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Running head: PERSONAL RELATIVE DEPRIVATION AND GAMBLING

The Relation between Personal Relative Deprivation and the Urge to Gamble among Gamblers is Moderated by Problem Gambling Severity: A Meta-Analysis

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Abstract

One psychosocial factor that has been identified to motivate gambling is personal relative deprivation (PRD), which refers to resentment stemming from the belief that one is deprived of a desired and deserved outcome compared to some referent. Although several lines of evidence point to a positive association between PRD and the urge to gamble, the factors that might moderate this relation have yet to be investigated. Through a quantitative research synthesis, we sought to test (a) the overall relation between PRD and gambling urges among people reporting recent gambling experience, and (b) whether this relation is moderated by problem gambling severity. Meta-analysis revealed that, overall, higher self-reported PRD was associated with stronger urges to gamble ($r = .26$). A meta-regression revealed that, across studies, the strength of this relation depended on problem gambling severity, such that the relation between PRD and gambling urges was stronger among samples higher in average problem gambling severity. This pattern was corroborated by an analysis of the aggregated individual participant data ($N = 857$), such that PRD predicted gambling urges only among participants higher in problem gambling severity. The potential practical implications and limitations of these results are discussed.

Keywords: personal relative deprivation; gambling; problem gambling; gambling urges; meta-analysis; meta-regression

The Relation between Personal Relative Deprivation and the Urge to Gamble among Gamblers is Moderated by Problem Gambling Severity: A Meta-Analysis

1. Introduction

Although gambling is a harmless form of recreation for most people, excessive gambling can lead to adverse consequences (Griffiths, 2004; Petry, 2005). Accordingly, researchers are interested in what motivates some people to gamble more than others and the factors that can lead people from recreational gambling to problem gambling (PG).

Recently, researchers have identified personal relative deprivation (PRD) as one psychosocial factor that motivates gambling. PRD refers to resentment stemming from the belief that one is deprived of a desired and deserved outcome compared to some referent (e.g., what similar others have; see Crosby, 1976; Smith, Pettigrew, Pippin, & Bialosiewicz, 2012). Callan, Ellard, Shead, and Hodgins (2008) proposed that PRD motivates gambling because gambling might be perceived as a means to attain the outcomes (e.g., money, status) that the gambler feels s/he deserves but might be unable or unwilling to achieve through conventional means (e.g., improving one's employment prospects). Consistent with this idea, Callan et al. (2008) found that participants higher in self-reported PRD reported stronger urges to gamble. In a separate experimental study, they found that participants who were made to feel financially deprived relative to their peers chose to play a real gambling game more frequently than did participants who were not deprived.

There is a growing body of correlational and experimental evidence demonstrating a link between PRD and gambling (Callan et al., 2008, 2011; Haisley, Mostafa, & Lowenstein, 2008; Mishra, Barclay, & Lalumière, 2014; Wohl, Branscombe, & Lister, 2014), but the individual difference factors that moderate this link have yet to be investigated. One factor that might moderate the relation between PRD and the urge to gamble is PG severity. PG is generally characterized by "difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community" (Neal,

Delfabbro, & O'Neil, 2005, p. 125). Gamblers higher in PG severity tend to be more preoccupied with gambling and are less able to control their gambling behavior (Hodgins, Stea, & Grant, 2011; Richard & Humphrey, 2014). PRD may more strongly affect urges to gamble among people higher in PG severity because they have a greater tendency to experience negative affect (e.g., PRD) and to act rashly when experiencing negative affect compared to non-problem gamblers (for a recent meta-analysis, see MacLaren, Fugelsang, Harrigan, & Dixon, 2011). Thus, one potential consequence of this proclivity to gamble among people higher in PG severity is that PRD might affect an urge to gamble more strongly among these gamblers than gamblers lower in PG severity.

We conducted aggregated and individual participant data meta-analyses of published and unpublished studies that measured PRD, PG severity, and gambling urges to test whether PG severity moderates the relation between PRD and gambling urges. First, we expected that, overall, higher PRD would be associated with stronger gambling urges. Second, we explored the moderating role of PG severity in the relation between PRD and gambling urges. If PG severity augments the relation between PRD and gambling urges, then the correlation between PRD and gambling urges should be stronger at higher levels of PG severity.

2. Method

2.1 Study Inclusion

We included in the meta-analyses all of our published ($n = 3$) and unpublished ($n = 5$) studies that, along with various other measures depending on the goals of the individual studies, included measures of PRD, PG severity, and gambling urges. For each study, participants were required to have gambled in some form in the recent past, which varied across studies from once in the last year to twice in the previous 3 months. Brief summaries of the methods for each of the studies are below (see also Table 1 for characteristics of the samples). A search of Google Scholar and PsycINFO in October, 2014, using relevant search

terms (e.g., “relative deprivation”, “problem gambling”, “urges”) revealed no additional studies that included measures of our pivotal constructs.

2.2 Summaries of Studies

Callan, Ellard, Shead, and Hodgins (2008). Callan et al. (2008, Study 1) recruited separate samples (A and B) of university students to complete online surveys. Participants from both samples completed Ferris and Wynne’s (2001) Problem Gambling Severity Index (PGSI). The PGSI is a widely-used nine-item scale that measures severity of PG within the general population. The items relate to maladaptive beliefs, feelings, and behaviours associated with gambling (e.g., “When you gambled, did you go back another day to try to win back the money you lost?”). Items are rated on a 4-point scale (0 = *never*, 3 = *almost always*) and pertain to an individual’s gambling over the previous 12 months. For analysis, we converted raw PGSI scores (0–27) into four meaningful subtypes of gamblers using Currie, Hodgins, and Casey’s (2013) revised scoring system, resulting in scores ranging from 1 (*non-problem*, raw score of 0), 2 (*low risk*, raw scores 1-4), 3 (*moderate risk*, raw scores 5-7), to 4 (*problem gambler*, raw scores 8-27).

Participants from Sample A completed Raylu and Oei’s (2004) Gambling Urge Scale (GUS). The GUS consists of six items relating to current desires to gamble (e.g., “All I want to do now is gamble”; 1 = *strong disagreement*, 7 = *strong agreement*). Participants from Sample B completed a 2-item gambling urge scale: “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” (1 = *no urge or craving*, 7 = *strong urge or craving*).

Participants from both samples completed Callan et al.’s (2008) 4-item Personal Relative Deprivation Scale (PRDS), which was designed to assess people’s general perceptions and emotions associated with comparing their outcomes to the outcomes of similar others (e.g., “I feel deprived when I think about what I have compared to what other

people like me have”; 1 = *strongly disagree*, 6 = *strongly agree*). Higher scores indicate higher PRD.

Callan, Shead, and Olson (2011). In their Study 4, Callan et al. (2011) recruited a community sample of participants for a study on gambling beliefs and decision-making. Participants completed the PGSI, GUS and a revised, 5-item version of the PRDS. This revised scale included an additional item from the original (“I feel dissatisfied with what I have compared to what other people like me have”).

Olson, Callan, and Shead (2012). Olson et al. (2012) conducted 4 studies on the effects of advertisements on gambling attitudes and behavior. For Study 1, among various other measures (e.g., exposure to gambling advertisements), a community sample of participants completed the PGSI, GUS, and the 5-item PRDS from Callan et al. (2011). The PRDS across Olson et al.’s studies used a 7-point *disagree/agree* scale.

In Studies 2 and 3, introductory psychology students evaluated television advertisements related to gambling, luxury products, or mundane products. They also completed the PRDS, PGSI, and GUS. Study 4 was similar to Studies 2 and 3 (i.e., involved watching television advertisements) and also included the PGSI, GUS, and PRDS.

Callan and Dunn (2012). Callan and Dunn recruited participants through Amazon’s Mechanical Turk (Buhrmester, Kwang, & Gosling, 2011). Participants completed the 5-item PRDS (6-point scale), GUS, and PGSI, along with other measures (e.g., income, perceived stress).

3. Results

3.1 Data Analysis

All effect sizes included in the aggregated data meta-analysis were product-moment correlations between PRD and gambling urges. Table 1 shows these correlations and their 95% confidence intervals (CI). We analyzed the data using the Metafor package in R

(Viechtbauer, 2010). Correlations were transformed with the Fisher Z_r transformation; the results were converted back to r for interpretation of the mean effect size. Due to variability in the designs and sample characteristics of the studies, we report the results of both fixed effects and random effects (using the restricted maximum-likelihood estimator) models.

3.2 Mean Effect Size

Shown in Table 1, the random effects weighted mean correlation between PRD and gambling urges was .261 ($Z = 6.43, p < .0001$; Fixed effects: $r = .263, Z = 7.78, p < .0001$), indicating that, overall, there is a small-to-medium positive correlation between PRD and gambling urges. A test of heterogeneity in effect sizes between studies was not statistically significant, $Q = 10.32, p = .17$, although Q has low power when the number of studies is small (Higgins & Thompson, 2002) and a non-significant Q does not preclude exploration of moderators. The I^2 statistic (Higgins & Thompson, 2002), which estimates the percentage of variance in effect sizes that is due to between-studies variability than sampling error, was 28.10%. Rosenthal's (1979) fail-safe N indicated that 159 missing studies with null results would be needed to render the observed mean effect size to $p > .05$, suggesting that the observed result was not unduly affected by publication bias.

3.3 Meta-Regression

Mixed and fixed effects meta-regressions were performed to test whether PG severity explains variability in the correlations between PRD and gambling urges across the studies. The mean level of PG severity from the PGSI for each study is shown in Table 1 (1 = *non problem gambler*, 4 = *problem gambler*). The mixed effects analysis indicated that there was no residual heterogeneity in the effect sizes ($\tau^2 = 0$) so it simplifies to a fixed effects case (see Viechtbauer, 2008). This analysis revealed that the size of correlations between PRD and gambling urges was significantly related to sample means of PG severity ($B = .23, SE = .08$,

95% CI = [.06, .39]), $Z = 2.75$, $Q_{\text{model}} = 7.55$, $p = .006$, indicating that the link between PRD and gambling urges is stronger at higher levels of PG severity.¹

3.4 Analysis of Individual Participant Data

We complemented our meta-analysis of the aggregated data with an individual participant data meta-analysis (see, e.g., Cooper & Patall, 2009; Curran & Hussong, 2009; Riley, Lambert, & Abo-Zaid, 2010). That is, the raw data across our studies were pooled to examine whether the relation between PRD and gambling urges is moderated by PG severity (while controlling for any between-sample differences at the level of study). Following Aiken and West (1991), we performed a moderated regression analysis where gambling urges were regressed onto PRD, PG severity, the study of participants (weighted effect coded with 7 coded vectors), all of the possible two-way interactions, and the three-way interaction term. Because some measures used different scale-points across studies, we standardized gambling urges, PGSI scores, and PRDS within study prior to analysis.

Consistent with our meta-regression results, these analyses revealed a significant PRD X PG Severity interaction for gambling urges ($B = .13$, $SE = .03$), $t(825) = 4.11$, $p < .001$.^{2,3} Shown in Figure 1, follow-up analyses showed that PRD significantly related to gambling urges at the mean ($B = .14$, $SE = .03$), $t(825) = 4.75$, $p < .001$, and one *SD* above the mean of PGSI ($B = .27$, $SE = .04$), $t(825) = 6.18$, $p < .001$, but not at one *SD* below the mean of PGSI, ($B = .02$, $SE = .04$), $t(825) = 0.43$, $p = .67$.

4. Discussion

¹ The same analysis using the mean of the raw PGSI scores yields the same conclusion ($B = .06$, $SE = .02$, 95% CI = [.02, .11]), $Z = 2.82$, $Q_{\text{model}} = 7.55$, $p = .005$.

² Because gambling urges are highly skewed, we also performed these analyses using bootstrapping (10,000 resamples, SPSS® 21), which does not require distributional assumptions. These analyses revealed the same interaction ($B = .13$, $SE = .038$), bias-corrected accelerated 95% CI = .05, .19, $p < .001$.

³ A separate regression analysis showed that the PRD X PG severity interaction for gambling urges remained statistically significant while controlling for participant age, gender, and publication status of the sample to which participants' belonged and their interaction terms with PRD and PG severity ($B = .11$, $SE = .03$), $t(828) = 3.31$, $p < .001$ (13 participants across studies did not provide their age).

The results of the meta-analyses demonstrate that, overall, there is a positive association between PRD and gambling urges. This relation was moderated by PG status both for the aggregated and individual participant data meta-analyses: the relation between PRD and the urge to gamble was stronger at higher levels of PG severity. This meta-analytic finding, which the previous individual studies were insufficiently powered to examine, suggests that gamblers higher in PG severity may be particularly affected by PRD in terms of gambling urges.

4.1 Limitations and Future Directions

Given the cross-sectional nature of the studies, we can only speculate about causal direction. Nonetheless, experimental evidence shows that experiences of PRD, such as adverse social comparisons of discretionary income, can causally increase gambling (Callan et al., 2008, Haisley et al., 2008; Mishra et al., 2014; Wohl et al., 2014). Longitudinal studies that examine how PRD affects gambling over time and how these effects might be moderated by, and further lead to, PG severity are needed to gain a fuller understanding of the potentially bi-directional relations among these variables.

As is common in non-clinical samples of gamblers, the average level of PG severity was relatively low across our studies (see Table 1). Thus, whether our findings generalize to problem or pathological gamblers remains to be elucidated. Nonetheless, our results suggest that PRD relates to the stronger urges to gamble even among more moderate problem gamblers.

4.2 Practical Implications

The current findings suggest potential targeted interventions for the treatment of gambling problems. Given the relatively high association between PRD and gambling urges among individuals higher in PG severity, treatment approaches could aim to help problem gamblers overcome feelings of PRD that may trigger gambling urges and subsequent relapse.

This approach may be most easily incorporated into a cognitive therapy approach to treatment that involves evaluating thoughts, disputing maladaptive thoughts, and cognitive restructuring with respect to one's perceived "lot in life" (Hodgins & Holub, 2007).

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Table 1. *Summary of Meta-Analysis and Study Characteristics*

Study	<i>N</i>	<i>r</i>	95% <i>CI r</i>	<i>M (SD) PGSI</i>	% Women	<i>M (SD) Age</i>	Published	Sample
Callan et al. (2008), Study 1, Sample A	130	.275*	[.11, .42]	2.10 (.82)	71	20.63 (4.22)	Yes	University Students
Callan et al. (2008), Study 1, Sample B	166	.203*	[.05, .35]	1.51 (.72)	65	19.32 (4.94)	Yes	University Students
Callan et al. (2011), Study 4	83	.443*	[.25, .60]	2.48 (.98)	49	43.85 (14.51)	Yes	Community
Olson et al. (2010), Study 1	102	.250*	[.06, .42]	1.97 (.85)	53	28.51 (11.86)	No	Community
Olson et al. (2010), Study 2	72	.278*	[.05, .48]	1.32 (.60)	58	18.93 (2.51)	No	University Students
Olson et al. (2010), Study 3	70	.060	[-.18, .29]	1.36 (.64)	79	18.99 (3.24)	No	University Students
Olson et al. (2010), Study 4	73	.124	[-.11, .34]	1.36 (.65)	64	19.26 (.58)	No	University Students
Callan & Dunn (2012)	161	.359*	[.22, .49]	2.33 (.99)	60	34.13 (12.26)	No	Online (% Students unknown)
Fixed Effects	857	.263*	[.20, .33]					
Random Effects	857	.261*	[.18, .33]					

Note: PRD = Personal Relative Deprivation. PGSI = Problem Gambling Severity Index. *r* = correlation between PRD and gambling urges.

* $p < .05$

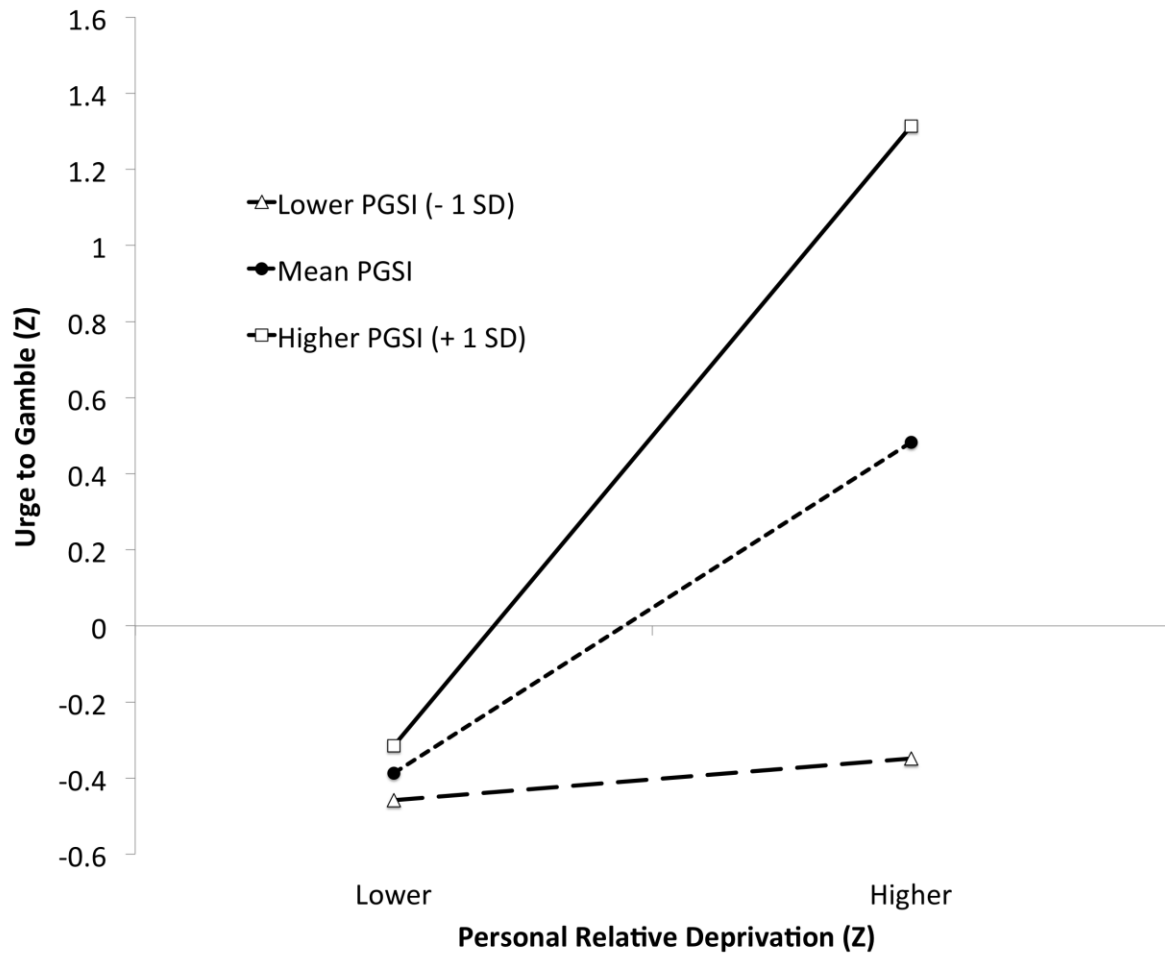


Figure 1. The relation between personal relative deprivation and gambling urges as a function of problem gambling severity.

Highlights

- Meta-analysis indicates personal relative deprivation (PRD) relates to gambling urges
- Relation between PRD and gambling urges is moderated by problem gambling severity
- PRD- gambling urges association is stronger at higher levels of problem gambling severity.

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Contributors

Mitchell Callan, N. Will Sheard, and James Olson wrote the first draft of the manuscript. Mitchell Callan conducted the statistical analysis. All authors contributed to and have approved the final manuscript.

Conflict of Interest

All the authors declare that they have no conflicts of interest.