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# Gambling as a Search for Justice: Examining the Role of Personal Relative Deprivation in Gambling Urges and Gambling Behavior

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*The present article explores the hypothesis that gambling might serve a justice-seeking function for some people, as gambling might offer a means to pursuing desirable outcomes that people feel they deserve but might be unable or unwilling to attain through conventional means. In Study 1, across two separate samples, self-reports of personal relative deprivation predict problem gambling and gambling urges over and above relevant control variables. In Study 2, the authors manipulate personal relative deprivation by informing participants that they have either less or more discretionary income than “similar others.” They then give participants \$20 and the opportunity to gamble. The results show that a greater percentage of participants who are “relatively deprived” (vs. “not relatively deprived”) opt to gamble. Two manipulation validation studies demonstrate that the “relatively deprived” participants are preoccupied with justice during a modified Stroop task and feel resentful. Implications for understanding why people gamble are discussed.*

**Keywords:** *gambling; gambling urges; problem gambling; personal relative deprivation; justice motivation; belief in a just world*

People who gamble undoubtedly do so for a variety of reasons, including entertainment and the hope of winning money. Gambling, however, can become problematic for some people, as problem gambling can lead to, among other things, financial strain, relational and family conflict, substance abuse, and depression (Petry,

2005; G. Smith, Hodgins, & Williams, 2007). Given the potential for recreational gambling to lead to problem gambling (Clarke et al., 2006), it is important to explore the reasons why people gamble. The purpose of this research was to illuminate a social psychological process that may account for some people’s tendency to engage in gambling activities. Namely, drawing on just world (Lerner, 1977, 1980) and relative deprivation theories (Crosby, 1976; Walker & Smith, 2001), we propose that gambling might serve a justice-seeking function for some people, as gambling might offer a means to pursuing desirable outcomes (e.g., money, status) that people might feel they deserve but are otherwise unable or unwilling to attain through conventional means (e.g., through better employment).

## PERSONAL RELATIVE DEPRIVATION AND GAMBLING

“Relative deprivation” is generally used to describe feelings of resentment stemming from the belief that one

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is deprived of a deserved outcome relative to some referent level (Crosby, 1976). Since Runciman's (1966) pivotal work, researchers have generally made distinctions between personal (egoistical) and group (fraternal) relative deprivation, with each stemming from individual or group-level social comparisons of outcomes, respectively, and each resulting in different psychological and behavioral consequences (e.g., symptoms of stress vs. collective action for personal and group deprivation, respectively; see Walker & Smith, 2001). In our analysis and research, we focus on personal relative deprivation and its consequences for gambling urges and behavior.

Research has demonstrated that feelings of personal relative deprivation often produce a number of negative psychological consequences, such as increased physical stress symptoms (Walker & Mann, 1987). However, personal deprivation has also been shown to predict people's self-improvement efforts (e.g., Hafer & Olson, 1993; Olson, Roese, Meen, & Robertson, 1995). For instance, Hafer and Olson (1993) found that working women's personal discontent with respect to their own job situation predicted the number of behaviors they undertook relevant to improving their lot (e.g., obtaining information about courses to improve their professional qualifications). Presumably, such self-directed behaviors are guided by the resentment elicited by the belief that one is getting less than one deserves in life. However, such self-improvement efforts are neither always successful nor always viable. Indeed, a single mother, for example, may not have the financial means to support her family and pursue further education (see Olson et al., 1995).

In the current research, we propose that gambling might offer another means, albeit a potentially costly and self-defeating one, by which some people attempt to behaviorally compensate for the sense that they are getting less than they deserve in life. That is, assuming that most people believe they are good, hard-working people deserving of good outcomes (Lerner, 1980), gambling offers the prospect of a convenient way out for individuals experiencing personal relative deprivation—individuals who also may not perceive more conventional means of self-improvement as viable or feasible in the shorter term. This focus on “quick gain” strategies for managing one's personal deservingness concerns is consistent with research suggesting that people may, at times, engage in seemingly irrational, self-costly behaviors in the pursuit of justice (e.g., Greenberg, 1993; Meindl & Lerner, 1983; Zuckerman, 1975).

Gambling researchers have demonstrated that the drive to make money is one of the primary motivators for gambling (Lee, Chae, Lee, & Kim, 2007), but it is also an important factor in the transition from recreational gambling to problem gambling (Clarke et al., 2006) and

in gambling relapse among recently quit pathological gamblers (Hodgins & el-Guebaly, 2004). Thus, we propose that personal relative deprivation might be an important predictor of gambling, because feeling unfairly deprived might increase the more immediate desire to make money. In the following sections, we review correlational data that are compatible with this idea. Specifically, research has demonstrated that (a) lottery ticket sales correlate positively with poverty rates and (b) gambling activities increased during the Great Depression.

### *Lottery Ticket Sales and Poverty*

If some people gamble because they lack deserved financial resources, then there might be a relation between socioeconomic status and gambling. Indeed, lower income individuals are more likely to spend a larger proportion of their income on gambling (e.g., MacDonald, McMullan, & Perrier, 2004; Welte, Wieczorek, Barnes, & Tidwell, 2006) and opportunities to gamble are more readily available in economically disadvantaged geographical areas (e.g., electronic gaming machines [EGM]; Gilliland & Ross, 2005; Wheeler, Rigby, & Huriwai, 2006). Of course, the relative deprivation perspective argues that low income is not sufficient for personal relative deprivation; individuals must also believe that they are unfairly deprived. Nonetheless, lowered income might increase the likelihood of personal relative deprivation, perhaps because a variety of cultural influences convince people that the “good life” is attainable through making money and acquiring materials (which, presumably people feel they deserve; Kasser, Ryan, Couchman, & Sheldon, 2004). It is interesting that advertisements for lotteries and other gambling-related activities either explicitly or tacitly portray gambling as a viable means of attaining desired outcomes (e.g., “dream” homes, cash prizes) that, according to the advertisements, everyone ought to have (Korn, Reynolds, & Hurson, 2006). Certainly, gambling advertisements are not specifically aimed at deprived consumers. Nevertheless, they do appear to try to evoke an awareness of the discrepancy between actual and ideal financial statuses along with the associated lifestyles, such as the television advertisements for a Canadian lottery that ask viewers to “imagine the freedom” of winning the lottery.

Consistent with our analysis, Blalock, Just, and Simon (2007) found that across 39 states and over a 10-year period, lottery ticket sales rose with poverty rates, which, as they suggest, speaks to the notion that individuals experiencing “financial shock” may come to view the lottery as a way—and perhaps the only way—to escape their current economic hardships. Blalock et al.'s desperation hypothesis is consistent with our analysis in

terms of the comparisons made between what one has and what one had, such that engaging in gambling activities might be influenced by the desire to improve one's standard of living during more desperate times. However, their research, though illuminating, is limited in terms of understanding the current concerns of individuals, given that they used aggregate lottery sales and poverty rate data. Thus, the extent to which experiences of relative deprivation at the level of individuals predicted lottery purchases is unclear, because the data did not indicate who was buying the lottery tickets and for what reasons.

### *Gambling and the Great Depression*

According to Rose (1991), legalized gambling and gambling popularity have historically waxed and waned in different "waves," with the most recent wave beginning around the time of the Great Depression. Both in Canada (Morton, 2003) and in the United States (Cross, 2000), gambling involvement increased dramatically during the Depression: Local stores, hotels, and restaurants began offering a variety of low-stakes gambling opportunities (e.g., punchboards, jar games) that were not previously available (nor legal) but were popular among the working class. Race-track betting rose nearly 800% and commercial lotteries and advertising sweepstakes expanded rapidly during the 1930s (Cross, 2000; Morton, 2003). This raises the question of why people were, despite the considerable economic deprivation of the time, seeking out and engaging in activities that would most likely lead to only further economic hardship. Consistent with our analysis, Cross (2000) suggests that widespread joblessness and poverty coupled with temporal comparisons between past gratifications and the current economic hardships enhanced people's desire for luxury, and gambling was perceived as one of the few viable means of attaining money and status. Indeed, as Cross states,

The impact of reduced income on people who expected expanded access to goods must have made the pinch of hard times seem intolerable. . . . For many working people, especially because the cost was nominal, gambling appeared to be a wise investment. "Why not me?" they asked. Losses were soon forgotten and winnings were cherished memories. This was certainly fatalistic, but it was also optimistic. The future would take care of itself, and it might also bring "pennies from heaven" (p. 73).

## OVERVIEW OF CURRENT RESEARCH

The foregoing review of the extant research linking economic deprivation to gambling behavior suggests the possibility that personal relative deprivation might

increase gambling urges and gambling behavior. This previous research, however, is limited for at least two reasons: the data are correlational (e.g., financial strain could be a consequence rather than a cause of gambling) and aggregate in nature (e.g., lottery ticket sales). Thus, the psychology of individual factors that motivate gambling with respect to personal relative deprivation has yet to be explicated. Accordingly, in the current research, we aimed to examine more closely the role that personal deprivation plays in gambling urges and gambling behavior. We used both correlational (Study 1) and experimental research designs (Study 2). Given our theoretical perspective, we also focused on relative deprivation across our studies, with the measure and experimental manipulation of relative deprivation involving felt deprivation stemming from social comparisons of outcomes.

In Study 1, using two different samples of participants, we examined whether self-reports of personal relative deprivation would predict current urges to gamble and severity of gambling problems. In Study 2, we examined whether a manipulation of personal relative deprivation would influence gambling behavior. Specifically, we designed a manipulation of personal relative deprivation that involved having participants compare their own average discretionary income with the average discretionary income of "similar others." The manipulation was designed such that participants were given feedback that they had either less or about the same level of discretionary income as similar others. We first validated this manipulation in two pilot studies, each using different dependent measures of participants' justice concerns. Following the manipulation of personal relative deprivation, we gave participants money and the opportunity to play a gambling game in which they could win or lose money. We predicted that the "relatively deprived" participants would choose to gamble more than the less deprived participants.

These studies build on previous research in at least two ways. First, we aimed to explicitly link gambling urges and behavior to relative deprivation. That is, felt unjust deprivation in these studies—either self-reported or experimentally induced—should predict the desire to gamble and gambling behavior if gambling serves as an attempt to allay one's personal deservingness concerns. Second, we aimed to offer experimental evidence that unjust deprivation leads to increased gambling, which to our knowledge has never been shown.

## STUDY 1

The purpose of Study 1 was to investigate the link between self-reports of personal relative deprivation and gambling-related problems and urges across two

samples of participants from two different Canadian universities. To do so, we compiled a short measure of personal relative deprivation and assessed participants' severity of problem gambling and gambling urges along with various control measures (e.g., self-esteem, Big Five Personality). On the basis of the foregoing analysis, we hypothesized that stronger feelings of personal relative deprivation would predict more severe characteristics of problem gambling and stronger urges to gamble across both samples.

## Method

### Participants and Procedure

*Sample A.* Participants in Sample A were 92 female and 38 male ( $N = 130$ ) undergraduate students from the University of Calgary enrolled in psychology courses participating for bonus course credit ( $M$  age = 20.63 years,  $SD = 4.22$ ). Participants were able to register for the study only if they had gambled in some form at least twice in the previous 6 months. Once participants registered for the study, they were directed to an online survey. Following informed consent, participants completed the measures of interest within a larger survey.

*Sample B.* Participants in Sample B were 109 female and 60 male (1 unreported;  $N = 170$ ) introductory psychology students from the University of Western Ontario who completed the measures of interest within an online mass testing survey for partial course credit ( $M$  age = 19.30 years,  $SD = 4.89$ ). Within the survey, participants were asked to complete the gambling-related measures only if they had gambled in some form at least once in the previous 12 months.

### Measures

*Problem Gambling Severity Index (PGSI).* Participants in both Samples A and B completed the PGSI (Ferris & Wynne, 2001). The PGSI is a nine-item questionnaire used for measuring problem gambling prevalence in the general population. The PGSI asks participants to rate how frequently over the past 12 months they engaged in various problematic gambling behaviors and experienced adverse consequences associated with their gambling (0 = *never* to 3 = *almost always*). An example item includes "Have you felt guilty about the way you gamble or what happens when you gamble?" Following common practice with the PGSI and for the purpose of analyses, we categorized raw PGSI scores (0 to 27) into four subtypes of gamblers as defined by Ferris and Wynne (2001). Given that these were nonclinical samples, distributions of the raw PGSI scores were highly skewed. The skewed nature of the scores was, however, improved

**TABLE 1:** Frequencies of Gambler Subtypes for Studies 1 and 2

Gambler Subtype	Study 1		Study 2
	Sample A	Sample B	
1. Nonproblem (0)	20%	58%	12%
2. Low risk (1-2)	36%	29%	44%
3. Moderate risk (3-7)	35%	9%	36%
4. Problem gambler (8-27)	8%	4%	8%

SOURCE: Ferris & Wynne (2001).

NOTE: Ranges of raw Problem Gambling Severity Index scores defining each gambler subtype are presented in parentheses.

by categorizing participants into these meaningful subtypes of gamblers. Table 1 depicts the frequencies of problem gambler subtypes expressed as percentages for both samples. Scores ranged from 1 (*nonproblem gambler*) to 4 (*problem gambler*).

*Gambling Urge Scale (GUS).* Participants in both samples completed a measure of gambling urge or craving to assess their desires to gamble in the present moment, although the exact measures used differed between the two samples. Participants in Sample A completed the GUS (Raylu & Oei, 2004), which is six-item assessment of gambling urges in nonclinical samples (e.g., "All I want to do now is to gamble"). Participants responded to the items using scales ranging from 1 (*strong disagreement*) to 7 (*strong agreement*), and higher scores indicate stronger gambling urges. Participants in Sample B completed the items "Please rate the intensity of your urge to gamble at this moment" and "Please rate the extent to which you are craving a gamble at this moment" on scales ranging from 1 (*no urge or craving*) to 10 (*strong urge or craving*). Responses to these two items correlated highly ( $r = .80$ ,  $p < .001$ ) and were averaged to form a composite measure of gambling urges.

*Gambling Attitudes and Beliefs Scale (GABS).* In Sample A, participants completed a revised, 15-item version of the GABS (Strong, Breen, & Lejuez, 2004). The GABS measures a range of beliefs and attitudes associated with gambling involvement (e.g., "Sometimes I just know I'm going to have good luck") and is purported to assess vulnerabilities to gambling problems. Scale items range from 1 (*strongly disagree*) to 4 (*strongly agree*), and a higher average score indicates a greater affinity for gambling problems.

*Personal Relative Deprivation Scale (PRDS).* Both Samples A and B completed the pivotal PRDS, which is a four-item author-compiled questionnaire that was designed to assess individuals' self-reports of their

**TABLE 2:** Scale Items, Component Loadings, and Communalities for the Personal Relative Deprivation Scale by Sample, Study 1

Scale Items	Sample A		Sample B	
	Component Loading	Communality	Component Loading	Communality
1. When I think about what I have compared to others, I feel deprived.	.78	.61	.74	.54
2. I feel privileged compared to other people like me.	.69	.48	.70	.49
3. I feel resentful when I see how prosperous other people seem to be.	.73	.53	.59	.35
4. When I compare what I have with others, I realize that I am quite well off.	.80	.64	.78	.60

NOTE: Items 2 and 4 were reverse scored.

personal relative deprivation (see Table 2). According to H. J. Smith and Ortiz (2001), the definition of personal relative deprivation is the belief and feeling that a person is worse off than others; therefore, a measure of relative deprivation should include “a comparison target in the items, ask about feelings, and focus on interpersonal comparisons” (p. 101). Accordingly, the four items included in the PRDS were constructed to capture participants’ general perceptions and feelings of personal relative deprivation associated with comparing their outcomes to the outcomes of others. The items share common elements with existing measures of personal relative deprivation (e.g., Dambrium, Taylor, McDonald, Crush, & Méot, 2006; Tougas, Rinfret, Beaton, & de la Sablonnière, 2005) but aim to assess more general perceptions and feelings of relative deprivation. Participants responded to the items using scales ranging from  $-3$  (*strongly disagree*) to  $+3$  (*strongly agree*). Average scores for the PRDS can range from 1 to 6, with higher scores indicating more personal relative deprivation.

*Rosenberg’s (1965) Self-Esteem Scale (RSES).* Participants in Sample B completed the 10-item RSES to assess their trait self-esteem. Participants responded to the items using scales ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Higher scores indicate more positive self-esteem. Because lowered self-esteem has been linked to both feelings of personal deprivation (e.g., Tougas et al., 2005; Walker, 1999) and problem gambling (Gupta & Derevensky, 1998; Rockloff & Dyer, 2006), we included the RSES as a control measure to test whether the predicted relation between personal deprivation and problem gambling and gambling urges might be due to more general negative evaluations of the self.

*Big Five Personality Dimensions.* Participants in Sample B completed the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), which captures each of the Big Five dimensions with a pair of items for each dimension. For example, for the “emotional stability” dimension, participants rated themselves in terms of how “anxious, easily upset” and “calm, emotionally

stable” they were using scales ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). The TIPI demonstrates high content validity and test–retest reliability (Gosling et al., 2003). As with assessing trait self-esteem, our primary purpose with the TIPI was to examine whether personality dimensions might confound the predicted relation between personal relative deprivation and severity of problem gambling and gambling urges. Indeed, Bagby et al. (2007) recently found that problem gamblers scored higher on neuroticism and lower on conscientiousness than nonproblem gamblers did, which are relations that might also be evident for self-reports of personal relative deprivation.

## Results

### Factor Structure of the PRDS

A principal components analysis was performed on the four items comprising the PRDS separately for both samples. Despite the moderate level of internal consistency of the PRDS (see Table 3), as shown in Table 2, results revealed a single principal components solution with high factor loadings for each item in each sample.

### Descriptive and Bivariate Analyses

Descriptive statistics, alpha reliabilities, and intercorrelations among the measures are reported in Tables 3 (Sample A) and 4 (Sample B). Similar to the raw PGSI scores, the distributions of gambling urges were highly skewed to the right. Accordingly, we applied a square root transformation to the gambling urge measures to improve normality. For exposition purposes, the means of untransformed scores are presented. The problem gambling measures correlated positively and significantly with one another in both samples. More important, with the exception of the GABS in Sample A (which approached significance), the PRDS correlated significantly with each of the gambling measures in both samples. As predicted, higher levels of self-reported personal relative deprivation were associated with more severe gambling problems and greater urges to gamble.<sup>1</sup>

**TABLE 3:** Descriptive Statistics and Intercorrelations for Measures Employed in Study 1, Sample A

Measures	M	SD	1	2	3	4	5	6
1. PGSI	2.32	0.89	(.84)					
2. GUS	2.10	1.35	.51**	(.89)				
3. GABS	2.48	0.37	.44**	.48**	(.80)			
4. PRDS	2.71	0.90	.28**	.25**	.17†	(.74)		
5. Age	20.63	4.62	-.05	.01	.09	-.03	—	
6. Sex (F = 1, M = 0)	—	—	-.22*	-.21*	-.22*	-.10	-.12	—

NOTE: PGSI = Problem Gambling Severity Index; GUS = Gambling Urge Scale; GABS = Gambling Attitudes and Beliefs Scale; PRDS = Personal Relative Deprivation Scale; F = Female; M = Male; when applicable, alpha reliabilities are presented along the diagonal.  
 † $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

**TABLE 4:** Descriptive Statistics and Intercorrelations for Measures Used in Study 1, Sample B

Measures	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. PGSI	1.59	0.82	(.81)										
2. Urges	1.61	1.34	.52**	(.88)									
3. PRDS	2.51	0.84	.24**	.22**	(.64)								
4. RSES	3.03	0.46	-.04	-.14†	-.32**	(.85)							
5. ES	4.60	1.28	-.14†	-.20**	-.10	.51**	(.64)						
6. E	4.55	1.47	-.07	.01	-.11	.14†	-.01	(.76)					
7. A	4.73	1.11	-.16*	-.29**	-.03	.23**	.24**	-.08	(.18)				
8. C	5.30	1.10	-.19*	-.22**	-.21**	.33**	.27**	-.05	.20**	(.36)			
9. O	5.20	1.03	-.14†	-.15*	-.27**	.05	-.02	.28	.13	.17*	(.22)		
10. Age	19.30	4.89	-.12	-.11	.01	.14†	.10	-.11	.23**	-.03	.01	—	
11. Sex (F = 1, M = 0)	—	—	-.17*	-.14†	.04	-.24**	-.23**	.04	.08	.13	.27**	-.02	—

NOTE: PGSI = Problem Gambling Severity Index; Urges = Gambling Urges; PRDS = Personal Relative Deprivation Scale; RSES = Rosenberg Self-Esteem Scale; ES = Emotional Stability; E = Extraversion; A = Agreeableness; C = Conscientiousness; O = Openness; F = Female; M = Male; when applicable, alpha reliabilities are presented along the diagonal.  
 † $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

Consistent with the research on personal relative deprivation noted above, self-esteem and the PRDS were significantly correlated in Sample B, but self-esteem did not correlate significantly with problem gambling or gambling urges. Men evidenced greater urges to gamble and more severe gambling problems, which is consistent with previous research (Raylu & Oei, 2004).

*Multiple Regression Analyses*

Multiple regression analyses were performed on the data from both samples to determine whether personal relative deprivation significantly predicted severity of gambling problems and gambling urges while controlling for age and sex in Sample A, and age, sex, personality dimensions, and self-esteem in Sample B. In separate regression analyses, gambling urges and PGSI scores were simultaneously regressed onto the control variables for both samples. Regression coefficients are shown in Table 5. Analyses revealed that the PRDS significantly predicted gambling urges and severity of gambling problems over and above the control variables tested in both samples.

**Discussion**

The results from both samples offer consistent evidence that personal relative deprivation predicts severity of problem gambling and gambling urges. The results for the gambling urge measures are particularly telling and consistent with our predictions: Although urges to gamble were low, self-reports of current personal relative deprivation predicted a current motivational state in the form of increased desire to gamble (Raylu & Oei, 2004). Moreover, despite being linked to both problem gambling and personal deprivation in previous research, self-esteem and personality factors did not specifically account for the observed relationships between gambling and personal relative deprivation.

Study 1 provided important evidence in support of our hypothesis but could not determine whether personal relative deprivation specifically caused urges to gamble or whether urges were influenced by other variables not examined. Indeed, it is unclear whether deprivation concerns are a cause or consequence of problem gambling and gambling urges, as problem gamblers may feel unfairly deprived because they have incurred

**TABLE 5:** Summary of Multiple Regression Analyses Predicting Problem Gambling Severity and Gambling Urges by Sample, Study 1

Predictor Variables	Problem Gambling Severity			Gambling Urges		
	<i>b</i>	<i>SE</i>	$\beta$	<i>b</i>	<i>SE</i>	$\beta$
Sample A						
1. PRDS	.25	.09	.25**	.09	.04	.19*
2. Age	-.02	.02	-.07	-.001	.01	-.01
3. Sex (F = 1, M = 0)	-.46	.17	-.24**	-.19	.08	-.21*
Overall statistics	$F(3, 118) = 5.35, p < .01, R^2 = .12$			$F(3, 118) = 3.40, p = .02, R^2 = .08$		
Sample B						
1. PRDS	.25	.08	.25**	.09	.04	.20*
2. Self-Esteem	.35	.17	.20*	.05	.08	.06
3. Emotional Stability	-.13	.06	-.20*	-.05	.03	-.16 <sup>†</sup>
4. Extraversion	-.07	.05	-.12	-.01	.02	-.01
5. Agreeableness	-.08	.06	-.10	-.08	.03	-.21**
6. Conscientiousness	-.09	.06	-.12	-.03	.03	-.09
7. Openness	.03	.07	.04	-.01	.03	-.01
8. Age	-.02	.01	-.12	-.01	.01	-.06
9. Sex (F = 1, M = 0)	-.27	.14	-.16 <sup>†</sup>	-.12	.07	-.14 <sup>†</sup>
Overall statistics	$F(9, 158) = 3.55, p < .01, R^2 = .17$			$F(9, 155) = 3.74, p < .01, R^2 = .18$		

NOTE: PRDS = Personal Relative Deprivation Scale; F = Female; M = Male.

<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

significant financial losses through gambling. Accordingly, for a second study, we designed and validated a manipulation of personal relative deprivation and examined gambling behavior.

## STUDY 2

Study 2 was designed to examine whether a manipulation of personal relative deprivation would influence gambling behavior. Therefore, we developed a manipulation of personal relative deprivation that involved having participants directly compare their own average monthly discretionary income with the average discretionary income of similar others (i.e., students taking psychology courses). The average monthly discretionary income of similar others varied between conditions, such that participants learned either that it was relatively low (\$244) or that it was relatively high (\$759). With respect to the known processes of relative deprivation, two features of this manipulation are of particular note: First, participants were asked to compare their discretionary income with that of similar others. Although the social targets people choose for comparison purposes often vary depending upon a variety of factors (see Suls, Martin, & Wheeler, 2000), comparisons with similar others are generally viewed as the most diagnostic (Festinger, 1954) and the most likely to produce feelings of unjust deprivation if the other has more of what someone feels he or she deserves (see Olson & Hazlewood, 1986). For example, having introductory psychology students compare their

discretionary income with, say, that of the CEOs of the *Fortune* 500 companies would likely do little in producing resentment.

Second, we assume that people generally want discretionary income, and wanting along with deserving have been identified as preconditions for the experience of relative deprivation (Crosby, Muehrer, & Lowenstein, 1986; Olson et al., 1995). Moreover, a number of studies have demonstrated that income satisfaction largely depends on income relative to a comparison level (e.g., Clark & Oswald, 1996; D'Ambrosio & Frick, 2007; Sweeney, McFarlin, & Inderrieden, 1990). For instance, Sweeney et al. (1990) found that the more participants perceived a gap between what they earned and what similar others earned, the more dissatisfied they were with their income, the more they wanted income, and the more they felt deserving of more income.

Our aim in this study, then, was to investigate whether personal relative deprivation elicited by the knowledge that one has less discretionary income than similar others will lead to an increased likelihood of gambling when given the opportunity to do so. Prior to conducting Study 2, however, we conducted two validation studies to ascertain whether our manipulation of relative deprivation does in fact produce concerns about personal deservingness and resentment. We chose to conduct separate validation studies to avoid the potential for bias and reactivity resulting from participants first completing a modified Stroop task (Validation Study A) or measures of wanting, deserving, and resentment (Validation Study B) before the gambling task in the main Study 2.

## MANIPULATION VALIDATION STUDIES

In Validation Study A, we examined whether knowing that one has less (vs. the same) discretionary income than similar others produces attentional biases toward justice during a modified Stroop task. Recent research using modified Stroop tasks in the context of a “just world” threat has demonstrated that perceived injustices (e.g., the innocent suffering of a little boy) implicitly activate concerns with justice (Callan, Ellard, & Nicol, 2006; Correia, Vala, & Aguiar, 2007; Hafer, 2000). Thus, to the extent that social comparisons of discretionary income are capable of threatening participants’ sense of personal deservingness, we expected to find that participants would respond more slowly to justice words than neutral words during a modified Stroop task when the referent value of average monthly discretionary income was high versus low.

In Validation Study B, we tested whether our manipulation produces personal relative deprivation in the form of resentment with one’s current level of discretionary income. We also tested the known preconditions (i.e., wanting and deserving) for whether a particular comparison of outcomes produces resentment (Crosby, 1982; Crosby et al., 1986; Olson et al., 1995). Specifically, immediately following our manipulation of personal relative deprivation, participants reported the degree to which (a) their current level of discretionary income was unfair and less than they deserved, (b) they wanted more discretionary income, and (c) they were dissatisfied and resentful with their current level of discretionary income. We expected that participants would report feeling more resentful with their discretionary income, want more discretionary income, and feel that their current level discretionary income was less than they deserved when the referent level of discretionary income was high versus low.

### MANIPULATION VALIDATION STUDY A

#### Method

##### *Participants*

Participants were 38 undergraduate psychology students from the University of Calgary taking psychology courses participating for bonus course credit. One participant’s data were not included in analyses because of a cell phone interruption during the Stroop task. The resulting sample consisted of 22 females and 15 males ( $M$  age = 20.14 years,  $SD$  = 2.35).

##### *Materials and Procedure*

Participants were informed that the study was concerned with examining whether trends in various aspects of people’s finances, including their spending behavior and financial decision making, are related to various information-processing styles. To provide a rationale for completing the modified Stroop task, the experimenter told participants that one style of information processing in which we were interested was reaction times in a color-naming task. To facilitate the credibility of this cover story, participants first completed a Financial Behaviors Scale that included items such as “I mull over a potential purchase for a while instead of making a decision in the heat of the moment.” Within the same questionnaire package, participants then completed a Demographics Questionnaire, which included our manipulation of social comparison of discretionary income (see appendix). Participants first provided basic demographic information and then reported their average monthly income and nondiscretionary spending over the previous 6 months. They then calculated their discretionary income.

The final section of the questionnaire asked participants to calculate their Normative Discretionary Income Index (NDI index), which formed the basis of our manipulation of personal relative deprivation. As shown in the appendix, throughout the questionnaire, participants were asked to explicitly and directly compare their discretionary income with the “average discretionary income of similar others,” who in this case were “students taking psychology courses.” Participants were informed within the questionnaire that the average monthly discretionary income of similar others from a recent survey was either \$759 (“relatively deprived” condition) or \$244 (“not relatively deprived” condition). These specific values were selected based on pretesting of the average monthly discretionary income of participants drawn from the same participant pool (which was approximately \$300). For simplicity, we decided to bracket participants’ NDI index scores by having them place their monthly discretionary income values within boxes ranging from 1 to 10 (each representing \$100 of discretionary income) and using the corresponding scores for comparisons throughout the remainder of the questionnaire. That is, to obtain their NDI index score, participants subtracted 2 (\$244 rounded down) or 8 (\$759 rounded up) from their resulting score, each representing the “not relatively deprived” and “relatively deprived” conditions, respectively. For example, if participants had \$340 of average monthly discretionary income, they were asked to write \$340 into the “3” box on the scale provided. If they were in the “relatively deprived” condition, they would then subtract 8 from 3

to get an NDI index score of  $-5$ . If they were in the “not deprived condition,” they would then subtract 2 from 3 to get a NDI index score of  $+1$ . Thus, NDI index scores could range from  $-8$  to  $+7$ , with more negative scores representing lesser discretionary income than the average similar other.<sup>2</sup> Finally, to enhance the perceived discrepancy between the participants’ discretionary income and the discretionary income of similar others, participants were asked to calculate their adjusted NDI index score, which they were told was achieved by multiplying their unadjusted NDI index score by a qualifier of 122 to attain a dollar value. They were then told that the adjusted dollar value represented how much more or less in discretionary income (in Canadian dollars) they had relative to similar others.

Immediately following the questionnaire, participants were asked to complete a color naming task under the guise that it assessed styles of information processing associated with color preferences. Participants were told that during the task they would see rows of Xs in different colors and lengths appearing on the computer screen. They were instructed to respond to the colors of the Xs as fast and accurately as they could using color-labeled keys on the keyboard.

Based on Hafer (2000), the modified subliminal Stroop task included 8 justice words (e.g., deserve, unfair, injustice), 16 neutral words (e.g., curve, absorb, thoughts) and 8 filler words (neutral in meaning) each presented twice over. The neutral and justice words were matched for word frequency and length (Kucera & Francis, 1967). The words were presented in red, yellow, green, and blue colors, and no two justice words or two colors were presented on more than two consecutive trials (see Hafer, 2000). The task began with 10 buffer trials. Each word was subliminally presented (20ms) and followed by a mask of Xs of the same color and length. Intertrial intervals were set at 1000ms, and the task was administered using Pyscope software (Cohen, MacWhinney, Flatt, & Provost, 1993) on a Macintosh computer.

## Results and Discussion

Data from two participants were not included in analyses because they incorrectly completed the NDI index procedure. Color-identification response latencies from the modified Stroop task were log transformed prior to analyses, although untransformed latencies are presented for purposes of exposition. Following Hafer (2000), color identification errors were removed (4.50%), and response latencies 3 standard deviations above each participant’s mean and below 300ms were considered outliers and were also removed (4.04%; Bargh & Chartrand, 2000).<sup>3</sup>

Log-transformed response latencies were analyzed using a Personal Relative Deprivation Condition (relatively deprived vs. not relatively deprived)  $\times$  Word Type (justice vs. neutral) ANOVA with repeated measures on the second factor. Analyses revealed a statistically significant interaction,  $F(1, 33) = 5.26, p = .03$ . Follow-up analyses revealed that as expected, response latencies for justice words and neutral words were significantly different in the “relatively deprived” condition ( $M_s = 580$  vs.  $563$ ),  $t(15) = 2.8, p = .01$  but not in the “not relatively deprived” condition ( $M_s = 550$  vs.  $552$ ),  $t(18) = -.78, p = .45$ . Neither main effect achieved statistical significance ( $p_s > .28$ ).

Consistent with our expectations, an experimentally induced awareness of personal relative deprivation produced attentional biases toward justice words during the Stroop task (cf. Hafer, 2000). This study demonstrates that personal relative deprivation stemming from social comparisons of discretionary income triggers the activation of concepts relating to the goal of maintaining a commitment to justice (Lerner, 1977). Beyond validating this manipulation as a threat to one’s sense of personal deservingness, to our knowledge, this study is the first to reveal selective attention toward justice involving self-relevant outcomes. Indeed, prior “just world” research using the modified Stroop task has only examined injustices occurring to others.

These results, however, do not indicate whether people feel deprived when they learn that they have less discretionary income than similar others. To that end, in our second validation study, we wanted to make sure that our manipulation of personal relative deprivation produced increased resentment and the perception that one is getting less than he or she deserves.

## MANIPULATION VALIDATION STUDY B

### Method

#### *Participants and Procedure*

Participants were 63 introductory psychology students from the University of Western Ontario participating to fulfill a course requirement. Seven participants incorrectly completed the manipulation procedure and were not included in analyses (e.g., reported a positive NDI index score when they spent more than they made). The resulting sample consisted of 29 women and 27 men with a mean age of 18.84 years ( $SD = 1.78$ ). Participants were told that the study was about financial behavior and decision making, and they were given a questionnaire package to complete. Participants completed the measures in groups of up to 5 people.

**TABLE 6:** Means and Standard Deviations by Conditions of Personal Relative Deprivation and the Intercorrelations Among Measures Used in Validation Study B

Measures	Deprivation Manipulation				<i>t</i>	<i>d</i>	Intercorrelations		
	Deprived	SD	Not Deprived	SD			1	2	3
1. Resentment	4.00	1.54	2.93	1.56	2.59*	.69	—		
2. Deserving or fairness	3.50	1.09	4.66	1.45	3.39**	.91	-.50**	—	
3. Wanting	5.86	1.35	5.11	1.81	1.76 <sup>†</sup>	.47	.52**	-.37**	—

NOTE: Measures represent resentment, deserving, and wanting with respect to current levels of discretionary income. Higher values indicate more of each construct (e.g., greater resentment).

<sup>†</sup> $p < .10$ . \* $p < .05$ . \*\* $p < .01$ .

Participants first completed the Financial Behaviors Scale from the previous validation study and then completed the same demographics questionnaire that included our manipulation of personal relative deprivation (see appendix). The last questionnaire within the package included our dependent measures of interest. Specifically, using 7-point scales, participants reported how satisfied and resentful they were about their current level of discretionary income, their agreement with wanting more discretionary income, and whether their current level of discretionary income was deserved and fair in comparison to other introductory psychology students. The fairness and deservingness items ( $r = .64$ ,  $p < .001$ ) and the satisfaction and resentment items ( $r = .68$ ,  $p < .001$ ) were averaged to form composite measures of resentment and personal deservingness.

## Results and Discussion

As shown in Table 6, each of the dependent measures correlated significantly with one another. More important, participants in the “relatively deprived” condition felt more resentful about their current level of discretionary income and rated their current level discretionary income as less than they deserved than participants in the “not relatively deprived” condition. The difference between conditions in terms of wanting more discretionary income was marginally significant. It is not surprising that the participants generally wanted more discretionary income, with 77% of the sample responding within the “agreement” range of the scale (i.e., 5 to 7).

Relative deprivation researchers have argued that relative deprivation stems from a violated sense of justice or entitlement (Crosby, 1976, 1982; Olson, 1986). Accordingly, following Preacher and Hayes's (2004) bootstrapping procedure for testing indirect effects, we examined whether perceived deservingness mediated the effect of the manipulation of personal relative deprivation on resentment. The bootstrapping procedure revealed that the 95% confidence interval did not cross

0 (.14 and 1.32), indicating that perceived deservingness mediated the manipulation effect on felt unjust deprivation. This finding is also consistent with research demonstrating the importance of deservingness on reactions to injustice (see Ellard & Skarlicki, 2002; Hafer & Bueg, 2005; Lerner, Miller, & Holmes, 1976). Moreover, the combined results of our two validation studies provide good evidence that our NDI index procedure successfully manipulates personal relative deprivation.

## MAIN STUDY 2

### Method

#### Participants

The participants were 52 University of Calgary undergraduate students taking psychology courses. Participants were informed that they would be paid at least \$5 for their participation, and they were required to have gambled in some form at least twice over the previous 3 months. Data from two participants were not included in analyses: One participant completed the NDI index procedure incorrectly and another was correctly suspicious that the NDI index procedure was expected to influence their decision to gamble. The resulting sample consisted of 27 females and 23 males ( $M$  age = 19.58 years,  $SD = 2.52$ ).

#### Materials and Procedure

Participants were informed that the study was concerned with gambling beliefs and attitudes and decision making during a gambling game. They were told that they would first complete a series of questionnaires about gambling beliefs and attitudes and would then be given \$20 and the choice to play a computerized high/low card-cutting game.

Participants first completed six practice trials of the gambling game. Modeled after Breen and Zuckerman (1999), the gambling game involved participants' betting

**TABLE 7:** Descriptive Statistics and Intercorrelations for Measures Used in Study 2

Measures	<i>M</i>	<i>SD</i>	1	2	3	4
1. PGSI	2.40	0.81	(.79)			
2. GABS	2.47	0.42	.50**	(.84)		
3. Bets ( <i>N</i> = 37)	37.97	21.18	.17	.06	—	
4. Gamble (1 = <i>player</i> , 0 = <i>nonplayer</i> )	—	—	.24 <sup>†</sup>	.10	—	—

NOTE: PGSI = Problem Gambling Severity Index; GABS = Gambling Attitudes and Beliefs Scale; Bets = Number of bets made by participants who played the gambling game; When applicable, alpha reliabilities are presented along the diagonal.

<sup>†</sup> $p < .10$ . \*\* $p < .01$ .

that the next card cut from a deck of cards would be either a low card (2 to 7) or a high card (9 to Ace). On each betting trial, participants first made wagers from \$1 to \$10, using a pull-down menu. After selecting whether the card would be high or low, participants then pressed a “draw” button to reveal a card. If the drawn card matched the participant’s selection (e.g., the participant bet \$7 that a low card would be drawn and a 2 card appeared), they would win whatever they wagered and a message would appear informing them of how much they won (e.g., “You WIN \$7!!”). If their selection did not match the drawn card, they would lose their wager and a “Sorry” message would appear. A running tally was displayed on the bottom of the screen informing participants of their available credits. Following Breen and Zuckerman, the rate of bets won was set at 70% for the first 10 trials and diminished by 10% after every subsequent set of 10 trials. Each participant received the same sequence of wins and losses throughout the game regardless of his or her betting strategy.

Following the practice trials (which involved no real money), participants were asked to complete a questionnaire package. Within the package, participants first completed the PGSI and the GABS measures used in Study 1. The last section of the package was the demographics questionnaire that included our NDI index manipulation of relative deprivation used in the validation studies. For this measure, participants were told that we were interested in whether differences between people on a variety of demographic factors might help us better understand decision making. The experimenter was blind to the experimental conditions, which, as in the validation studies, included the “relatively deprived” and “not deprived” conditions.

Immediately following the questionnaire package, participants were given \$20 as payment for their participation. They were then given the option to play the gambling game with the potential to win more or less than the \$20. The experimenter told the participants that the decision to play the game was entirely theirs and there was no pressure to play the game if they did not want to. If participants chose not to play the game, they kept the \$20 and were then debriefed and thanked for their time.

If participants chose to play the game, they were asked to buy in to the game by handing the \$20 bill back to the experimenter. They then faced the computer and pressed a “play” button to begin the game. The experimenter told the participants that they could play for as long as they wanted and wager as much as they wanted (up to \$10). When the participants were finished with the game (either by their own choice or if they lost all their credits), the experimenter handed them their winnings (or \$5 if they ended the game with \$0). Participants were then probed for suspiciousness and debriefed.

## Results and Discussion

Our primary interest with the gambling task was to examine whether our manipulation of personal relative deprivation influenced participants’ decision to gamble. The gambling task, however, also enabled us to examine gambling persistence, which was operationalized as the number of bets made within the game for those who chose to play (Breen & Zuckerman, 1999). Descriptive statistics and intercorrelations among the measures of problem gambling (i.e., GABS, CPGI), decision to play, and number of bets made by players are shown in Table 7. Overall, 74% of the participants chose to gamble. Frequencies of gambler subtype are shown in Table 1. Players won \$27.70 on average.

We analyzed participants’ decisions to play the game (1 = *player*, 0 = *nonplayer*) using a logistic regression analysis that included the manipulation effect (1 = *deprived*, -1 = *not deprived*), mean-centered PGSI scores, and their interaction term. We included the interaction term to test whether the manipulation of personal relative deprivation on decisions to gamble depended on severity of problem gambling, although we had no specific hypothesis in this regard. Consistent with our hypothesis concerning the manipulation effect, a significantly larger proportion of the participants in the “relatively deprived” condition (88%) than in the “not deprived” condition (60%) chose to gamble ( $B = 1.04$ ,  $SE = .50$ , Wald = 4.29,  $p = .038$ , odds ratio = 2.82). The PGSI also predicted decisions to gamble with more problematic gambling resulting in marginally greater

odds of playing the game ( $B = 1.04$ ,  $SE = .59$ ), Wald = 3.15,  $p = .076$ , odds ratio = 2.83. The interaction did not achieve statistical significance ( $p = .35$ ). Similar analyses with the GABS measure also did not reveal a significant interaction ( $p = .38$ ).

Multiple regression analyses were also performed to examine the effects of the manipulation, PGSI scores, and their interaction on the number of bets made by players. The manipulation of personal relative deprivation did not affect the number of bets made during the task between the “relatively deprived” and “not deprived” conditions ( $M_s = 39$  and 36 bets, respectively),  $p = .72$ . No other effects achieved statistical significance ( $p_s > .32$ ). Thus, at least in the context of this study and with this particular gambling task, relative deprivation appears to only predict decisions to gamble and not gambling persistence.

## GENERAL DISCUSSION

The objective of this research was to examine whether personal relative deprivation influences gambling urges and gambling behavior. In Study 1, we demonstrated that self-reports of personal relative deprivation predicted problem gambling severity and current desires to gamble. In Study 2, we found that a greater percentage of “relatively deprived” participants opted to play a real gambling game than “not relatively deprived” participants. The results of two additional manipulation validation studies demonstrated that our manipulation of personal relative deprivation produced concerns with justice and resentment when participants learned that they had less discretionary income than “similar others.” Thus, the combined results of Study 2 are consistent with the notion that gambling is, in part, motivated by personal relative deprivation. Although previous research has linked a number of variables that are seemingly related to personal relative deprivation (e.g., changes in poverty rates, regions and times of economic deprivation) to gambling involvement (e.g., lottery sales, geographical locations of EGMs), the causal role of personal relative deprivation in gambling and the psychological factors involved were previously less well understood. The current findings build on this previous research by demonstrating that the unfairness associated with personal relative deprivation influences gambling desires and behavior.

### Limitations of the Current Research

Limitations of this research are worth noting. First, the samples we recruited are limited to younger adults of a particular privileged group (i.e., university students) who were generally nonproblem gamblers. Although young

adults are the most at risk for developing gambling problems (see Petry, 2005) and thus might make for an important subgroup to investigate, the fact that we recruited only university students—who are generally of higher socioeconomic status—limits the conclusions we can draw from this research. Nevertheless, our findings demonstrate that variance in personal relative deprivation predicted gambling urges and affected gambling behavior, even among these limited samples. Moreover, although severity of problem gambling did not moderate the effect of the personal deprivation manipulation on decisions to gamble in Study 2, only a relatively small percentage of the participants were classified as “problem” gamblers. Thus, the extent to which relative deprivation affects gambling among problem or pathological gamblers is also unknown, as the participants in the current studies were generally nonproblem to low-risk gamblers. It is also important to note that we only recruited participants with recent gambling experiences and thus our results relating personal relative deprivation to gambling are at this point only applicable to this limited population.

Second, our manipulation of personal relative deprivation was limited to social comparisons of discretionary income. It is likely, however, that not all social comparisons of outcomes will lead to increased gambling desires and behavior. For example, relative deprivation stemming from social comparisons of health status may not predict gambling, but financial social comparisons—because they are more closely tied to the outcomes of gambling—might better predict gambling decisions. Thus, the current research did not reveal whether any instance of injustice will lead to increased likelihood of gambling or if an appropriate relation must first exist between what produces relative deprivation (e.g., social comparisons of income) and the subsequent outcomes being sought (e.g., money through gambling).

### Implications and Applications

The present research adds to the relative deprivation and “just world” literatures in at least two ways. First, the results demonstrate that gambling is another potential consequence of personal relative deprivation. Indeed, this research reveals the potential for responses to relative deprivation that have been, to our knowledge, understudied in the relative deprivation and “just world” literatures. In the domain of personal deservingness, people need to have ongoing evidence that their personal situation is just (Lerner, 1977, 1980). Most of the time, people are able to maintain the functional belief that their “world” is a just one, irrespective of their absolute standing (see Crosby, 1976, 1982). Our manipulation of personal relative deprivation, however, provided participants with here-and-now evidence that

presumably threatened their sense of personal deservingness. Such an extant threat to one's sense of personal deservingness, we argue, may be sufficiently compelling to pull for behavioral responses that potentially produce immediate, compensating evidence that one's world *is* just. Gambling offers the prospect of an immediate and potentially full solution to a deficit to one's personal deservingness. Thus, evidence that one is on the winning track might be soothing to the acute experience of personal relative deprivation and obviates the larger problem of whether efforts at self-improvement are feasible in the short term. Such a strategy is, however, ultimately problematic, as those individuals prone to gambling as a means to managing their deservingness concerns will likely only dig themselves into a deeper hole, which might instigate further gambling. Chasing losses, which is an example of this effect, has been identified as an earlier indicator of gambling problems (Toce-Gerstein, Gerstein, & Volberg, 2003).

As noted earlier, research has demonstrated that self-improvement behaviors are, at times, motivated by relative deprivation (e.g., Hafer & Olson, 1993; Olson et al., 1995). We have suggested that gambling might serve as another behavioral means by which people attempt to allay their personal deservingness concerns. However, the relation between whether people attempt to attain the outcomes they feel they deserve through self-improvement or gambling (or through other means) is certainly unknown and open for further investigation. If more conventional self-improving means of reducing relative deprivation are not viable or are perceived as infeasible, then a person may search for justice through other—perhaps self-costly—means. In the current research, we identified and examined gambling as one such potential means. Beyond the investigation of the potential interplay between self-improvement and gambling behavior, another direction for future research might be to investigate whether varying patterns of gambling outcomes might interact with experiences of unjust deprivation to produce gambling persistence. In our gambling task, we controlled the rate at which participants won the game, but it would be interesting to know whether experimental manipulations of winning (or losing) streaks might produce the desire to continue (or cease) gambling as a function of one's prior experience of unjust deprivation.

Of course, there are a number of potentially limiting factors that might prevent someone from gambling regardless of his or her experiences of personal relative deprivation, such as when gambling is not available (Jacques, Ladouceur, & Ferland, 2000) or perceived as immoral (Giacopassi, Vandiver, & Stitt, 1997). Moreover, although the effect of our relative deprivation

manipulation on gambling was not significantly moderated by general gambling beliefs and attitudes in Study 2 (i.e., the GABS), it is unknown whether specific gambling beliefs might play a moderating role in the effects of relative deprivation on gambling (e.g., beliefs in personal luck, illusory control). For instance, it might be the case that experiences of relative deprivation might only influence gambling behavior for individuals who more generally believe in luck: If, for instance, a person believes that he or she is generally unlucky, then perhaps no amount of relative deprivation will affect his or her decision to pursue outcomes by playing a game that is solely determined by luck (cf. Wohl, Young, & Hart, 2007). Indeed, perhaps it is only those “relatively deprived” individuals who believe in luck who will feel that if they gamble, fate will somehow smile on them.<sup>4</sup> An important area for future research, then, is to examine the potential moderating or limiting factors to these findings.

Second, we developed and validated a manipulation of personal relative deprivation that can be adopted for testing other variables relevant to relative deprivation theory (e.g., stress symptoms, self-improvement). Although manipulations of personal relative deprivation exist in the literature (e.g., Hafer & Olson, 1989; H. J. Smith, Spears, & Oyen, 1994; Walker, 1999), they often involve complicated procedures (e.g., an experimenter error leads to an unfair outcome; Hafer & Olson, 1989). The manipulation we developed, on the other hand, can be administered relatively easily, and the discretionary income of similar others can be scaled or changed to apply to many groups of interest (i.e., nonstudent samples). However, even though we stressed the importance of following the instructions, some of our participants found the NDI index procedure confusing and consequently made incorrect calculations. Thus, there are limitations and benefits to this procedure as a manipulation of personal relative deprivation.

The present research also contributes to the gambling literature in at least two ways. First, the results fit well within biopsychosocial models of gambling behavior (see G. Smith et al., 2007) by highlighting social psychological factors. This research, then, should help gambling researchers develop more complex models of gambling and problem gambling by incorporating social psychological and economic contextual factors. Second, this research has implications for clinical work with problem gamblers. Future research is certainly necessary, but to the extent that gambling is at least partially motivated by personal relative deprivation, simply increasing one's awareness of a possible connection between social comparisons of income and gambling behavior may be an effective treatment strategy for people with gambling problems.

**NOTES**

1. Similar correlations with the Personal Relative Deprivation Scale (PRDS) were obtained using the raw Problem Gambling Severity Index (PGSI) scores (i.e., 0 to 27) and the untransformed gambling urge scores: The PRDS correlated significantly with the raw PGSI scores in Samples A ( $r = .30, p = .001$ ) and B ( $r = .19, p = .01$ ) and with the untransformed gambling urges in Samples A ( $r = .28, p = .002$ ) and B ( $r = .20, p = .01$ ).

2. Across all studies using this manipulation, participants who learned that the referent level of discretionary income was higher resulted in significantly more negative Normative Discretionary Income Index scores on average ( $M_s = -3.56, -4.61, \text{ and } -4.16$ ) than participants who learned that the referent level was lower ( $M_s = 2.58, 2.00, \text{ and } 0.04; p_s < .001$ ).

3. The participants made more color-identification errors and had more anticipated responses than we and others have previously observed using this Stroop procedure (e.g., Callan et al., 2006; Hafer, 2000). We suspect that participants were motivated to respond more quickly during the task than previously observed because in this study they were told, "how quickly people react to colors can reveal how they think about important matters in their lives." Nevertheless, the number of response latencies removed did not significantly differ between experimental conditions ( $p = .77$ ) or word category ( $p = .58$ ).

4. Two items from the Gambling Attitudes and Beliefs Scale measure used in Study 2 specifically referenced a general belief in luck: "Sometimes I just know I'm going to have good luck" and "Some people can bring bad luck to other people." As ancillary analyses, we averaged these two items into a single measure of "general belief in luck" ( $r = .56, p < .001$ ) and used the same logistic regression analyses as in Study 2 to predict decisions to gamble. Analyses revealed a marginally significant Belief in Luck  $\times$  Personal Relative Deprivation interaction on decisions to gamble (Wald = 3.54,  $p = .06$ ). Follow-up analyses revealed that the personal relative deprivation manipulation significantly affected decisions to gamble at 1 SD above the mean of "belief in luck" (Wald = 4.59,  $p = .03$ ) but not at 1 SD below the mean (Wald = .09,  $p = .77$ ), suggesting that the manipulation produced increased gambling behavior primarily for people who believed in luck. Although these ancillary findings are consistent with what we are suggesting here in terms of potential moderating factors, their post hoc nature requires that these findings be viewed with caution.

**APPENDIX  
MANIPULATION OF PERSONAL  
RELATIVE DEPRIVATION**

This questionnaire is a part of an ongoing research project examining the discretionary income of students attending the University of Calgary (Western Ontario). *Discretionary income* is defined as the amount of a person's income available for spending after the essentials (i.e., food, clothing, shelter, transportation, and debt) have been taken care of. This research is interested in examining trends in University of Calgary students' discretionary income. We're also interested in how people think about discretionary income as part of a larger study of financial behavior. Please fill out the following questions. It's important that you be as accurate as you can. A calculator will be provided for you to calculate your discretionary income.

1) Please provide the following demographic information about yourself:

Age \_\_\_\_ Sex \_\_\_\_ Living at home? (circle) Y N

Marital Status a) Married c) Widowed e) Separated  
(circle one): b) Living d) Divorced f) Single  
common law

2) Please report your average monthly income (after taxes) over the last 6 months.

\$ \_\_\_\_\_ per month (A)

3) Please provide a percentage breakdown of all income sources in the spaces below:

Employment \_\_\_\_\_ %  
Family (include support for education costs) \_\_\_\_\_ %  
Other \_\_\_\_\_ %  
Total 100%

4) Please provide the average amount you have spent each month on the following items over the past 6 months:

(b) Housing costs (includes utilities) \$ \_\_\_\_\_  
(c) Food costs \$ \_\_\_\_\_  
(d) Clothing costs \$ \_\_\_\_\_  
(e) Transportation costs \$ \_\_\_\_\_  
(f) Debt payments \$ \_\_\_\_\_  
(G) Sum of (b) through (f) \$ \_\_\_\_\_

5) Your discretionary income equals your average monthly income (A) minus your nondiscretionary spending (G).

Please calculate your discretionary income below:

Average monthly income (A) from #2 above

\$ \_\_\_\_\_

Minus your Nondiscretionary spending from #4 (G)

\$ \_\_\_\_\_

Equals your DISCRETIONARY INCOME

\$ \_\_\_\_\_ (DI)

Please continue to the next page...

Please report your discretionary income (DI) from #5 on the previous page:

\$ \_\_\_\_\_ (DI)

**The Normative Discretionary Income Index**

This part of the discretionary income questionnaire asks you to calculate your *Normative Discretionary Income* (NDI) Index score. The NDI index measures people's relative standing in terms of their discretionary income and recent trends in discretionary income. The index uses data reported by similar others, as well as trends in increases or decreases in discretionary income reported within a 6-month period by similar others, to calculate an NDI score for each person.

Our most recent survey with a sample of students taking psychology courses demonstrated an average discretionary income of \$759 [or \$244 = "not deprived"]. Each value on the scale below (1 to 10) represents \$100 dollars worth of discretionary income. Please write your discretionary income (DI) in the appropriate slot on the scale below rounding to the nearest \$100 point value. For example, the average discretionary income from the most recent sample of students taking psychology courses was \$759 [\$244], which when rounded up would be placed into the 8 slot on the scale. If your (DI) value is less than 0 dollars, please place it in the 1-point value slot. If it is more than \$1000, please place it in the 10-point value slot:

1	2	3	4	5	6	7	8	9	10

(continued)

## APPENDIX (CONTINUED)

Now please complete your *unadjusted* NDI index score by subtracting your point value score from the scale above from the point value for the current average students' discretionary income (i.e., 8 [2]).

\_\_\_\_\_ - 8 [2] = \_\_\_\_\_ unadjusted NDI index score (NDI)  
(your point  
score from  
the scale above)

We would now like you to compute your adjusted NDI score. Your adjusted NDI score takes into account recent trends in increases or decreases in discretionary income. While both the adjusted and unadjusted NDI index scores are often used in research like this, the adjusted NDI (A-NDI) index is widely regarded as the best representation of a person's NDI (i.e., his or her discretionary income compared to similar others).

General increases in discretionary income lead to an increased absolute NDI index score, whereas general decreases in discretionary income lead to decreased absolute NDI index scores. Just like the unadjusted NDI you calculated above, each point value for the adjusted NDI represents \$100 of discretionary income, which is reflected in the current qualifier (i.e.,  $+1.22 \times 100 = 122$ ) below. Please calculate your *adjusted* NDI index score by using the following equation that includes the most current NDI index qualifier:

(I) \_\_\_\_\_  $\times$  122 = \$ \_\_\_\_\_ adjusted NDI index score (A-NDI)  
(your (qualifier)  
unadjusted NDI)

This adjusted NDI Index (A-NDI) score represents on average how much more or less in dollars you have relative to similar others. A *negative* A-NDI score means you have on average less than similar others. A *positive* A-NDI score means you have more than similar others.

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