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The relationship between irrational gambling beliefs and gambling behavior: application of autoregressive cross-lagged modeling.

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Abstract

The purpose of this study was to identify the longitudinal causality between gambling beliefs and gambling behavior. An online survey was conducted 3 times across 10 months (January, May, and October) among adult gamblers (N=340) who had more than one year of regular gambling behavior, at least once a month (N=340, 64.7% males). The mean age of the subjects was 40.34 y (SD=0.43). The causality between irrational gambling beliefs and gambling behavior was analysed using autoregressive cross-lagged modeling. Analysis showed that gambling beliefs affected gambling behavior after 5 months (B=0.152, p<0.001), and gambling behavior also affected gambling beliefs after 5 months (B=0.090, p<0.01). These results explain that there is a mutual causality between irrational gambling beliefs and gambling behavior. Thus, the gambling disorder treatment programs should take into account not only cognitive behavioral theory but the cognitive dissonance perspective.

Keywords: Gambling disorder, Gambling beliefs, Gambling behavior, Autoregressive cross-lagged modeling.

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Introduction

Lately, gambling disorder (GD) has been one of the most serious behavioral addictions in South Korea. Irrational gambling beliefs (IGBs) are inaccurate expectations or perceptions concerning gambling processes or outcomes, and have been found to directly or indirectly affect gambling addiction in many previous studies [1,2]. The results of these previous studies support the importance of cognitive behavioral therapy (CBT) for GD. However, there have been somewhat pessimistic findings concerning the effectiveness of GD treatment programs based on CBT [3,4]. As opposed to cognitive behavioral theory, cognitive dissonance theory argues that problematic behavior may cause irrational beliefs. Cognitive dissonance is a state of tension that occurs when one behaves in a psychologically inconsistent way [5,6]. When the two aforementioned theories are compared in order to establish a future direction for GD treatment programs, it is important to first test the causality between IGBs and gambling behavior. Therefore, this study aimed to identify the direction and degree of causality between IGBs and gambling behavior and to provide basic data to support the provision of an intervention for GD when its symptoms are observed.

Materials and Methods

The research data provided by the National Research Foundation of Korea (NRF) were downloaded from the foundation's Basic Research Resource Center website [7]. The data were collected through an online survey (January, May, and October). The survey participants were 340 gamblers who had gambled at least once a month for more than a year. The mean age of the participants was 40.34 y (SD=0.43), and 64.7% of them were males. The education level of 253 (74.4%) of the participants was higher than college and 238 (70.0%) of the participants were regular workers. The research was reviewed and approved by the Institutional Review Board of Kangwon National University. The reliability of an Irrational Gambling Beliefs Scale [8], as measured in the first round was 0.93, and 0.95 in the second and third rounds. The reliability of the gambling behavior scale [9], as measured in both the first and second rounds was 0.89, and 0.90 in the third round. The change trend between IGBs and gambling behavior was analysed using descriptive statistics, while the causality between IGBs and gambling behavior was analysed using autoregressive cross-lagged (ARCL) modeling. ARCL modeling on panel data can control individual variables, allowing for the testing of the direction of causality between two or more variables. For analysis, SPSS 20.0 was used to

generate descriptive statistics, and AMOS was used for ARCL modeling.

Results

During the study period, gambling behavior and IGBs decreased over time. Five models were set (Models 1-8) based on the assumptions of measurement invariance, path invariance for the autoregressive coefficients, and path invariance for the cross-regressive coefficients. It was judged that it is appropriate to use Model 8 for ARCL modeling for IGBs and gambling behavior (Table 1). In terms of the cross-regressive coefficients representing the significance of the cross-lagged path, all the paths between the 1st IGBs and the 2nd gambling behavior, between the 2nd IGBs and the 3rd gambling behavior, between the 1st gambling behavior and the 2nd IGBs, and between the 2nd gambling behavior and the 3rd IGBs were found to be significant. This suggests that gambling behavior affects IGBs, and that IGBs also affect gambling behavior (Table 2).

Table 1. Comparison of model's goodness of fit.

Model	χ^2	df	TLI	CFI	RMSEA
Model 1. Basic model	5849.048	934	0.711	0.727	0.125
Model 2. Measurement invariance (IGBs)	5866.28	944	0.714	0.727	0.124
Model 3. Measurement invariance (GB)	5990.07	960	0.712	0.721	0.124
Model 4. Path invariance (AC) (IGBs → IGBs)	5990.514	961	0.713	0.721	0.124
Model 5. Path invariance (AC) (GB → GB)	5999.826	962	0.713	0.721	0.124
Model 6. Path invariance (CC) (IGBs → GB)	6003.217	963	0.713	0.721	0.124
Model 7. Path invariance (CC) (GB → IGBs)	6004.189	964	0.713	0.721	0.124
Model 8. Error covariance invariance	6004.2	965	0.713	0.721	0.124

IGBs: Irrational Gambling Beliefs; GB: Gambling Behavior; AC: Autoregressive Coefficient; CC: Cross-Regressive Coefficient.

Table 2. Short-term longitudinal relationship between gambling beliefs and gambling behavior.

Path	Non-standardized	SE	Standardized	CR
Autoregressive path				
IGBs (1st) → IGBs (2nd)	0.754	0.032	0.752	23.558** *
IGBs (2nd) → IGBs (3rd)	0.754	0.032	0.752	23.558** *
GB (1st) → GB (2nd)	0.684	0.03	0.716	22.954** *
GB (2nd) → GB (3rd)	0.684	0.03	0.715	22.954** *
Cross-lagged path				
IGBs (1st) → GB (2nd)	0.152	0.032	0.147	4.765***
IGBs (2nd) → GB (3rd)	0.152	0.032	0.154	4.765***
GB (1st) → IGBs (2nd)	0.09	0.03	0.097	2.968**
GB (2nd) → IGBs (3rd)	0.09	0.03	0.092	2.968**

IGBs: Irrational gambling beliefs; GB: Gambling Behavior; *p<0.05, **p<0.01, ***p<0.001

Discussion

The purpose of this study was to test the causal direction between gambling-related irrational beliefs and gambling behavior. First, the results of this study imply that the relationship between IGBs and gambling behavior can be better explained by the interaction between the two rather than by cognitive behavioral theory or cognitive dissonance theory. While the main theory of gambling disorder, stating that IGBs lead to gambling behavior is reasonable [10], GD can also be explained by cognitive dissonance theory [11], which states that people change their beliefs after engaging in gambling behavior to rationalize their behavior. Therefore, GD treatment programs should take into account not only cognitive behavioral theory but the cognitive dissonance perspective. This study is different from other previous studies in purpose, analysis method, and model. For example, Kwon [12] used the Latent Growth Model to analyse the change trajectories of gambling beliefs and gambling behaviors, whereas this study used an autoregressive cross delay model to test causality. In addition, Kwon [12] assumed that the gambling belief had a one-way influence on gambling behavior. On the other hand, this study set up a model with the possibility that gambling behavior may influence gambling belief by cognitive dissonance phenomenon.

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