

# The Mediating Role of Psychological Distress in Excessive Gambling Among Young People: A Four-Country Study

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**Running head:** Psychological Distress and Excessive Gambling

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## The Mediating Role of Psychological Distress in Excessive Gambling Among Young People: A Four-Country Study

### Abstract

**Background and aims** Loneliness and a low sense of mastery have been associated with excessive gambling, but the underlying processes of these relationships remain unstudied. Because psychological distress can increase vulnerability to excessive gambling, we investigated its mediating role in these relationships among young people. To meet the need for cross-country research, we also observed how these relationships occur in four countries with different cultures. **Design, setting and participants** Demographically balanced cross-sectional survey data were collected for 15–25-year-olds in Finland (n=1200; 50% male), the United States (n=1212; 49.8% male), South Korea (n=1192; 49.6% male) and Spain (n=1212; 51.2% male). **Measurements** Excessive gambling was measured with the South Oaks Gambling Screen, psychological distress was assessed with the 12-Item General Health Questionnaire, loneliness was measured with the Three-Item Loneliness Scale and low sense of mastery was assessed with the Pearlin Mastery Scale. Associations were examined first using zero-inflated negative binomial regression analyses with excessive gambling as the outcome. In addition, path analyses were performed to study how loneliness and low sense of mastery relate to excessive gambling, with psychological distress as the mediating variable. **Findings** Loneliness and low sense of mastery were associated indirectly with excessive gambling via psychological distress in all country samples. Low sense of mastery was also directly associated with excessive gambling. There was a direct association between loneliness and excessive gambling only in samples from South Korea and Spain. **Conclusions** Psychological distress is an important factor in understanding how loneliness and sense of mastery relate to gambling.

**Keywords:** excessive gambling, psychological distress, loneliness, sense of mastery, adolescents, young adults

## Introduction

There is a growing concern worldwide regarding gambling as a potential source of harm. For example, in the United States, a group of researchers recently signed a call for the gambling industry, stakeholders and the federal government to take more responsibility so problems related to gambling can be minimised with properly scaled prevention, treatment and recovery [1]. Global gambling expenditures have risen to hundreds of billions of euros transferred from consumers to the industry each year, whereas individuals, families and communities tend to experience multiple financial, mental and social problems because of excessive gambling [2]. Moreover, despite age restrictions and other limitations placed on underage gambling, positive social portrayal and technological advances have made gambling popular and even accessible among adolescents [3–5].

One of the most notable dangers of gambling is that it can become excessive in a way comparable to substance-related addictions [6–8]. Because most of the research concentrates on harms that are expected to be caused by excessive behaviours, situational and sociocultural factors have received less attention. However, some evidence suggests that excessive behaviours can also be caused by underlying chronic psychosocial problems [9,10]. In this study, we adapt the latter causal assumption, positioning excessive gambling as the outcome rather than a predictor.

Among psychosocial factors, loneliness plays an important role in excessive behaviours. For example, recreational drug use is higher among the lonely, [11] and problem gamblers experience more loneliness [12,13]. In addition, a great deal of research has associated loneliness with Internet and digital addiction [12,14–16]. Loneliness is a subjective feeling in which one's social relationships are qualitatively or quantitatively deficient [17]. Loneliness is

an unpleasant experience, and chronic loneliness due to prior experiences of isolation can be a major source of psychological distress in people [18,19]. Different social normative environments might increase the risk of loneliness for different reasons, with a lack of satisfying relationships being more probable in stricter cultures and physical isolation being more probable in lenient cultures [20].

One possible explanation for excessive behaviours lies in the adoption of a high controlled orientation, which typically predicts poor well-being on a personal level [21]. As Orford [22] points out, power and powerlessness lie at the core of addictions as industries and their stakeholders tend to profit at the expense of vulnerable populations. Sense of mastery refers to psychological resources that help individuals cope with difficult life situations [23]. High mastery means that an individual has control over one's life and has the means to implement positive adaptation strategies [24]. Individuals with low mastery, in contrast, are less capable of avoiding negative events and chronic problems. Earlier research has related low sense of mastery to increased psychological distress [25–27] and excessive gambling [28]. Thus, high sense of mastery might help people cope with life stressors, whereas people with low sense of mastery might resort to excessive behaviours to cope with these kinds of stressors.

The healthy functioning of individuals depends on their psychosocial well-being and the integration of experiences through social interaction [9,18,21]. In particular, interpersonal traumas and maltreatment in childhood are linked to later distress, poor integration into society and addictive behaviours [29,30]. Similarly, comorbidity of other excessive behaviours or psychological distress is commonly associated with excessive gambling [2,31–35]. Although it is not the only pathway to excessive gambling, Blaszczynski and Nower [10] recognized that psychological distress can increase vulnerability to excessive gambling. Based on prior research

findings, their model suggests that psychological distress contributes specifically to emotional vulnerability toward problem and pathological gambling, especially among females. Emotionally vulnerable individuals are likely to gamble to alleviate aversive affective states. However, more up-to-date research is needed to examine the role of psychological distress in diverse and non-clinical samples.

This article is focused on the mediating role of psychological distress in excessive gambling among 15–25-year-olds in Finland, the United States, South Korea, and Spain, with loneliness and sense of mastery as the predicting variables. Excessive gambling by young people is a global phenomenon, but there is a need for cross-country research investigating potentially related psychosocial factors. This study's cross-country design facilitated the comparison of the same psychological phenomenon in culturally different settings. Finland, the United States, South Korea, and Spain are also geographically distinct, as they represent the Nordic, Western, Eastern, and Southern European nations, respectively. These countries share similarities in their gambling prevalence rates [36], although they differ in gambling laws and regulations. Our research questions were as follows:

- 1) Does psychological distress mediate the relationship between loneliness, sense of mastery and excessive gambling?*
- 2) Are there any differences in the relationships between the independent variables and excessive gambling in the sample countries?*

## Methods

### *Participants*

The sample consisted of 4,816 young people ages 15–25, of whom 1,200 were from Finland (mean 21.29, SD 2.85; 50% male), 1,212 were from the United States (mean 20.05, SD 3.19; 49.8% male), 1,192 were from South Korea (mean 20.61, SD 3.24; 49.6% male) and 1,212 were from Spain (mean 20.07, SD 3.16; 51.2% male). All samples were demographically balanced in terms of age, gender and living area. The participants were recruited from research panels administrated by Dynata. There were no missing data. The ethics committee of [ANONYMIZED] region stated in December 2016 that the study included no ethical issues.

### *Measures*

Excessive gambling was measured using the South Oaks Gambling Screen (SOGS), which is based on the diagnostic criteria of pathological gambling [37]. The participants were asked to assess whether they had experienced gambling-related problems such as gambling more than intended, arguments with people about gambling and borrowing money from multiple sources during the past year. The scale contains 20 binary-scored items, giving a range of 0 to 20. The scale had good internal consistency. Cronbach's alpha ( $\alpha$ ) was .89 in Finland, .90 in the United States, .80 in Spain and .68 in South Korea. To minimise possible biases in estimates of excessive gambling that might result from arbitrary categorization and the use of low cut-off points [38,39], the SOGS was used as a continuous variable. Higher values indicate higher levels of gambling problems.

Psychological distress was measured with the 12-item General Health Questionnaire (GHQ-12) which is typically used to screen for current minor mental health problems among patients in general health care [40]. The questionnaire had items assessing general factors of well-being,

such as concentration, enjoyment, self-confidence, and happiness. The  $\alpha$  was .88 in Finland, the United States and South Korea, and it was .86 in Spain. The instrument was scored using bimodal scoring (0-0-1-1) for all 12 items, giving a range between 0 and 12. Higher values indicate higher psychological distress.

Loneliness was measured using the 3-item Loneliness Scale, which is a shorter but equally usable version of the original UCLA Loneliness Scale [41]. Its  $\alpha$  was .83 in Finland, .82 in the United States, .81 in Spain and .84 in South Korea. The participants were asked how often they felt a lack of companionship, left out and isolated from others. The response scale was 1 (hardly ever), 2 (some of the time) and 3 (often). The items were summed and then divided by 3 to acquire average scores with values ranging from 1 to 3. Higher value indicates a higher sense of loneliness.

Sense of mastery was measured using the 7-item Pearlin Mastery Scale [23]. The participants were asked to assess how strongly they agreed or disagreed with statements about their control over their life's events and problems (e.g., I have little control over the things that happen to me) using a scale ranging from 1 (strongly agree) to 4 (strongly disagree). To unify the scoring with other variables, the first five items were inverted, after which a sum variable was created and divided by 7 to acquire average scores with values in the range 1–4. Thus, higher values indicate a lower sense of mastery. The  $\alpha$  values were .79 in Finland, .76 in the United States, .72 in Spain and .71 in South Korea.

Age and gender were used as demographic control variables.

### *Analyses*

Several multivariate analysis methods were used to examine the associations between independent variables and the dependent variable. Although the sample size is considerably high, the distributions are moderately to highly skewed, which can result in biased estimates. This skewness applies especially to the SOGS (see Figure 1). Thus, the normality of the curves cannot be assumed. Zero-inflated negative binomial regression (ZINB) analyses were conducted to account for overdispersion and excess zeroes. According to Yang et al. [42], ZINB models perform consistently well in such situations over alternatives. By analysing excess zeroes separately using odds ratios (OR), ZINB gives more proper estimates of the effects of loneliness, mastery and psychological distress on excessive gambling. These effects, in turn, are analysed using incidence rate ratios (IRR), which are typically used to analyse count variables such as those described here.

In addition to ZINB regression analyses, generalized structural equation model based path analyses were used to examine mediation between the dependent variable and independent variables. Psychological distress was positioned as a mediating variable, with loneliness and low sense of mastery as independent variables. The SOGS was the dependent variable in all analyses.

### **Results**

Gambling is prevalent in all four country samples, but there were some minor differences in the distribution of SOGS scores (see Figure 1). In all countries, most respondents did not report experiencing problems related to excessive gambling. This was especially true in South Korea, where almost two thirds of the respondents had a SOGS score of 0, whereas in Finland and Spain, only half of the respondents had similar scores. The highest rate of respondents with



excessive gambling was in Finland (n=631). However, the severity of excessive gambling was highest among Spanish respondents when a cut-off of 4 or more problems was crossed, and the differences evened out only in the proportion exceeding a score of 13 or more problems.

The results of ZINB analyses are reported in Table 1. Similarities and differences exist among the four countries with varying significances, especially in terms of excess zeroes. Here, distress had a significant association with excessive gambling, but only in the U.S. sample. Loneliness and low sense of mastery had no significant associations with excessive gambling in any countries, whereas age was significant in Finland, the United States and Spain, and gender was significant in Finland and Spain. The ORs for age were similar in these three countries. In Finland and the United States, age increased the risk of excessive gambling by 28 per cent, whereas in Spain, age increased the risk by 21 per cent. Males had increased the risk excessive gambling, but only in Finland and Spain. None of the variables predicted the lack of excessive gambling in South Korea.

Regarding the presence of excessive gambling, only low sense of mastery and gender showed consistent significance in all countries. Rate ratios varied also among countries. The rate ratios for low sense of mastery varied from 1.31 (95% CI 1.02–1.67) in the U.S. data to 2.10 (95% CI 1.48–2.96) in South Korean data, with data from Finland (IRR: 1.56; 95% CI 1.24–1.96) and Spain (IRR: 1.39; 95% CI 1.10–1.74) falling in between. Thus, for every increase in low sense of mastery, the increase in SOGS scores can be expected to be 31 per cent in the United States, 39 per cent in Spain, 56 per cent in Finland and 110 per cent in South Korea. Being male increased the SOGS scores by 69 per cent in Spain, 81 per cent in the United States, 101 per cent in Finland and 185 per cent in South Korea.

In contrast, loneliness was a significant predictor of excessive gambling only in South Korea (IRR: 1.65; 95% CI 1.23–2.22) and Spain (IRR: 1.49; 95% CI 1.24–1.79), psychological distress only in Finland (IRR: 1.06; 95% CI 1.02–1.10) and the United States (IRR: 1.07; 95% CI 1.02–1.12) and age only in South Korea (IRR: 0.93; 95% CI .89–.97). Here, every increase in loneliness showed a 65 per cent increase in excessive gambling in South Korea and a 49 per cent increase in Spain. Every increase in psychological distress showed an approximately 6–7 per cent increase in excessive gambling in Finland and the United States. Lastly, the relationship between age and excessive gambling was inverse in South Korea, meaning that every increase in age decreased excessive gambling by 7 per cent.

Further analyses (Figures 2a–2d, Tables 2a–2d) show the direct, indirect, and total effects of loneliness and low sense of mastery on excessive gambling, with psychological distress as the mediating variable. The effects are similar to previous analyses, as low sense of mastery is the overall strongest predictor of the severity of excessive gambling. Loneliness had a strong, significant direct and total effect in South Korea and Spain, but not in Finland and the United States. However, the indirect effect was significant in all four countries. Psychological distress had a fairly low direct effect on excessive gambling and was only a partial mediator for the indirect effects of loneliness and low sense of mastery on excessive gambling.

## **Discussion**

In this article, we aimed to examine how psychological distress mediates the associations of sense of mastery and loneliness with the severity of excessive gambling in cross-country data. Cross-country analyses revealed varied results regarding the associations, but low sense of mastery was a consistently significant predictor of the severity of excessive gambling in all countries, both directly and indirectly, with psychological distress as a partial mediator. In

contrast, loneliness predicted excessive gambling indirectly in all countries, but direct effects were found only in the South Korean and Spanish data. Moreover, indirect effects were not strong compared to direct effects, probably because psychological distress did not have a strong association with excessive gambling.

Low sense of mastery and loneliness had significant effects on psychological distress, which is in line with former research. Indeed, low sense of mastery is a likely stressor, so it contributes to the amount of distress a person might have [26]. Similarly, loneliness has been found to activate neuroendocrine stress mechanisms in both animal and human studies [19].

The low effect of psychological distress on the severity of excessive gambling was surprising, considering how closely psychiatric disorders are associated with excessive gambling [12,31]. One possible explanation for this result could be that there are multiple ways to attempt to cope with distress, and gambling is not among the most attractive alternatives if one does not already have a strong predisposition towards gambling. As discussed earlier, in loneliness, social relationships are qualitatively or quantitatively deficient, [20] with varying degrees and roles in different social normative environments. Thus, in collectivistic and socially cohesive societies such as Spain and South Korea, the role of loneliness – probably coming from lack of satisfying relationships – might be stronger in addictive behaviours such as excessive gambling.

As a cross-country study, the results provide insight into how different social and cultural environments might affect the psychosocial factors behind distress or excessive gambling. For instance, strict gambling regulations and overall negative gambling attitudes in South Korea might explain the overall lower excessive gambling levels among South Korean participants [43]. However, male gender and sense of mastery predicted the severity of excessive gambling

in all countries, suggesting that these factors may not be as country dependent as other factors are. Because studies have linked trait impulsivity with excessive gambling [44,45], in future studies, it might be useful to consider whether sense of mastery is involved in these kinds of associations in some way. It is also worthwhile to recognize that, although gambling might be potentially harmful, psychosocial difficulties in life might also contribute to the development of excessive and harmful behaviours [9,10] even though the majority of people do not seem to form this kind of harmful relationship with gambling.

Our study had some limitations. First, no causal attributions can be made because of the cross-sectional nature of the data, and all suggested causalities are purely theoretical. Although our analyses provided some theoretical evidence for psychological distress as a mediating variable, this needs to be verified in longitudinal settings. Second, because of the complexity of human behaviour, the variables in our analyses may have more complicated and reciprocal relationships than we could provide here. Third, the data are not targeted exclusively for those who experience harm or even for those who gamble. The associations might be stronger in these groups. Finally, self-reported data are susceptible to pressure to provide socially desired answers, particularly in terms of stigmatized phenomena such as excessive gambling; however, it can be expected that the use of an anonymous online survey makes this bias less likely to occur compared to less anonymous situations.

This study showed strong evidence for the effects of psychological distress on excessive gambling. Impairments in psychosocial well-being can influence various harmful behaviours, but they do not necessarily lead to excessive gambling. However, psychological distress can increase the severity of excessive gambling among those who gamble. Prevention and

intervention strategies should focus on recognizing and improving young individuals' overall well-being. Reinforcing youths' sense of mastery could be particularly beneficial.

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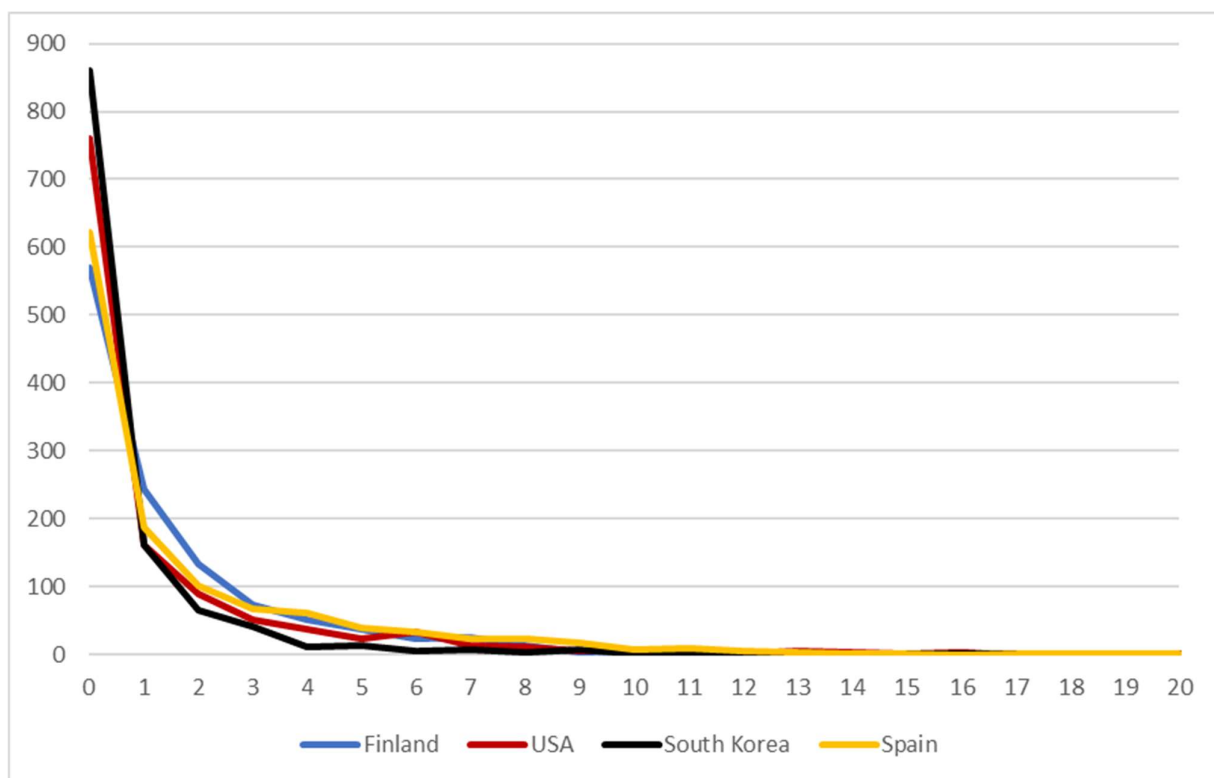
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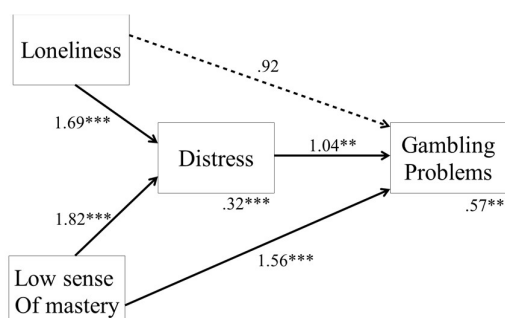
## Tables and figures



**Figure 1.** Distribution of excessive gambling in Finnish, U.S., South Korean and Spanish data, as measured by the SOGS.

**Table 1.** Zero-inflated negative binomial regression models explaining the severity of excessive gambling and excess zeroes (no excessive gambling).

	Finland			United States			South Korea			Spain		
	log(b)	IRR	Robust SE	log(b)	IRR	Robust SE	log(b)	IRR	Robust SE	log(b)	IRR	Robust SE
<i>Excessive gambling</i>												
Distress	<b>.05**</b>	<b>1.06**</b>	.02	<b>.07**</b>	<b>1.07**</b>	.02	.04	1.04	.03	.04	1.04	.03
Loneliness	.01	1.01	.12	-.10	.90	.12	<b>.50**</b>	<b>1.65**</b>	.15	<b>.40***</b>	<b>1.49***</b>	.09
Low sense of mastery	<b>.44***</b>	<b>1.56***</b>	.12	<b>.27*</b>	<b>1.31*</b>	.13	<b>.74***</b>	<b>2.10***</b>	.18	<b>.33**</b>	<b>1.39**</b>	.12
Age	-.03	.98	.02	.04	1.04	.02	<b>-.07**</b>	<b>.93**</b>	.02	.01	1.01	.02
Male gender	<b>.70***</b>	<b>2.01***</b>	.11	<b>.59***</b>	<b>1.81***</b>	.13	<b>1.05***</b>	<b>2.85***</b>	.15	<b>.53***</b>	<b>1.69***</b>	.11
	log(b)	OR	Robust SE	log(b)	OR	Robust SE	log(b)	OR	Robust SE	log(b)	OR	Robust SE
<i>No excessive gambling</i>												
Distress	-.03	.97	.10	<b>-.98***</b>	<b>.37***</b>	.25	-2.12	.12	1.66	-.10	.90	.07
Loneliness	-.03	.98	.57	-.08	.93	.48	-1.26	.03	1.15	.28	1.32	.24
Low sense of mastery	.49	1.62	.65	-.16	.85	.38	.97	2.63	.77	-.22	.80	.30
Age	<b>-.32**</b>	<b>.72**</b>	.12	<b>-.33*</b>	<b>.72*</b>	.14	.13	1.14	.12	<b>-.24**</b>	<b>.79**</b>	.08
Male gender	<b>-1.28**</b>	<b>.28**</b>	.48	-.04	.96	.64	.46	1.59	1.03	<b>-.88***</b>	<b>.41***</b>	.23
(/ln)alpha	.03	1.03		<b>.79***</b>	<b>2.21***</b>		<b>1.00***</b>	<b>2.73***</b>		-.08	.93	
* $p < .05$ ; ** $p < .01$ ; *** $p < .001$												
Wald .066 $\chi^2$ : (5)	68.14			38.23			118.28			58.90		
Max. likelihood R <sup>2</sup>	.13			.14			.12			.16		
Cragg & Uhler's R <sup>2</sup>	.13			.15			.14			.16		
McFadden's Adj. R <sup>2</sup>	.03			.04			.05			.04		

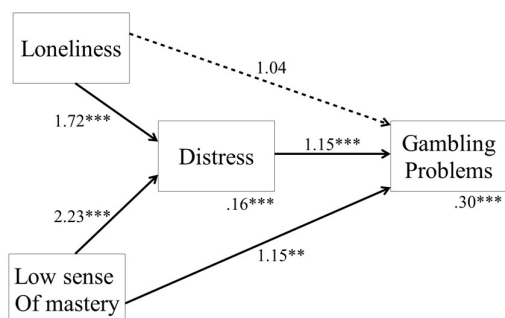


**Figure 2a.** Path model, Finnish data. The effect of loneliness and low sense of mastery on excessive gambling, with psychological distress as a mediating variable. Values are in rate ratios.

**Table 2a.** Direct and indirect effects of loneliness and low sense of mastery, along with the direct effect of psychological distress on excessive gambling. Finnish data. Values are in log(b).

Excessive gambling	Direct effect	Robust SE	Indirect effect	Bootstrap SE	Total effect	Bootstrap SE
Distress	.04**	.02	-	-	.04**	-
Loneliness	-.08	.09	.02**	.01	-.06	.09
Low sense of mastery	.44***	.09	.03**	.01	.47***	.09

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Bootstrap: 5000

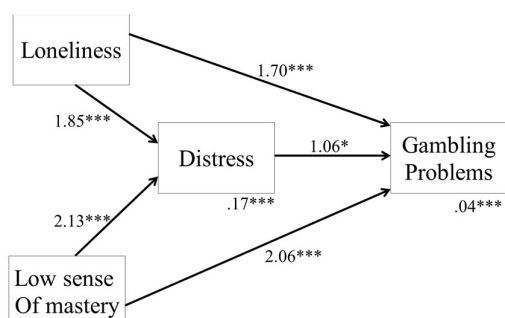


**Figure 2b.** Path model, U.S. data. The effect of loneliness and low sense of mastery on excessive gambling, with psychological distress as a mediating variable. Values are in rate ratios.

**Table 2b.** Direct and indirect effects of loneliness and low sense of mastery, along with the direct effect of psychological distress on excessive gambling. U.S. data. Values are in log(b).

Excessive gambling	Direct effect	Robust SE	Indirect effect	Bootstrap SE	Total effect	Bootstrap SE
Distress	.14*	.02	-	-	.14*	-
Loneliness	.04	.11	.08*	.01	.11	.11
Low sense of mastery	.35*	.12	.11*	.02	.46*	.12

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Bootstrap: 5000

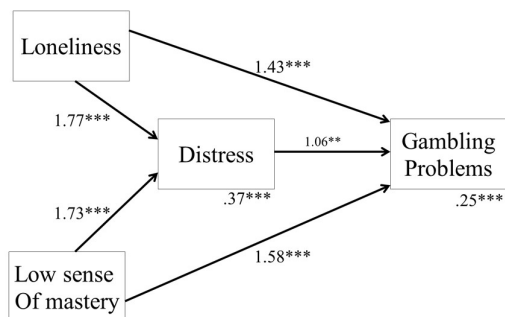


**Figure 2c.** Path model, South Korean data. The effect of loneliness and low sense of mastery on excessive gambling, with psychological distress as a mediating variable. Values are in rate ratios.

**Table 2c.** Direct and indirect effects of loneliness and low sense of mastery, along with the direct effect of psychological distress on excessive gambling. South Korean data. Values are in log(b).

Excessive gambling	Direct effect	Robust SE	Indirect effect	Bootstrap SE	Total effect	Bootstrap SE
Distress	.06*	.02	-	-	.06*	-
Loneliness	.53***	.13	.04*	.02	.57***	.13
Low sense of mastery	.73***	.17	.04*	.02	.77***	.17

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Bootstrap: 5000



**Figure 2d.** Path model, South Korean data. The effect of loneliness and low sense of mastery on excessive gambling, with psychological distress as a mediating variable. Values are in rate ratios.

**Table 2d.** Direct and indirect effects of loneliness and low sense of mastery, along with the direct effect of psychological distress on excessive gambling. South Korean data. Values are in log(b).

Excessive gambling	Direct effect	Robust SE	Indirect effect	Bootstrap SE	Total effect	Bootstrap SE
Distress	.06**	.02	-	-	.06**	-
Loneliness	.36***	.09	.03**	.01	.39***	.09
Low sense of mastery	.46***	.11	.03**	.01	.49***	.10

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Bootstrap: 5000