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An Exploration of Players' Aggression: Role of Game and Life Self-Efficacy and Adaptive Game Use Tendency

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ABSTRACT

This study examined whether game usage would alleviate players' aggressive tendencies. Other game-related variables, psychological care factors (adaptive game use tendency, game self-efficacy, and life self-efficacy), and psychological problem factors (loneliness and depression) were controlled for determination of the effect. We drew on the catharsis theory from therapeutic psychology literature to explain how game usage contributes to the alleviation of aggressive tendencies. Over two weeks data were collected from 918 participants online. The results indicated that gaming activity had a significant effect on aggression. Higher levels of game and life self-efficacy, as well as adaptive game use tendencies, decreased the degree of aggression. Likewise, higher levels of loneliness and depression reduced the degree of aggression. Results and implications are discussed.

***Key words**: Aggression Catharsis, Game and Life Self-efficacy, Adaptive Game Use Tendency.*

1. INTRODUCTION

Aggression is one of the innate fundamental instincts [1] therefore, human aggression, as a basic and very complex social behavior, can range from mild verbal anger to vicious behavior including everything in between. Recently, games have become a popular leisure activity globally [2]. Games are used by whole generations inclusive of toddlers and the elderly without limits of time and space. While general surveys exist regarding broad patterns of game usage, less is known about the relationship between game usage and aggression in psychological or mental health care.

Regarding the relation between game usage and aggression, previous studies have attempted to clarify various factors that influence the aggression of game players. Researchers have also examined whether violent games are associated with players' aggression, or whether such games can enhance long-term aggression [3]-[19]. Although an important topic, a number of concerns about these studies have been raised. Some researchers concluded that the gathered evidence proves the existence of a causal link between violent games and aggression [3]-[8]. However, others revealed a number of methodological flaws and suggested that the association between game playing and aggression could not be supported [9]-[19].

A recent study even suggested that playing games decreases rather than increases aggression and violence [19]-[22]. In other words, games can be a tool for "venting" aggression, alleviating aggressive feelings and tendencies in players. Importantly, previous studies found that playing games indicated high adaption with catharsis seeking [19]-[21], [23] Desai et al. [24] found that mental health correlates with game use among young people, especially for managing urges and relieving tension. In this regard, playing games may affect various sociopsychological aspects in terms of better mental health and social functioning.

There are two perspectives regarding the link between game playing and aggression. The first viewpoint sees games as an emotional outlet through which people can express themselves and gain some sense of catharsis [19]-[21], [23]. This notion is based on the catharsis theory [25]-[27]. Aggression catharsis alleges that watching another person's aggressive behavior drains the viewer of aggressive feelings. In contrast, the other viewpoint posits that aggression-related games increase accessibility to aggression, which in turn can affect aggressive behavior such as playing violent games. This concept is supported by the General Aggression Model [8].

To date, there are few empirical studies that examined the cause and effect of venting aggression through playing games. There are relatively few studies on the effects of perception toward the preferred game and aggression, such as adaptive

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game use tendency with broad-based game players. Most of the recent studies focusing on the effects of violent games have tended to opt for violent content. Moreover, there is little research that considers both the venting effects and players' aggression on the basis of the catharsis perspective.

Although the two perspectives have crucial differences regarding the proposed relation between playing games and aggression (accelerating vs. alleviating aggression), relatively few game studies have emphasized the role of venting players' aggressive inclinations with consideration of control factors, such as psychological, gaming, and demographic variables.

The present study examined the positive aspects of gaming activity, in terms of venting aggression, as an affective regulation within the framework of catharsis theory. Therefore, this study investigated the effects on aggression by controlling other variables. Psychological care aspects (adaptive game use tendency, game self-efficacy and life self-efficacy), psychological problem variables (loneliness and depression), and demographic variables (age, gender) were selected as the main indicators for aggression of game players.

2. BACKGROUND AND HYPOTHESES

2.1 Venting aggression through exposure to gaming activity

According to the aggression catharsis hypothesis [25]-[27], aggressive actions allow people to vent their aggressive inclinations, who will thus behave less aggressively. The aggression catharsis hypothesis has a long history. It was first delineated by Aristotle and then adapted by Freud for use in therapeutic psychology [28]. According to the catharsis hypothesis, acting aggressively, or even viewing aggression, is an effective way to eliminate angry and aggressive feelings. Catharsis is defined as "the verbal or non-verbal expression of intense affect associated with a coherent narrative of experience that provides relief of chronic anxiety states" [29]. This definition describes a mental or emotional release from repressed negative feelings through vicarious experiences, which is reflected in game characteristics such as interactivity, narrative, social use, and provision of specific experiences [30].

After the concept of catharsis had been adapted by Freud for use in therapy, several different uses in modern psychotherapy, such as drama and art therapy, were developed [31]. Freud especially believed that repressed negative emotions such as aggression were created inside various psychological symptoms, such as hysteria [23]. His focal idea was that it is better to let the aggression out than to keep it inside until it builds up to the point of a more dangerous outburst. In other words, expressing aggression is much better than bottling it up. The catharsis mechanism provides an understanding of human aggressive behavior in daily life where people are confronted with frustrating situations that can lead to acts of violence.

Regarding previous game studies, the results of extensive investigations on aggression revealed that violent games do not predict violent acts or even physically aggressive behaviors [10], [11], [13], [17]. Greitemeyer and Osswald [32] found that some games yielded a reduction of aggression. Importantly, Ferguson et al. [19] reported that playing violent games can induce catharsis seeking. Lee et al. [20]-[21] found that therapeutic catharsis seeking decreases universal aggression in the players. In this regard, we focus specifically on the idea that venting aggression through exposure to gaming activity will reduce aggression. We also predict that participation in gaming activity could allow release of individuals' aggressive energy and violent urges from their daily life.

2.2 Self-efficacy as a psychological care context

Self-efficacy has attracted the attention of researchers since Bandura proposed his useful social cognitive theory. Self-efficacy is defined as "the conviction that one can successfully execute the behavior required to produce the outcomes" [30]. Here, self-efficacy refers to the players' expectation that they can be successful and represents the belief in themselves and in their abilities to achieve a particular mission [30]. Schunk [34] asserted that self-efficacy has a positive influence on motivation and performance irrespective of the domain. Many studies have identified that individuals with a high degree of self-efficacy tend to dedicate themselves to perform tasks and behaviors [35].

In game studies, game self-efficacy refers to an individual's confidence in his or her ability to interact with the game [36]. Trepte and Reinecke [37] identified an association between player performance and self-efficacy. As self-efficacy involves self-conviction, individuals with greater game self-efficacy are more likely to be successful in game achievements. Thus, game self-efficacy is expected to be associated with degree of aggression.

Along these lines, game self-efficacy may transmit to real life through the gaming experience. Although several studies examined various real-life situations and gaming behaviors, no research has yet focused on the relationship between game self-efficacy and real-life self-efficacy with the examination of player aggression. In this regard, we examined the empirical relationships between player aggression and game and real-life self-efficacy. Based on previous literature, the following hypotheses were tested with control of other variables.

H1: Controlling for other variables, players' game self-efficacy will be negatively associated with degree of aggression.

H2: Controlling for other variables, players' life self-efficacy will be negatively associated with degree of aggression.

2.3 Adaptive game use tendency

McGonigal [38] suggested that some of the most positive emotional experiences are induced in the context of playing video games. Several studies have shown a causal relation between playing preferred games and enhanced mood or increases in positive emotion [39]-[41]. Przybylski et al. [41] suggested that the motivations for game playing are associated with the potential to satisfy basic psychological needs. Russoniello et al. [39] found that playing games could enhance players' moods, boost relaxation, and alleviate anxiety. Thus, gaming activities allow the players to express their feelings and help maintain mental health.

With regard to aggression, the beneficial effects of expressing one's emotions (e.g., aggression) have been supported in a psychological therapeutic context [42]. Thus,

aggression may differ depending on the perceptions toward games and adaptive use of the game by the players. The adaptive game use tendency can increase the entertainment value of games as well as allowing the players to vent their aggression, thereby decreasing the overall degree of aggression. However, relatively little emphasis has been placed on the association between aggression and adaptive game use tendency. In line with this notion, it can be assumed that gaming activity may reduce aggression if the adaptive game use tendency involves the individuals' perception when controlling for other variables. Considering the previous papers, the hypothesis below was tested:

H3: Controlling for other variables, players' adaptive game use tendencies will be negatively associated with degree of aggression.

2.4 Psychological problem factors: loneliness and depression

According to the mood management theory [43], people automatically seek positive moods and avoid negative moods. When an event induces a negative mood, such as loneliness and depression, people are willing to reduce that feeling or change the negative mood. Thus, individuals may depend on playing games to reduce negative feelings or to meet their needs for control that cannot be met in their real lives.

Loneliness has been referred to as an unpleasant experience that is derived from major deficiencies in an individual's network of social relationships [44]. Feelings of loneliness may result from unfulfilled desires to have emotional relatedness or gaps between one's actual and desired social position. Thus, it is highly probable for these individuals to indulge in playing games to fill the deficiency in social ties. Particularly, playing online games is the best way to socialize and avoid feelings of loneliness for such individuals [45].

Depression has been defined as "feelings of sadness, diminished interest in activities, fatigue and diminished ability to think or concentrate, indecisiveness, recurrent thoughts of death" (DSM-IV-TR, 2000, p. 366) [46]. Depression also involves lassitude and aggression. In regard to the mechanism by which games affect depression, Dillman-Carpentier et al. [47] argued that depressed adolescents may pursue violent content, and that such media may boost their depressed mood. In this sense, playing games in particular, may offer an environment for exploring negative feelings. Because players can acquire power and control, accomplishing goals in the game world may turn negative moods into positive ones [48]. Thus, we predict that players' aggression will decrease along with the depressive mood because of mood change tendencies.

In line with the findings from previous studies, we expect loneliness and depression to be an antecedent of players' aggression. Furthermore, if aggression decreases, loneliness and depression should also decrease because of the ripple effect showing mood contagion [49].

Furthermore, prior literature paid considerable attention to the personal characteristics of players, such as their age and gender [35]. In this sense, we expected that aggression of players would be at least related to age and gender in terms of gaming activity. In light of previous research, the following hypotheses are proposed:

H4: Controlling for other variables, players' loneliness will be negatively associated with degree of aggression.

H5: Controlling for other variables, players' depression will be negatively associated with degree of aggression.

H6 (a/b): Controlling for other variables, players' a) gender and b) age will be associated with aggression.

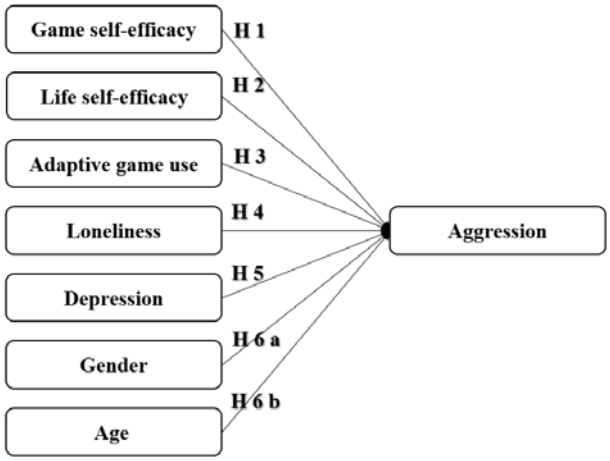

Fig. 1. Research Model

3. METHOD

3.1 Survey design and analysis

In this study, an online survey was conducted by a major research center through which a total of 918 participants, ranging in age from 16 to 59 years, were selected for the final analysis. The survey lasted for about two weeks and was carried out in Seoul, South Korea. Regarding gender, 532 (58%) of the respondents identified themselves as male and 386 (42%) as female. Game players were invited to take part in the study. The respondents were told that this was a survey, and that they would be rewarded a souvenir valued at 5,000 KRW (about 5 US dollars) for filling out a questionnaire. Notably, to allow choice of a preferred game, various options about different types of games were presented, including arcade, console, solo play on computer, and online games. The respondents were informed beforehand that they had to be currently involved in game playing or have played a game within the past 6 months. After determining the variables significantly correlated with aggression, a regression analysis was used to examine how each variable effected aggression.

3.2 Measures

The attitudes toward aggression were measured by Buss and Perry's aggression questionnaire [50], which consists of 29 items related to potential aggressive responses to various hypothetical situations. Sample items include "If I have to resort to violence to protect my rights, I will." Participants were required to rate each statement on a 5-point Likert scale,

ranging from 1 "strongly disagree" to 5 "strongly agree" (α = .89).

The social self-efficacy in online game scale [35] was modified to serve as a measure of game self-efficacy through 12 items. This measure focused on each individual's sense of competence with games. An example question was: "I am a valuable and important person in the gaming world; I know the game better than others." Participants responded on a 5-point Likert scale, ranging from 1 ''strongly disagree'' to 5 "strongly agree" (α = .86).

A 12-item measure of life self-efficacy was created by modifying the self-efficacy scale [51]. Sample items include "If something looks too complicated, I will not even bother to try it; I can easily become friends with others." Participants were asked to rate the items on a 5-point Likert scale, ranging from 1 "strongly disagree" to 5 "strongly agree" (α = .82).

The loneliness symptoms were measured with the UCLA Loneliness Scale [52]. The scale was developed by Russell and colleagues. This involved a 20-item scale designed to measure each participant's subjective feelings of loneliness as well as feelings of social isolation by asking participants to answer questions such as "I feel as if nobody really understands me," using a 4-point scale ranging from 1 (strongly disagree) to 4 (strongly agree) (α = .92).

Depressive symptoms were measured with the CESD (Center for Epidemiological Studies Depression) scale published by Radloff in 1977 [53]. The CESD is a subset of the 11-item CESD scale and has been used extensively in general populations. Items were rated from 1 to 4 according to how often the symptoms were present (1 = never/rarely, 2 = sometimes, 3 = often, and 4 = very often) (α = .88).

The Korea Creative Content Agency [54] created a detailed 21-item, 5-point Likert scale based on the DSM-IV-TR and ICD-10 (WHO) to estimate adaptive game use in the CSG (Comprehensive Scale for Assessing Game Behavior) Manual. The adaptive game use scale includes many items to measure how individuals feels about making good use of spare time, experience vitality, and extend world experience through gaming activity. A sample item includes "I get rid of stress by engaging in playing games" (α = .96).

3.3 Statistical analysis

We performed all statistical analyses using SPSS 20.0. We carried out Pearson's correlation analysis with the aggression scale for the continuous independent variables. Finally, linear regression analysis was performed to explore significant predictors of aggression scale. The independent variables for inclusion were those showing statistically significant associations with the aggression scale from the correlation analysis conducted previously.

Table 1. Descriptive and reliability analysis

	Mean	Standard deviation	Cronbach's α
Aggression	93.02	13.58	.89
Game self-efficacy	29.64	7.19	.86
Life self-efficacy	37.38	5.15	.82
Adaptive game use	50.01	15.05	.96
Depression	1.49	.59	.88
Loneliness	48.33	8.53	.92

4. RESULTS

4.1 Correlation analysis

The analysis identified significant relationships between game self-efficacy and aggression. Fig. 2. shows the results of the correlation analysis. Game self-efficacy showed a negative correlation with aggression ($r = -.27$, $p < .01$), while life self-efficacy exhibited a significant positive relationship with aggression ($r = .19$, $p < .01$). Both loneliness ($r = -.44$, $p < .01$) and depression ($r = -.46$, $p < .01$) showed significant negative associations with aggression. The relationship between adaptive game use and aggression was also negative ($r = -.31$, $p < .01$). Regarding demographic variables, both gender ($r = .07$, $p < .05$) and age ($r = .07$, $p < .05$) were found to be positively correlated with aggression.

4.2 Regression analysis

To test the hypotheses, regression analysis was performed to examine how each of the variables affected aggression. Fig. 3. shows the results of the regression analysis. Both game self-efficacy ($\beta = -.15$, $p < .001$) and life self-efficacy ($\beta = -.09$, $p < .01$) revealed negative effects on aggression ($\beta = -.06$). Thus, both H1 and H2 were supported. Adaptive game use indeed showed a significant effect on aggression ($\beta = -.12$, $p < .01$), thus supporting H3. A negative relationship was observed between loneliness ($\beta = -.31$, $p < .001$) and aggression. Likewise, depression ($r = -.30$, $p < .001$) also displayed a negative effect on aggression. Thus, both H4 and H5 were supported. However, significant effects of gender and age on aggression were not supported, thus causing H6 a/b to be rejected.

5. DISCUSSION

This study examined the effects of players' gaming activity on aggression in terms of psychological care while controlling for other variables such as game self-efficacy, life self-efficacy, loneliness, depression, adaptive game use tendency and demographic variables. In the association between gaming activity and aggression, strong effects of game and life self-efficacy, loneliness, depression, and adaptive game use on aggression were found. These relations seem to support the notion that games may act as emotional outlets with healing powers and as a means to satisfy certain needs through playing, as noted by the catharsis of aggression perspective [19]-[23], [26]-[28].

These results could be explained from the catharsis perspective. Players who reported higher levels of game and life self-efficacy had diminished aggression. The reason for this might be that gaming environments create an opening for venting anger and "blowing off steam" in a therapeutic way, thereby enhancing the strength of the player's game and life self-efficacy. In other words, there may be a ripple effect from

virtual life to real life. Self-efficacy may directly influence aggression through playing games.

	1	2	3	4	5	6	7	8
1. Aggression	1							
2. Game self-efficacy	-.277**	1						
3. Life self-efficacy	.190**	.091**	1					
4. Adaptive game use	-.311**	.704**	-.009	1				
5. Depression	-.462**	.086**	-.380**	.150**	1			
6. Loneliness	-.444**	.023	-.576**	.115**	.541**	1		
7. Gender	-.076*	.214**	.006	.188**	-.050	.000	1	
8. Age	.070*	-.258**	.073*	-.150**	-.157**	-.011	-.052	1

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

Fig. 2. Correlations between variables

N = 918						
Model	Unstandardized coefficients	Standardized coefficients	t	p-value	Collinearity statistics	
	B	β			Tolerance	VIF
(Constant)	152.672		28.637	.000		
Game Self-efficacy_	-.283***	-.150***	-3.797	.000	.463	2.160
Life Self-efficacy_	-.242**	-.092**	-2.741	.006	.642	1.558
Adaptive game use	-.110**	-.122**	-3.182	.002	.489	2.043
Depression	-6.932***	-.302***	-9.192	.000	.669	1.494
Loneliness	-.504***	-.316***	-8.614	.000	.536	1.865
Gender	-1.030	-.037	-1.354	.176	.944	1.060
Age	-.039	-.033	-1.158	.247	.896	1.116

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

Fig. 3. Regression analyses on aggression

Interestingly, the players who indicated higher levels of loneliness and depression also had a decreased degree of aggression. We reason that it may be possible to obtain curative value in the psychotherapy domain via playing games. Another possible explanation for the association between psychological problem factors (e.g. loneliness and depression) and aggression is that each player was affected differently according to his or her personality traits. Future studies need to explore such influential factors and their relationships with effects on aggression in detail. With respect to adaptive game use, players with higher levels of adaptive game use tendencies also had a decreased degree of aggression. This result is consistent with earlier research [39]-[41].

Playing games provides a truly dynamic fantasy world and allows venting of aggressive energy, which may have a substantive impact on the maintenance of mental health among players. In the mental health domain, games provide an improved medium for therapeutic relaxation [20], [21]. The characteristics of games seem to converge on the comparison with drama therapy, an integration of techniques from theater including role play and improvisation, which allows exploration of problems and rehearsal of possible solutions from creative situations [55]. This feature reflects game characteristics, which include interactivity, narrative, social use, and provision of specific experiences [30]. Related research showed expressive-creative therapies, such as art and drama, to be more accessible, helping people to make progress in terms of healing [56], [57]. Therefore, playing games has the capacity for therapeutic use, because games prove to be a better channel

for gaining attention and motivating people than real life environments [20], [21], [30].

Although the vast majority of research on the effects of gaming has focused on its potential negative impact, such as causing violence and addiction, it is important to figure out the potential benefits of games, due to the dramatically changed nature of games over the past decade that are becoming increasingly more diverse, realistic, and social in nature [16], [20]. In this sense, we focused on the relations between gaming activity and human aggression based on the catharsis theory framework. As expected, strong influences of gaming activity and other variables on aggression were found. To sum up, gaming activity contributes to the alleviation of aggressive tendencies. Therefore, it may be able to offer help with various aspects of human aggression.

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