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## Effect of sports participation on Internet addiction mediated by self-control: A case of Korean adolescents

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### ABSTRACT

Internet addiction among adolescents has become a major social problem. Thus, more effective Internet addiction treatment programs through sports are required. This study tried to identify the relationship among sports participation, self-control, and Internet addiction among Korean adolescents. In total, 345 students (aged 15–18 years) from two middle schools and two high schools in South Korea were analyzed using Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM).

SEM indicated a significant effect of sports participation on Internet addiction mediated by self-control. The results suggest the effectiveness of and need for sport and physical activity in Internet addiction treatment programs and for other addictions as well. Moreover, sports participation has a wider variety of psychological and physical benefits unlike intervention strategies or pharmacological treatments. Thus, the adoption of sports needs to be broadened from physical development to treating diverse psychological problems among adolescents.

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### Introduction

Young (1998) defined addictive Internet use as “an impulse control disorder that does not involve an intoxicant” (p. 238), and suggested that this new clinical disorder of Internet addiction has similar traits as drug or gambling addictions. Internet addiction is explained as spending more than 38 h per week for pleasure in online activities and having academic, social, financial, and physical problems due to Internet use (Young & Rogers, 1998). The habit-formation of addiction explains that a low level of self-control makes people accept the current tolerance and

over-consumption, even if it has larger future costs (Becker, Grossman, & Murphy, 1994; Chapman, 1998; O'Donoghue & Rabin, 1999). The incentive effect, in contrast, is likely to alleviate over-consumption as a result of a high level of self-control (O'Donoghue & Rabin, 1999). Therefore, self-control is one of the most important psychological factors affecting addiction and impulse (Baumeister, 2003; O'Donoghue & Rabin, 1999; Trimmel & Kopke, 2000).

O'Donoghue and Rabin (1999) defined self-control deficit as a time-inconsistent taste for immediate gratification for the consumption of harmful addictive products. Similarly, Baumeister (2003) found that the absence of self-control may cause addictive behavior. Trimmel and Kopke (2000) studied alcoholic patients and reported that a level of self-control is negatively related to alcohol consumption.

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Prior studies also provided the evidence that self-control affects Internet addiction in particular (Kim, Namkoong, Ku, & Kim, 2008; Mehroof & Griffiths, 2010). Kim et al. (2008) analyzed 1,471 online game users and found that aggression and narcissistic personality traits are positively correlated with online game addiction while self-control is negatively correlated with online game addiction. Mehroof and Griffiths (2010) examined 123 university students to identify how various personality traits affect individuals' Internet gambling addictions. Their results also suggested significant relationships between online gambling addiction and aggression, self-control, sensation seeking, trait anxiety, state anxiety, and neuroticism. Specifically, self-control was negatively related to Internet gambling addictions.

Sports participation has many advantages of psychological and physical well-being such as decreasing anxiety, depression, and stress (Hassmén, Koivula, & Uutela, 2000; Salmon, 2001; Scully, Kremer, Meade, Graham, & Dudgeon, 1998; Warburton, Nicol, & Bredin, 2006). Specifically, prior studies have shown the effect of physical exercise and sport participation on self-control. Jonker, Elferink-Gemser, and Visscher (2011) analyzed 622 adolescents consisting of 428 elite athletes, 140 regional athletes, and 54 non-athletes. They found that adolescents who actively participate in sport indicated a higher level of self-control than those not engaged in sport. Therefore, the amount of time training in sports was positively associated with a higher level of self-control (Jonker et al., 2011).

Oaten and Cheng (2006) identified the effect of regular physical exercise on self-control. They examined a four-month physical exercise program with 24 undergraduate students. Participants were separated into two groups, with the first group joining the four-month physical exercise program directly and the second group waiting two months without exercise then joining a two-month physical exercise program. After four-month's investigation, Oaten and Cheng (2006) found that participants who were assigned to the first group improved their level of self-control more than participants in the second group. They concluded that physical exercises improved the participants' level of self-control, which was related to performance of their tasks and study. In addition, during the physical exercise program, the consumption of alcohol, caffeine, and smoking was also significantly decreased in both groups (Oaten & Cheng, 2006).

In another study, Jonker, Elferink-Gemser, Toering, Lyons, and Visscher (2010) investigated 292 students (aged 12–16 years) consisting of 128 elite soccer players and 164 non-athletes and found that the elite soccer players indicated a higher level of self-control than non-athletes.

Therefore, based on the details above, this study tried to identify the effect of sports participation on Internet addiction mediated by self-control among Korean adolescents.

## Methodology

### Sampling and Data Collection Procedure

In total, 388 students from two middle schools and two high schools in South Korea were invited to participate in a

survey using the convenience sampling method. Of the 388 copies of the questionnaire distributed, 43 were discarded due to missing values resulting in 345 usable surveys. Of the research participants, males accounted for 17.7 percent and females accounted for 82.3 percent. Most students used the Internet 1–2 h daily (40.9%). Approximately 45 percent of the students did not participate in almost any physical activity. Participants' demographic information is presented in Table 1.

### Instrument

A questionnaire measuring the research constructs and participants' demographic information was distributed. To measure Internet addiction, 18 items with six sub-factors consisting of disturbance of adaptive functions (3 items), addictive automatic thought (3 items), withdrawal (3 items), virtual inter personal relationship (3 items), deviate behavior (3 items), and tolerance (3 items) were adopted and modified from the Korean scale for Internet addiction self-diagnosis that was established by the Korean A for Digital Opportunity and Promotion (2003). In previous studies, the Korean scale for Internet addiction self-diagnosis has been found to have acceptable reliability, with Cronbach's alpha coefficients ranging from .76 to .85 (Oh, 2010; see Table 2). Items were measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Higher scores indicated a higher level of Internet addiction.

In total, 6 items for self-control were drawn from Song (1998) who established a self-diagnosis scale for self-control by developing and translating the Self-Control Rating Scale (SCRS) for children (Kendall & Wilcox, 1979).

**Table 1**  
Demographic information ( $n = 345$ )

Variable	Category	Number	Upper limit
Gender	Male	61	17.7
	Female	284	82.3
Age	15	147	42.6
	16	47	13.6
	17	72	20.9
	18	79	22.9
	<1	101	29.3
Daily Internet usage (hours a day)	1–2	141	40.9
	3–4	81	23.5
	5–6	21	6.1
	>7	1	.2
	<1	101	29.3
Sport participation frequency	Almost nonet	155	44.9
	1–2 days/week	92	26.7
	3 days/week	32	9.3
	4–5 days/week	48	13.9
	6–7 days/week	18	5.2
Sport participation intensity	Very light breathing	31	9.0
	Light breathing	81	23.5
	Moderate breathing	170	49.3
	Heavy breathing	59	17.1
Sport participation duration	Very heavy breathing	4	1.1
	<10 min	41	11.9
	20 min	106	30.7
	30 min	106	30.7
	40 min	40	11.6
	>50 min	52	15.1

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