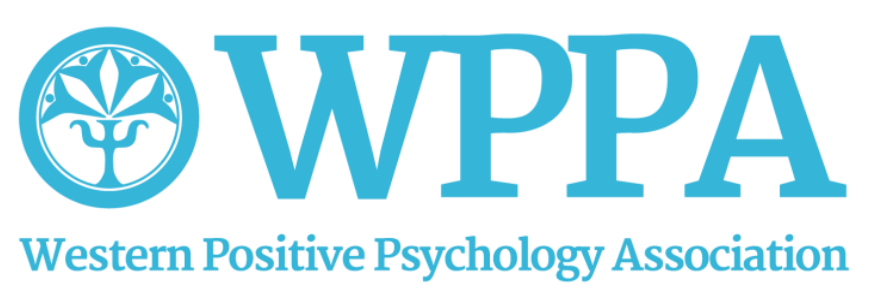


The Effects of the Drone Sports Program on Positive Psychological Attributes in Out-of-School Adolescents



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Introduction

- Adolescents should grow into desirable citizens and lead social change through 'sophisticated institutions that spread social values and purposes' schools (Dewey, 1909) (Choi, 2017)
- According to Piaget's theory of cognitive development, adolescence is a period of cognitive and emotional changes as well as physical changes, and stress increases. Therefore, it is a vulnerable time when various psychological and social maladjustments can occur (Choi, 2010; Compas, 1987; Schonert-Reichl & Muller, 1996).
- As anxiety continues, negative internalization problems such as depression, anxiety, and interpersonal relationships appear, and it is difficult to express them, making it easier to be exposed to seclusion, delinquency, and crime (Cole, Martin, & Dennis, 2004; Greenberg, 2002).
- Among the adolescents who account for 15.1% of the total population of Korea, 1% stop studying and become out-of-school adolescents. For that reason, 'psychological and mental problems' were the highest at 31.4% (Korea Education Development Institute and Ministry of Education, 2024).
- Out-of-school adolescents have lower positive psychological variables because they do not properly perform their developmental tasks in educational institutions compared to general adolescents. Therefore, depression or crime are more likely to appear (Kim, 2016; Kim, Park, Kim, 2019; Park, 2019; Park, Hwang, 2017; Jeon, Kim, 2020; Jung, Kim, 2015)..
- Prior research that can promote positive psychological variables through participation in sports also applies to out-of-school adolescents. However, it is practically difficult for out-of-school adolescents to participate in sports.
- The government is also implementing various policies to solve these problems, but there is a lack of practical help focusing only on employment or education and training (Baek, Song, 2015; Sung, Lee, 2016).
- Through the "Drone sports program," which has become a modern trend, we want to find out whether it facilitates the accessibility of out-of-school adolescents to sports and affects positive psychological variables.

Methods

- The Voluntary Components Inventory (VCI) developed by Kuhl and Fahrman (1998) was modified and validated based on factor analysis by Yoon Young-shin (2007) adapting the English version of the VCI shortened form. The scale was measured on a 5-point Likert scale, and consists of a total of 21 questions.
- It was cited by the Behavior Science Research Institute (2000), developed and translated by Rosenberg (1965), and used as revised and supplemented by the Korea Youth Policy Institute. It consists of a total of 10 questions and is divided into two sub-factors: 5 positive self-esteem and 5 negative self-esteem. It is on a Likert 5-point scale.
- Based on Bandura (1977) theory, a questionnaire for middle and high school students developed by Sher et al. and adapted and revised by Kim A-young (1998) was used. Of the 24 questions, 9 questions for self-confidence, 10 questions for self-regulatory efficacy, and 5 questions for task difficulty preference are Likert's 5-point scale.
- Frequency analysis and descriptive statistics were conducted according to demographic characteristics.
- An analysis of variance was conducted on the effect of participation in the drone sports program on positive psychological variables, and a correlation analysis was conducted to examine the relationship with each variable. In addition, a regression analysis was conducted between each variable with self-control capability as an independent variable.

Results

Table 1. General characteristics of participants

Variables		Means±SD
Age (yrs)		16.99±2.66
Variables		n (%)
Gender	Male	73 (49)
	Female	76 (51)
	Total	149 (100)
Drone	No	55 (36.9)
	Yes	75 (50.3)
	Total	130 (100)

Table 2. Difference in Self-Control Capability, Self-Esteem, Self-Efficacy according to participation of drone sports.

Variables		n	Means±SD	F	p
Drone					
a	No	55	3.09±.75	4.887*	.029
	Yes	75	3.40±.78		
b	No	53	2.56±.78	4.307*	.040
	Yes	74	2.82±.69		
c	No	55	3.04±.77	9.615**	.002
	Yes	74	3.46±.74		
d	No	55	2.70±.85	13.979***	.000
	Yes	73	3.29±.89		
e	No	54	3.25±.65	2.232	.138
	Yes	72	3.43±.71		
f	No	55	2.53±.92	.868	.353
	Yes	74	2.67±.78		

Note. Values are the mean±SD. a through b are sub-elements of 'Self-Control Capability'; a, Self-Control Mode; b, Self-Control Inhibition. c is 'Self-Esteem'. d through f are sub-elements of 'Self-Efficacy'; d, Self-Confidence; e, Self-Regulatory Efficacy; f, Task Difficulty Preference; *:p<.05, **:p<.01, ***:p<.001

Table 3. Correlation coefficients between Self-Control Capability, Self-Esteem, and Self-Efficacy

Variables	a	b	c	d	e	f
a	1					
b	.210*	1				
c	.588***	.384***	1			
d	.460***	.647***	.771***	1		
e	.627***	.062	.458***	.328***	1	
f	.432***	.180*	.208*	.231**	.328***	1
M±SD	3.28±.79	2.73±.71	3.32±.78	3.04±.92	3.39±.70	2.63±.87

Note. a, Self-Control Mode; b, Self-Control Inhibition; c, Self-Esteem; d, Self-Confidence; e, Self-Regulatory Efficacy; f, Task Difficulty Preference; *:p<.05, **:p<.01, ***:p<.001

Table 4. Effects of the Self-Control Capability on Self-Esteem

DV	IV	SE	β	t	p	VIF
c	(Constant)	.267		2.725	.007	
	a	.066	.539	8.159***	<0.001	1.046
	b	.073	.271	4.105***	<0.001	1.046
R=0.652		R ² =0.425	adjR ² =0.417	F=50.967	p<0.001	D-W=1.929

Note. a, Self-Control Mode; b, Self-Control Inhibition; c, Self-Esteem

*:p<.05, **:p<.01, ***:p<.001

Table 5. Effects of the Self-Control Capability on Self-Confidence

DV	IV	SE	β	t	p	VIF
d	(Constant)	.286		-1.382	.169	
	a	.072	.351	5.937***	<0.001	1.043
	b	.077	.576	9.743***	<0.001	1.043
R=0.733		R ² =0.537	adjR ² =0.530	F=80.071	p<0.001	D-W=2.378

Note. a, Self-Control Mode; b, Self-Control Inhibition; d, Self-Confidence

*:p<.05, **:p<.01, ***:p<.001

Table 6. Effects of the Self-Control Capability on Self-Regulatory Efficacy

DV	IV	SE	β	t	p	VIF
e	(Constant)	.250		6.804	<0.001	
	a	.062	.626	9.034***	<0.001	1.041
	b	.067	-.062	-.897	.371	1.041
R=0.617		R ² =0.381	adjR ² =0.372	F=41.217	p<0.001	D-W=2.214

Note. a, Self-Control Mode; b, Self-Control Inhibition; e, Self-Regulatory Efficacy

*:p<.05, **:p<.01, ***:p<.001

Table 7. Effects of the Self-Control Capability on Task Difficulty Preference

DV	IV	SE	β	t	p	VIF
f	(Constant)	.349		2.251	.026	
	a	.087	.421	5.430***	<0.001	1.043
	b	.094	.095	1.221	.224	1.043
R=0.450		R ² =0.203	adjR ² =0.191	F=17.546	p<0.001	D-W=1.660

Note. a, Self-Control Mode; b, Self-Control Inhibition; f, Task Difficulty Preference;

*:p<.05, **:p<.01, ***:p<.001

Discussion

- Drone sports participants exhibit significantly higher self-control capability, self-esteem, and self-confidence compared to non-participants.
- Self-control capability strongly predicts self-esteem and self-confidence, with self-control mode playing the most significant role.
- Drone sports may be an effective means to enhance psychological attributes related to personal development and behavioral achievement.
- Self-control capability, self-esteem, and self-efficacy play crucial roles in psychological development and behavioral achievement. Sports participation is known to enhance these psychological factors, and drone sports have recently gained attention as an emerging activity. This study aims to investigate the effects of drone sports participation on self-control capability, self-esteem, and self-efficacy, as well as analyze the relationships among these variables.

Conclusions

- The drone sports program has effects in enhancing confidence, self-reliability and controllability among out-of-school adolescents. It implies that the drone sports can be an alternative modality to significantly changing out-of-school adolescents' psychological attributes. More importantly, the current finding suggests that the drone sports strategy will contribute significantly to the socialization of young people and help them grow into emotionally stable adults.