking, and myopic focus on reward foster sub-optimal gambling outcomes. These results have clear implications for the role of narcissism, and narcissists' accompanying intemperate risk-attitudes, in other domains. For example, in leadership or managerial settings, narcissists may be highly charismatic and initially make positive impressions (Paulhus, 1998); however, narcissistic tendencies would likely serve as an impediment to long-term leader effectiveness (cf. Rosenthal & Pittinsky, 2006). Likewise, in negotiation settings, narcissistic tendencies would likely inhibit parties reaching mutually beneficial outcomes (cf. Campbell et al., 2005). In both of these examples, negative outcomes will likely befall narcissists as a function of both their personality characteristics (e.g., self-focus and inflated self-views, exploitative behavior coupled with an arrogant and domineering interpersonal style) and their subsequent judgment and decision-making biases (e.g., overconfidence and focus on attaining immediate rewards) that ultimately will undermine their performance.

It is possible, however, that narcissists' propensities for judgment and decision-making biases might promote adaptive (i.e., more successful) outcomes when compared to non-narcissists in some domains. For example, narcissists' behavioral strategies aimed at procuring personal resources (Campbell et al., 2005) and tendencies for overconfidence and reward focus suggest that narcissists are more likely to employ maximizing, as opposed to satisficing, strategies (e.g., Simon, 1957), whereby individuals search for and engage in behaviors to test all possible options in an attempt to find the 'best' of something (i.e., maximizing), instead of settling for something that meets a minimum, 'good enough' threshold of acceptability (i.e., satisficing). In this vein, using a sample of graduating college students, Iyengar, Wells, and Schwartz (2006) provide evidence that maximizers were more likely than satisficers to, for example, gain their choice employment and secure larger starting salaries (while at the same time finding less psychological satisfaction with these outcomes). In such a scenario, it is plausible that narcissists might surpass non-narcissists in areas such as starting salary.

Another situation that might reward narcissism can be found in a bull market scenario. Indeed, when compared to risky endeavors that entail an inherently negative average value that punishes risky behavior (e.g., casino gambling), a bull market, such as those seen in the US stock market of the late 1990s and the highly speculative real estate markets in the early years of this century, provides an instance in which the net

rate of return may increase as a function of risky behavior. The possibility that narcissists might outperform non-narcissists in such a situation could be tested empirically, using the GGT and IGT for example, by altering the payoff structure to reward risk-taking with bets that are positively valued. Such bull markets, however, are relatively fleeting. As such, should overconfidence, tendencies for risk acceptance based on poorly calibrated confidence assessments, and a focus on immediate reward without sensitivity for future consequences be operative, we speculate that over long-term investment periods, narcissists' performance will suffer compared to non-narcissists (see Stein, 2003).

CONCLUSIONS

The present studies demonstrated that, when compared to individuals low in narcissism, narcissists gamble more frequently, wager larger amounts of money when gambling, and evidence more severe gambling outcomes in terms of heightened reports of gambling pathology. The relation between narcissism and PG was partially explained by narcissists' judgment and decision-making biases of overconfidence, propensity to accept risky bets, and myopic focus on immediate reward. These biases stem from their inflated self-beliefs, general reward sensitivity, and willingness to accept risk, even when this risk engenders less-than-optimal consequences. Taken together, these factors ultimately undermine narcissists' adaptive behavioral regulation, and seemingly facilitate the transition from harmless, recreational gambling to gambling-related pathology. These results provide support for the longstanding and widely held assumption, which previously was surprisingly lacking in empirical validation, that narcissism is associated with gambling activity as well as problems associated with gambling. Further, these results indicate that narcissism may be an especially relevant individual difference variable for study in other risk-relevant domains.

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