

## Article

# Exploring the Influence of Parenting Style on Adolescents' Maladaptive Game Use through Aggression and Self-Control

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**Abstract:** Adolescent aggression manifests in problematic game use and ultimately undermines life quality. This study deals with the mechanisms behind adolescents' perception of parenting, maladaptive game use, self-control, and life satisfaction within the context of integrated supportive-positive parenting and harsh-negative parenting. Using 778 valid panel data from the Korea Creative Content Agency (KOCCA), we reached the conclusions that both supportive-positive parenting and harsh-negative parenting, mediated by self-control and maladaptive game use, are major predictors of adolescents' life satisfaction. PLS-SEM analysis was used for the hypothesized model test. This study helped bridge the gap in existing research by finding clues to recovering parent-child relationships from the side effects of youth game use.

**Keywords:** parenting style; coping strategy; maladaptive game use; self-control; aggression; life satisfaction



**Citation:** Jeon, H.G.; Lee, S.J.; Kim, J.A.; Kim, G.M.; Jeong, E.J. Exploring the Influence of Parenting Style on Adolescents' Maladaptive Game Use through Aggression and Self-Control. *Sustainability* **2021**, *13*, 4589. <https://doi.org/10.3390/su13084589>

Academic Editor: Antonio Valle

Received: 2 March 2021

Accepted: 16 April 2021

Published: 20 April 2021

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## 1. Introduction

Aggression is one of the most serious and pervasive issues that make contemporary life unstable [1]. Good social relations are a prerequisite to subjective well-being. In the family, which is the cornerstone of society, aggression or violence in children can threaten the sustainability of social communities. According to reports, more than 60% of U.S. youth and about 17% of British youth witnessed or experienced violence in the previous year [2].

The formation of adolescent aggression is greatly influenced by parenting attitudes during children's growth period. The parent-child relationship is a major factor in determining adolescents' life satisfaction [3]. Previous studies note that adolescents' aggression and life satisfaction are triggered or supplemented by the school environment, peer support, and positive family environment [4–6]. Parents are stressed during parenting, and their stress can lead to negative parenting, which has negative effects on their children, such as stress and depression [7]. Thus, altering parenting behavior can contribute to arresting adolescent aggression [8–12].

Parenting behavior is defined as a parent's attitude toward his or her child, especially with respect to communication with the child. Different parenting behaviors can be manifested, but the dominant behavior characterizes the overall relationship of parents and their children [13]. In this study, two parenting styles that directly influence adolescent aggression are compared. A harsh-negative parenting style that is hostile and oppressive tends to breed adolescent aggression, and a supportive-positive parenting style that is warm and supportive is not likely to result in adolescent aggression [14–19].

The coping model of Lazarus and Folkman [20] enables prediction of the coping strategies of adolescents. When children experience stress from negative parenting, they have a high probability of choosing either problem-focused coping strategies or strategies

to solve the problem, or emotion-focused coping strategies or strategies to control, relieve, or avoid their negative emotions caused by the stress.

Aggression can be a problem-focused or emotion-focused coping strategy. Aggressive individuals prefer to solve problems using antisocial means or perceive abnormal situations as hostile and respond accordingly [21]. Thus, aggression, as a psychological trait, predicts maladjustment problems, antisocial behavior, and crime [22,23].

Aggression in adolescence is mutually triggered with problematic game use [24–27]. Research has shown that child aggression can be expressed through antisocial behavior such as addictive use of digital media, including online or mobile games and the Internet. Moreover, adolescents' habitual use of problematic games can breed aggressiveness or aggressive behavior that can be difficult to control or is potentially irreversible [24,25]. Conversely, such high aggression rather leads to problematic game use [26,27]. The consequences can mar the balance of children's lives. Therefore, the relationship between parenting styles and adolescents' life satisfaction, self-control, and game use must be understood more deeply.

Research on games began with the expansion of the game market in the early 1980s after the birth of personal computer games such as Spacewars in 1961. However, to our knowledge, there have been few in-depth studies on the effect of parenting behaviors on adolescents' aggression, self-control, maladaptive game use, and well-being by simultaneously integrating supportive-positive parenting and harsh-negative parenting behaviors. This study bridged such a gap to find clues to recovering parent–child relationships from the adverse side effects of children's game use. For this research, the stimulus–organism–response (S–O–R) framework [28] was used. The S–O–R framework is well-suited to explaining children's coping attitudes (self-control and aggression) and responses (game use and life satisfaction) to parental stimuli (supportive-positive parenting and harsh-negative parenting).

The research questions (RQ) are as follows:

- RQ1: How do the two contrasting parenting behaviors affect children's aggression and self-control as coping strategies?
- RQ2: Are children's aggression and self-control significantly related to their maladaptive game use and life satisfaction?

## 2. Theoretical Background

### 2.1. Children's Coping Strategies with Parenting Behaviors

In studies of the relationship between parents and children, it has been consistently argued that parenting behavior induces psychological symptoms in children, such as depression. Scholars describe parenting behavior in different ways (i.e., authoritative, authoritarian, permissive, etc.) but their definitions generally converge towards bipolar parenting behavior. Parenting behavior that is predominantly warm and supportive is referred to as supportive-positive parenting, whereas parenting behavior that is predominantly hostile and oppressive is referred to as harsh-negative parenting [29,30]. Harsh-negative parenting is characterized by impulsive behaviors such as physical aggression and verbal aggression towards children. Physical aggression includes spanking, slapping, and hitting, while verbal aggression includes shouting and cursing [16].

Studies have revealed that harsh-negative parenting may be more dangerous than supportive-positive parenting by increasing the risk of depression in children. It has been empirically proven that when parents' harsh-negative parenting rate is high and their supportive-positive parenting rate is low, their child has a high probability of developing depression [31–33]. The harsh-negative parenting also gives children negative affects, such as anxiety, by putting strong stress on them [34]. In a meta-analytical review study, Rueger et al. revealed a significant relationship between parenting behavior and parental affect [30]. Negative parental affect has a positive correlation with harsh-negative parenting, whereas positive parental affect has such a relationship with supportive-positive parenting.

However, a parent's perceived parenting style determines a child's well-being. For example, authoritarian parenting generally leads, on one hand, to children's good performance in school and good behavior, but on the other hand, to low self-esteem, lack of social skills, and relatively high levels of depression. Conversely, permissive parenting usually results, on one hand, in children's poorer performance in school and problem behavior, but on the other hand, to high self-esteem, good social skills, and relatively low levels of depression [13]. Consequently, children need to adapt to changes in their parents' affect and parenting behavior by controlling their own psychological, cognitive, and environmental responses. The underlying mechanisms in the relationship between parenting behavior and adolescents' coping strategies are particularly important to identify because adolescence is a crucial period in the life cycle, during which growth is experienced biologically, cognitively, and socio-emotionally followed by an immediate transition to adulthood [35].

Earlier, Lazarus & Folkman defined coping as "cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" [20]. From the perspective of the nature of goal orientation and motivation, coping strategies can be widely classified into two dimensions. Problem-focused coping strategies (e.g., problem-solving and help-seeking) try to eliminate the stress arising from the relationship between oneself and the environment, and emotion-focused coping strategies (e.g., avoiding and ignoring) try to alleviate negative emotions arising from stress [36]. Apart from these, coping attitudes have various dimensions, such as primary versus secondary control coping, engagement (approach) versus disengagement (avoidance) coping, self-focus versus external-focus coping, cognitive versus behavioral coping, active versus passive coping, etc. However, upon closer observation, the mentioned coping processors are complementary rather than divergent [37]. Regarding the results of coping strategies, recent studies highlighted the need for more positive coping strategies to successfully cope with psychosocial problems such as cybercrime [12]. This finding emphasizes the importance of understanding children's strategies for coping with parenting behaviors [8–12], especially with respect to adolescents who are constantly exposed to game activities, whose selection of effective coping strategies can save them from future psychosocial problems.

## 2.2. Self-Control as a Coping Strategy

Research on crimes or risk factors of drunk driving, drug use, excessive alcohol consumption, school bullying, dating violence, software piracy, criminal victimization, etc., attribute their cause to loss of self-control [38,39]. Self-control is the ability of an individual to handle his/her emotions, thoughts, and actions to cope with the impulses and temptations that an individual is expected to experience [40]. Parenting behavior, both warmth and hostile, has a profound relationship not only to a child's psychological competence, but especially to the child's development of self-control [38,41]. This is because parents' judgments or affects about the appropriateness of their children's behavior are delivered explicitly or implicitly to their children [42].

Research on adolescents from 30 countries showed that supportive-positive parenting greatly contributed to the self-control performance of the adolescents [38]. The result supports the logic that supportive parenting behavior instills self-control in children by effectively monitoring, supervising, and responding to the child's problematic behavior. In contrast, harsh-negative parenting adversely affects the development of self-control in adolescents [43]. A longitudinal study found that an authoritarian parenting style is detrimental to the long-term development of adolescent self-control because it deprives the adolescents of the opportunity to learn self-control on their own by forcing them to repress their negative emotions [42].

Adolescent self-control is being studied because self-control is a predictor of maladaptive game use and life satisfaction. When discussing the problematic game use behaviors instigated by digital technology, the concept of maladaptive online and mobile game or

Internet use as a recent social pathological phenomenon has been mainly borrowed from alcoholism research [44]. While terms such as maladaptive or problematic Internet use have been defined in various ways, there is still no clear definition of maladaptive or problematic game use. Thus, based on the research on Internet use [45], we define maladaptive game use as game use by an individual beyond his or her ability to control.

Predictors of problematic behavior such as hyperactivity and delinquency are heavily focused on self-control [46]. Studies demonstrated that high self-control strengthens the prevention of addiction problems such as drugs, alcohol, and smoking [47–50] and facilitates decision making, emotional control, and impulse resistance related to addiction issues [51,52]. Individuals with high self-control succeed in controlling their desire and determination to commit problematic behavior, whereas individuals with low self-control are more susceptible to problematic behaviors such as violent crimes by failing to overcome their impulses and temptations [53,54]. Amidst the recent interest in Internet addiction, a study conducted on 623 college students statistically proved that self-control had a negative effect on Internet addiction [55]. Moreover, in the context of game use, deterioration of self-control triggered by frustration of needs and stress led to critical problematic game use [56,57].

However, people with high self-control tend to prioritize the achievement of important life goals over immediate rewards, so their self-control is organically linked to their perception of satisfaction and happiness in life [58]. In other words, self-control satisfies the requirements for happiness by skillfully controlling and balancing life [59]. Life satisfaction is uniquely defined in each research area. In the domain of adolescents' perception and behavior, life satisfaction has been found to be the degree of subjective well-being that adolescents perceive in their relationship with their families, which reflects their personal judgment and evaluation of their overall quality of life. In psychological studies, self-control was found to have a strong correlation with life satisfaction. Scholars argue that people with high self-control perceive satisfaction more strongly in the process of achieving their goals, so they are more immersed in controlling their behaviors [60,61]. The mechanism can also be inferred in the game-use environment where adolescents are involved.

### *2.3. Aggression as a Coping Strategy*

Formally, the definition of aggression or aggressive behavior tends to focus on the behavioral view, such as a physical attack aimed at harming another person or object. However, as virtual interaction increases, the concept of aggression extends beyond the limits of the existing dimension to cyber-aggression. Borrowing from the traditional concept, aggression that includes cyber-aggression can be defined as aggressive behaviors intended to harm others, including through computers, smartphones/cellphones, and other electronic products [62].

It is inferred that children who grew up in a supportive-positive parenting environment are very unlikely to be more aggressive than those who grew up in a harsh-negative parenting environment. Such reasoning can be explained well by the relationship between the parenting style and the child's aggressive coping strategy. Supportive-positive parenting weakens the child's aggression by suppressing problematic behaviors such as addiction [18,63,64], whereas harsh-negative parenting, accompanied by physical or verbal violence, stimulates the child's aggressive emotions or behaviors by inducing the child to solve his or her problems in aggressive ways, in imitation of the parent [14–16]. To explain further, supportive-positive parenting contributes to strengthening friendly parent–child relations, whereas harsh-negative parenting does the opposite [18,63,64]. In fact, harsh-negative parenting is classified as a risk factor because it has been found to cause aggression in children. The coercive family process theory, which illuminates the relationship between negative parenting practices and childhood externalizing behavior, reveals that harsh-negative parenting plays a crucial role in shaping child aggression [16,17,65,66]. Several studies, including a meta-analytical study of Chinese students [18] and an analytical study

of 2399 Spanish adolescents [19], supported the rigorous relationship between parenting style and children's aggression. The inverse relationship between supportive-positive parenting and aggression may be better understood by reflecting on the strong synergistic effect of harsh-negative parenting on aggression and vice versa.

Aggression is a form of self-destructive behavior, which implies that aggression is an antecedent of problematic behaviors such as addiction [67,68]. Aggression has been widely identified as a predictor of addiction in various studies, including in a drug and alcohol abuse study conducted in Iran [67], a study on college students' aggression towards addiction, and a study on game use disorders of 263 Korean male adolescents [69]. Aggression is deeply related to online game addiction [70], especially to violent game preferences and excessive game use [71]. Extreme male gamers prefer violent video games [72]. The mechanism confirms that pursuing a specific game genre is a voluntary attitude of individuals that is directly related to their innate tendency [73].

The negative emotional attitudes of individuals, such as aggression, are inversely related to their life satisfaction or happiness [74–76]. Particularly, the happiness of adolescents with insufficient emotional control and an inadequate personality-forming state has an important negative relationship to their aggressive beliefs, affects, and behaviors [77]. Thus, adolescents' problematic behavior, violence, and aggression are among the main variables that represent their low levels of happiness [78]. As a result, aggressive emotions decrease long-term happiness by increasing negative affect or violent behavior such as frustration or anxiety [77].

#### 2.4. Maladaptive Game Use and Life Satisfaction

Addiction to media such as online/mobile games and the Internet is considered to have a detrimental effect on personal satisfaction and happiness in life. Scholars are drawing consistent conclusions on the harmfulness of media addiction. People with game-use disorder or excessive game users are more likely to experience tension, fatigue, fear, or negative emotions than those who do not [79]. Such problematic game users experience more severe depressive symptoms, and their self-efficacy and general life satisfaction are significantly lower [80]. A recent longitudinal study on the link between game use and psychosocial well-being in older adolescents and emerging adults clearly revealed a negative correlation between early maladaptive game use and perceptions of happiness [81]. Therefore, it is assumed that in the case of adolescents, game use disorder lowers their positive evaluation and increases their familiarity with virtual life, which will significantly decrease their satisfaction with real life.

### 3. Hypotheses Development

#### 3.1. Stimulus-Organism-Response Paradigm

This study aims to investigate the relationship between children's coping strategies with supportive-positive parenting (SPP) and harsh-negative parenting (HNP), self-control (SCT) and aggression (AGR) as coping strategies, and maladaptive game use (MAU) and life satisfaction (SAT) by empirically analyzing adolescents' problematic gaming behaviors.

Our study justifies the theoretical background for our hypothesis development based on the stimulus–organism–response (S–O–R) paradigm [28], which was supplemented by the mediating role of the individual's internal or organismal experience of the direct causal relationship between the original stimulus and the response. The S–O–R paradigm has been expanding the research area of consumer behavior to include computer experience or website experience. The S–O–R paradigm refers to a framework in which an individual cognitively or emotionally stimulated by an external environmental stimulus responds to it with reflective behavior [82]. In detail, human decision making is bound by a process of three sequential elements: the stimulus, the organism, and the response. The stimulus element is the influence that stirs an individual (applied to supportive-positive/harsh-negative parenting behaviors in our study); the organism element is the cognitive or affective mediating state between the environmental stimuli and the response (applied



to self-control/aggression in our study), and the response element is the individual's resulting behavior such as acceptance or avoidance (applied to maladaptive game use/life satisfaction in our study) [83].

### 3.2. Hypothesis Proposal

Therefore, applying such theory to our hypothesis development, we considered the S–O–R paradigm reasonable for use to theoretically examine the framework of adolescents' coping strategies (Organism) to the environment of their parents' bipolar parenting behavior (Stimulus) and their responsive behavior associated with game use and satisfaction (Response). Thus, we established the following hypotheses.

**Hypothesis 1.** *Perception of supportive-positive parenting will have a positive effect on children's self-control (H1a) and a negative effect on their aggression (H1b).*

**Hypothesis 2.** *Perception of harsh-negative parenting will have a negative effect on children's self-control (H2a) and a positive effect on their aggression (H2b).*

**Hypothesis 3.** *Children's self-control will have a negative effect on their maladaptive game use (H3a) and a positive effect on their life satisfaction (H3b).*

**Hypothesis 4.** *Children's aggression will have a positive effect on their maladaptive game use (H4a) and a negative effect on their life satisfaction (H4b).*

**Hypothesis 5.** *Children's maladaptive game use will have a negative effect on their life satisfaction.*

## 4. Research Methodology

### 4.1. Data Source and Participants

Panel data from the Korean Adolescent Game User Cohort Research was used in this study. The Korea Creative Content Agency (KOCCA) conducted a longitudinal survey to determine the extent of game use of elementary, middle, and high school students (ages 10 to 17). Panel data collection was previously approved by the ethics committee of KONKUK University, a partner organization. The survey received informed consents from the respondents, such as privacy protection or anonymity guarantees related to data collection. A quota sampling method based on school grade and gender ratio was used. Responses were collected 9 times (6-month intervals between each wave) in a face-to-face interview by trained professional agents, who followed established survey guidelines. Respondents were given the same questionnaire throughout the entire wave. Panel participants each received USD 27.00 as a reward. The full description of the survey method and data is on the website ([www.kocca.kr](http://www.kocca.kr) accessed on 10 December 2020).

Of the 778 students surveyed for our analysis, 381 (49.0%) were male and 397 (51.0%) were female. The daily gaming time of 360 students (46.3%) was above average and of 418 students (53.7%) was below average. The students were asked about their online and mobile gaming behaviors. Table 1 summarizes the demographic characteristics of the study respondents.

Table 1. Demographic Characteristics.

Characteristics		All Participants ( <i>n</i> = 778)		High-Daily Gaming Hours ( <i>n</i> = 360)		Low-Daily Gaming Hours ( <i>n</i> = 418)	
		Frequency	(%)	Frequency	(%)	Frequency	(%)
Gender	Male	381	49.0	215	59.7	166	39.7
	Female	397	51.0	145	40.3	252	60.3
Age (in years)	Under 12	287	36.9	100	27.8	187	44.7
	12–14	273	35	152	42.2	121	28.9
	15–17	218	28	108	29.9	110	26.4
Education	Elementary School	287	36.9	100	27.8	187	44.7
	Middle School	273	35.1	152	42.2	121	28.9
	High School	218	28.0	108	30.0	110	26.3
Online game duration (daily average)	Elementary School	38.1 min		64.6 min		23.9 min	
	Middle School	62.2 min		96.8 min		19.4 min	
	High School	62.0 min		103.4 min		20.7 min	
Mobile game duration (daily average)	Elementary School	48.4 min		81.7 min		30.6 min	
	Middle School	78.2 min		109.7 min		39.1 min	
	High School	53.8 min		81.4 min		27.0 min	

#### 4.2. Measurement

The survey questionnaire contained items to measure constructs such as parenting behaviors (i.e., affection, supervision, rationality, inconsistency, over-interference, and over-expectation); self-control, aggression (i.e., physical aggression, verbal aggression, anger, and hostility); maladaptive game use (i.e., time management and performance, withdrawal and social problems, and reality substitute); and life satisfaction. The survey questionnaire was generally adopted from the existing literature validated by prior researchers, and some questions were developed for the Korean situation. Different Likert scales were used to measure each construct. The detailed items are shown in the Appendices A and B.

Supportive-positive parenting (SPP) and harsh-negative parenting (HNP) were assessed based on items developed by Myo-yeon Huh [84], which originally measured the parenting behaviors of Korean fathers and mothers with 43 items. In the KOCCA panel data, parenting behavior was measured with 21 items in a single dimension of the parent after deleting the repeated items from the original version. This variable is a second-order construct with six dimensions (i.e., supervision, affection, inconsistency, over-expectation, over-interference, and rationality) and was measured on a four-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly agree). Among the subfactors, affection-supervision-rationality constituted the construct of supportive-positive parenting (SPP), and inconsistency-overinterference-overexpectation constituted the construct of harsh-negative parenting (HNP).

Self-control (SCT) was assessed using the 13-item Brief Self-Control Scale (BSCS) developed by Tangney et al. [85] on a 5-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree).

Aggression (AGR) was assessed with the 12-item Short-Form Buss–Perry Aggression Questionnaire (BPAQ-SF), which Diamond et al. revised [86] after Bryant and Smith [87] refined the first 29-item self-report BPAQ developed by Buss and Perry [88]. This variable is a second-order construct with four dimensions (i.e., physical aggression, verbal aggression, anger, and hostility) and was measured on a 5-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree).

Maladaptive game use (MAU) was assessed with the 20-item Internet Addiction Scale developed by Young [89] after adapting and modifying it for the game context. This variable is a second-order construct with three dimensions (i.e., time management and performance, withdrawal and social problems, and reality substitute) and was measured

on a 5-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly agree).

Life satisfaction (SAT) was assessed using the scale of Diener et al. [90] for measuring subjective satisfaction, which represents the degree of happiness in one's life. This variable contains five items and was measured on a 7-point Likert scale (1 = Strongly disagree, 2 = Disagree, 3 = Slightly disagree, 4 = Neutral, 5 = Slightly agree, 6 = Agree, and 7 = Strongly agree).

#### 4.3. Procedure and Data Analysis

The data were analyzed using the PLS-SEM method. In PLS-SEM statistical processing, the measurement model is evaluated based on the statistical criteria of convergent validity (i.e., the factor loading value, AVE), internal consistency reliability (i.e., Cronbach's alpha value, CR), and discriminant validity. The acceptable thresholds had to meet the following requirements: To ensure higher convergent validity, the loading value of individual items had to be at least 0.7 [91]. The average variance extracted (AVE) had to be at least 0.5 [92,93]. For higher internal consistency, the Cronbach's alpha and the composite reliability (CR) of the individual constructs had to be at least 0.7 [94]. The discriminant validity was assessed using the heterotrait–monotrait (HTMT) ratio. This test complements Fornell and Larcker's criterion, criticized for the lack of reliability of discriminant validity in common research settings. The acceptable threshold values for the HTMT ratio are up to 0.9 [95]. Given that panel data were used, higher-order constructs (i.e., parenting behavior, aggression, and maladaptive game use) were assessed using a typical reflective–reflective modeling method. In Tables 2 and 3, we confirmed that convergent validity, internal consistency reliability, and discriminant validity were obtained from the measurement model analysis. The data were analyzed using the SmartPLS 3 software (v. 3.3.2, Bönningstedt, Germany) [96].

**Table 2.** Results for Measurement Model.

Scale/Items	Cronbach's $\alpha$	CR	AVE	$R^2$
Supportive-positive parenting (SPP)/second-order				
Affection (AFF)	0.806	0.873	0.633	0.910
Supervision (SUP)	0.782	0.875	0.701	0.237
Rationality (RAT)	0.754	0.858	0.668	0.686
Harsh-negative parenting (HNP)/second-order				
Over-interference (INT)	0.712	0.835	0.630	0.569
Over-expectation (EXP)	0.734	0.849	0.653	0.914
Self-control (SCT)	0.805	0.865	0.562	0.118
Aggression (AGR)/second-order				
Physical Aggression (PHY)	0.748	0.856	0.665	0.814
Anger (ANG)	0.750	0.856	0.665	0.766
Maladaptive game use (MAU)/second-order				
Time Management (TMP)	0.882	0.914	0.682	0.866
Withdrawal (WSP)	0.907	0.925	0.608	0.944
Reality Substitute (RSS)	0.776	0.870	0.690	0.789
Life satisfaction (SAT)	0.889	0.918	0.692	0.182

Note: CR = Composite Reliability, AVE = Average Variance Extracted,  $R^2$  = R Square Adjusted.

**Table 3.** Heterotrait–Monotrait Ratio (HTMT) for Discriminant Validity.

Variables	MAU	HNP	SPP	AGR	SAT	SCT
Maladaptive game use (MAU)						
Harsh-negative parenting (HNP)	0.395					
Supportive-positive parenting (SPP)	0.301	0.345				
Aggression (AGR)	0.485	0.347	0.317			
Life satisfaction (SAT)	0.297	0.269	0.591	0.339		
Self-control (SCT)	0.609	0.282	0.381	0.525	0.462	

Note: Shaded boxes are the standard reporting format of PLS-SEM HTMT analysis.



Additionally, we were concerned that self-reported data may have a common method bias (CMB) that should be eliminated. In this study, we used two methods of checking the existence of a CMB. First, from the result of the measurement model analysis, the correlation matrix of the constructs was examined. A CMB can occur if the correlations are higher than 0.9. We confirmed that the highest correlation was 0.832, which suggests that a CMB was unlikely. Next, Harman's single-factor test was performed on the constructs. The result revealed 12 factors, and the greatest variance explained by one factor was 39.063% (less than 50%). The two results indicated that our study did not have a threat of a CMB, as shown in Table 4 [97].

**Table 4.** CMB Assessment Results.

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.688	39.063	39.063	4.114	34.283	34.283
2	1.76	14.668	53.73	1.586	13.214	47.496
3	1.262	10.517	64.247	0.831	6.928	54.425
4	1.071	8.927	73.174	0.833	6.939	61.364
5	0.742	6.18	79.354			
6	0.556	4.637	83.991			
7	0.506	4.22	88.211			
8	0.401	3.344	91.555			
9	0.343	2.856	94.411			
10	0.322	2.68	97.091			
11	0.222	1.85	98.941			
12	0.127	1.059	100			

Note: CMB = Common Method Bias.

## 5. Hypotheses Test Results

Based on our evaluation of our measurement model, we tested our hypotheses through structural model analysis. Our hypotheses were statistically supported in our structural model analysis, except for H5 (maladaptive game use (MAU) → life satisfaction (SAT)). The hypotheses test results are briefly summarized as follows.

First, on the relationship between self-control (SCT) and its antecedents, supportive-positive parenting (SPP) had significant positive effects on self-control (SCT) ( $\beta = 0.275$  and  $p < 0.001$ ), and harsh-negative parenting (HNP) had significantly negative effects on self-control (SCT) ( $\beta = -0.148$  and  $p < 0.01$ ).

Second, on the relationship between aggression (AGR) and its antecedents, supportive-positive parenting (SPP) had significantly negative effects on aggression (AGR) ( $\beta = -0.205$  and  $p < 0.001$ ), and harsh-negative parenting (HNP) had significantly positive effects on aggression (AGR) ( $\beta = 0.226$  and  $p < 0.001$ ).

Third, on the relationship between maladaptive game use (MAU) and its antecedents, self-control (SCT) had significantly negative effects on maladaptive game use (MAU) ( $\beta = -0.423$  and  $p < 0.001$ ), and aggression (AGR) had significantly positive effects on maladaptive game use (MAU) ( $\beta = 0.251$  and  $p < 0.001$ ).

Contrary to these significant relationships, some of the results did not match our expectations. Maladaptive game use (MAU) is significantly irrelevant to life satisfaction (SAT) at the  $p < 0.05$  level. However, at the  $p < 0.1$  level, maladaptive game use (MAU) has a significant negative effect on life satisfaction (SAT). Therefore, in the context of adolescent game use, maladaptive game use (MAU) turns out to be a key variable that inhibits life satisfaction (SAT) along with aggression (AGR). Figure 1 and Table 5 summarize the hypotheses test results.

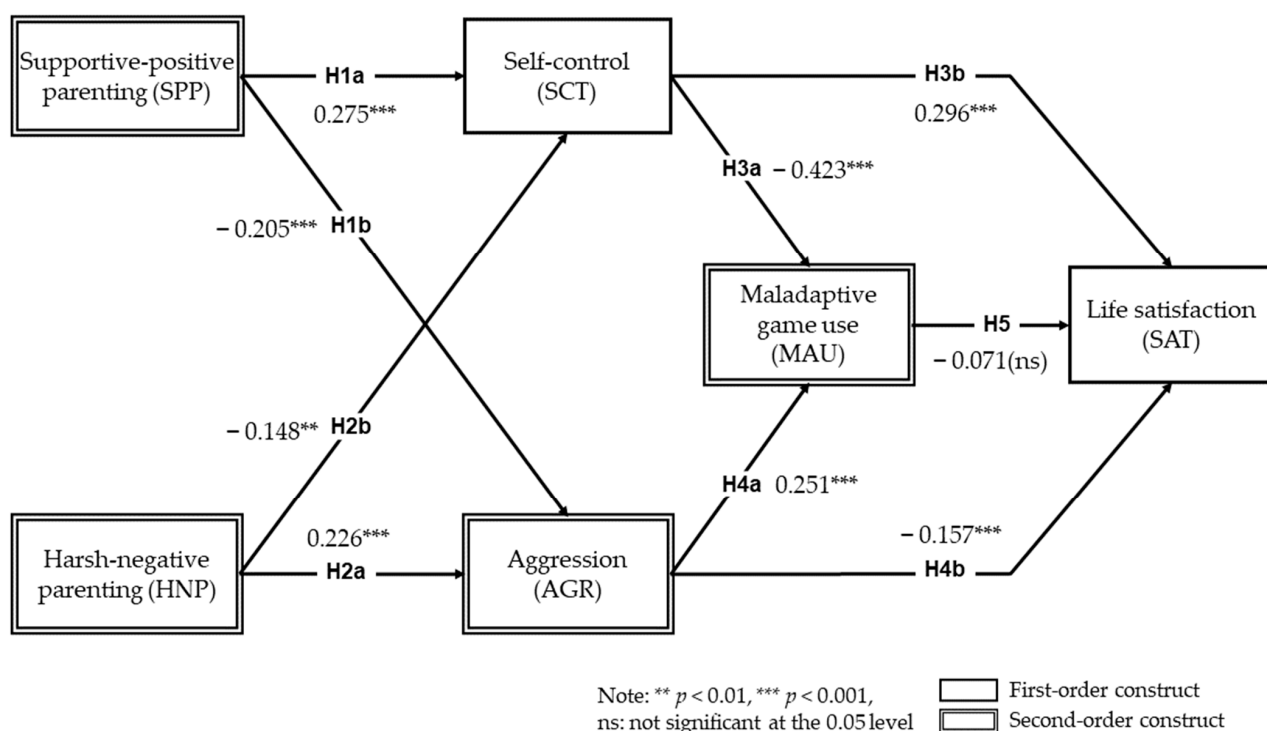


Figure 1. The results estimated by PLS-SEM using SmartPLS ( $n = 778$ ).

Table 5. Results of the hypothesis tests ( $n = 778$ ).

Hypothesis	Coef.	Mean	SD	T-Values	Results
H1a. supportive-positive parenting (SPP) → self-control (SCT)	0.275	0.278	0.047	5.911 ***	Accepted
H1b. supportive-positive parenting (SPP) → aggression (AGR)	−0.205	−0.207	0.040	5.176 ***	Accepted
H2a. harsh-negative parenting (HNP) → self-control (SCT)	−0.148	−0.146	0.043	3.428 **	Accepted
H2b. harsh-negative parenting (HNP) → aggression (AGR)	0.226	0.224	0.037	6.027 ***	Accepted
H3a. self-control (SCT) → maladaptive game use (MAU)	−0.423	−0.426	0.031	13.715 ***	Accepted
H3b. self-control (SCT) → life satisfaction (SAT)	0.296	0.300	0.046	6.478 ***	Accepted
H4a. aggression (AGR) → maladaptive game use (MAU)	0.251	0.249	0.037	6.797 ***	Accepted
H4b. aggression (AGR) → life satisfaction (SAT)	−0.157	−0.155	0.042	3.768 ***	Accepted
H5. maladaptive game use (MAU) → life satisfaction (SAT)	−0.071	−0.069	0.041	1.721	Rejected <sup>†</sup>

Note: Coef. = Coefficient, Significant level: \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ . (<sup>†</sup> MAU is significantly related to SAT at the  $p < 0.1$  level.).

## 6. Discussion

This study investigated the relationship among parenting, aggression, self-control, maladaptive game use, and life satisfaction within the integrated framework of supportive-positive parenting and harsh-negative parenting by focusing on the transition of adolescents' gaming behaviors to problematic use such as addiction. The S–O–R paradigm was applied as a conceptual link between the major constructs. Based on the findings, the research questions related to the issues in the Introduction are answered below.

First, to answer research question 1 on the effect of the two contrasting parenting styles on children's aggression and self-control as coping strategies, the results of this study are consistent with those of prior research, including from similar studies. Hypothesis 1 states that children's perception of supportive-positive parenting motivates them to increase their self-control [38,39] and lowers their aggression [18,63,64]. Conversely, Hypothesis 2 states that the perception of harsh-negative parenting lowers children's self-control [42,43] and increases their aggression [14–17,66].

These results are typical when problem-focused coping or emotion-focused coping is applied to adolescent cases. The routine life of adolescents immersed in game play can cause temporary or long-term harsh-negative parenting by mothers or fathers. Such

harsh-negative parenting is likely to increase children's incompetence and insecurity in the future [34], and strongly stresses them and makes them feel negative emotions. In this situation, negative stimuli such as harsh-negative parenting will make adolescents take on an attitude of problem-focused coping or emotion-focused coping. In emotion-focused coping, adolescents who feel negative emotions caused by harsh-negative parenting will try to avoid or ignore them. This seems to be due to the intentions of the children to restore the friendly parent-child relationship that was temporarily destroyed. In the process, adolescents are expected to develop self-control to positivize their situation.

In a different way, the increase in aggression due to harsh-negative parenting may be attributed to the recovery psychology of adolescents trying to avoid the disconnected parent-child relationship. In problem-focused coping, adolescents who feel negative emotions caused by external stress will try to solve the problem or seek help in solving the problem [36]. To solve the problem, adolescents may use aggression, a coping strategy different from self-control, because it can be regarded as a direct and short-term solution for the youth. The above discussion reveals that adolescents use three coping strategies depending on their parents' parenting style. Classifying adolescents' self-control and aggression into different coping strategies is the theoretical contribution of this study.

In the context of adolescent game use, the parent-child S-O-R framework conveyed as life satisfaction systematically addresses the coping strategies of adolescents for parenting stimulation. Game use can be a breakthrough for stress relief as a limited and universal behavior of adolescents in response to their father's or mother's parenting. Self-control and aggression are contrasting adolescent coping attitudes, and the results of this study revealed their opposite effects.

Second, to answer research question 2 on the effects of aggression and self-control on maladaptive game use and life satisfaction, the results of this study coincided with those of previous studies, including related studies. Hypothesis 3 states that children's self-control decreases their maladaptive game use [47–57] and increases their life satisfaction [58–61]. On the contrary, Hypothesis 4 states that children's aggression increases their maladaptive game use [67,69–72] and decreases their life satisfaction [74–78].

These results confirm two key points. First, self-control and aggression influence adolescents' maladaptive game use and life satisfaction in opposite directions. Second, the effects of self-control and aggression on the degree of maladaptive game use and life satisfaction give a comprehensive insight into the stimulus-organism-response framework of adolescent game use. The S-O-R process intuitively presents several contextual paths, such as SPP (high self-control, high life satisfaction) and HNP (high aggression, low life satisfaction). These intuitive context paths simply and clearly present the link between parenting, coping strategy, game use, and well-being, and explain how self-control and aggression act as organisms between the stimulus-response relationship of parenting and life satisfaction. These results imply that adolescents' well-being can be regulated according to how self-control and aggression are handled. Parents may assert that parenting styles are multivariate but deterministic, so they are irreversible. Such a mindset can frustrate their attempts to improve their children's well-being and can be very intimidating. However, if parents change their mindset, adolescents' well-being can be improved even in a harsh-negative parenting environment.

The results of the relationship between maladaptive game use and life satisfaction are interesting. They do not match the results of prior research [80,81]. Hypothesis 5, which rejects the relationship between maladaptive game use and life satisfaction, was proven correct by the high statistical significance of the result of this study ( $p < 0.1$ ) that showed that children's maladaptive game use weakens their life satisfaction. From the result, we can observe that maladaptive game use interferes with adolescents' life satisfaction, although the statistical significance of such a result was low. Maladaptive game use is related to problematic game use, such as addictive game use. It needs to be considered in line with self-control because it describes the use of problematic games beyond the user's ability to control. As stated by Hypothesis 3, low self-control increases maladaptive game

use and decreases life satisfaction. From the same perspective, it would be a reasonable outcome that maladaptive game use degrades life satisfaction through low control over game use. This finding will play a role in reinforcing the causal relationship between problematic game use and adolescent life satisfaction.

However, despite these empirical findings, this study offered suggestions for future research by recognizing its limitations. First, the use of panel data had limitations in expanding the research model. The collection and use of purpose-appropriate data will help to systematically reinforce research on adolescent coping related to game use. Second, as this study was limited to the use of games by adolescents, it was difficult to comprehensively consider adolescent coping strategies. Research that reflects recent trends such as YouTube vlogging and digital media will expand the boundaries of understanding adolescent coping strategies. Third, this study focused on the stimulus–organism–response paradigm and investigated the causal relationship between parenting, coping, maladaptive game use, and well-being. Efforts to apply additional theoretical frameworks will contribute to the development of new theories in related studies.

The contributions and implications of this study are as follows. First, the previous research on parenting, which was conducted mainly in a single dimension, did not fully examine the effects of simultaneous but contrasting parenting styles such as supportive-positive parenting and harsh-negative parenting on adolescents. This study bridged such a gap by considering multidimensionality, thereby contributing to a deeper understanding of the interactive relationship between parenting and adolescents' attitudes. Second, previous studies focused on strategies to cope with stress-related external stimuli. However, adolescents can be exposed to various types of stimuli, such as non-stress stimuli. This study contributed to expanding such a perspective by transcending such a limited range of stimulus types. Third, more studies are needed on how adolescents cope with parenting behavior through game use, especially because game players are becoming younger. This study contributed to providing a basis for future research targeting younger game users.

## 7. Concluding Remarks

In conclusion, this study proved that adolescents' strategies for coping with parenting styles have a decisive influence on their maladaptive game use and life satisfaction. Furthermore, this study emphasized the importance of parenting styles and adolescents' coping strategy in the context of game use. These findings will contribute to providing the guidelines necessary to properly nurture children who will sustain our society in the global context of game use.

**Author Contributions:** E.J.J. supervised and reviewed the manuscripts; H.G.J. conducted original draft preparation, data processing and analysis; J.A.K. performed literature review; G.M.K. analyzed the model test; and S.J.L. performed literature review, discussion section, and editing. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was supported by Konkuk University in 2019.

**Institutional Review Board Statement:** The study was conducted according to the guidelines of Declaration of Helsinki, and approved by the Institutional Review Board in Konkuk University (7001355-201408-HR-031; August 2014).

**Informed Consent Statement:** Informed consent was obtained from all subjects involved in the study.

**Data Availability Statement:** The data used in this study are available with permission from Korea Creative Content Agency (KOCCA, <http://www.kocca.kr/gameguide/contents.do?menuNo=203709>; accessed on 10 December 2020).

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A. Outer Factor Loadings of Constructs

Scale/Items	Loadings	Mean	SD	t-Value
Supportive-positive parenting behaviors (SPP)/second-order				
<i>Affection (AFF)</i>		3.149	0.578	
Q142A15	0.823			47.109
Q142A19	0.819			54.607
Q142A12	0.803			49.190
Q142A3	0.734			30.286
<i>Supervision (SUP)</i>		3.393	0.567	
Q142A2	0.883			71.166
Q142A1	0.882			71.365
Q142A8	0.738			26.456
<i>Rationality (RAT)</i>		2.905	0.613	
Q142A21	0.850			63.323
Q142A11	0.822			50.366
Q142A18	0.779			34.112
Harsh-negative parenting behaviors (HNP)/second-order				
<i>Over-interference (INT)</i>		2.176	0.668	
Q142A17	0.876			105.681
Q142A20	0.760			33.171
Q142A5	0.738			30.665
<i>Over-expectation (EXP)</i>		2.175	0.709	
Q142A16	0.834			63.245
Q142A6	0.813			48.151
Q142A10	0.775			38.245
Self-control (SCT)		3.282	0.752	
Q150A12	0.775			40.837
Q150A10	0.771			41.418
Q150A13	0.765			41.231
Q150A9	0.729			35.500
Q150A2	0.705			31.662
Aggression (AGR)/second-order				
<i>Physical Aggression (PHY)</i>		1.932	0.809	
Q148A4	0.835			54.375
Q148A8	0.813			55.354
Q148A1	0.799			56.325
<i>Anger (ANG)</i>		1.908	0.838	
Q148A10	0.851			68.484
Q148A12	0.849			60.274
Q148A6	0.743			31.204
Maladaptive game use (MAU)/second-order				
<i>Time Management (TMP)</i>		2.465	0.954	
Q134A17	0.871			93.592
Q134A2	0.859			79.950
Q134A16	0.826			65.885
Q134A1	0.826			68.573
Q134A8	0.741			37.351
<i>Withdrawal (WSP)</i>		2.059	0.863	
Q134A18	0.819			60.621
Q134A15	0.813			55.342
Q134A9	0.804			54.892
Q134A20	0.788			48.692
Q134A3	0.779			42.889
Q134A19	0.778			39.835
Q134A5	0.725			36.333
Q134A13	0.723			37.999



Scale/Items	Loadings	Mean	SD	t-Value
Reality Substitute (RSS)		2.040	0.924	
Q134A12	0.854			73.861
Q134A10	0.848			70.800
Q134A14	0.789			43.108
Life satisfaction (SAT)		4.482	1.253	
Q166A4	0.876			77.798
Q166A3	0.867			82.919
Q166A1	0.849			56.931
Q166A2	0.781			28.335
Q166A5	0.780			35.412

## Appendix B. Constructs and Measurement Items

### Supportive-positive parenting (SPP)/second-order (*adapted from Myo-yeon Huh [84]*) Affection (AFF)

- Q142A3. My parents/guardians respect my opinion.
- Q142A12. My parents/guardians express their liking to me.
- Q142A15. My parents/guardians give me courage when I am struggling.
- Q142A19. My parents/guardians give me frequent praise.

### Supervision (SUP)

- Q142A1. My parents/guardians know what I do/where I go after school.
- Q142A2. My parents/guardians know what I spend time doing.
- Q142A8. My parents/guardians know what time I return home after going out.

### Rationality (RAT)

- Q142A11. My parents/guardians reasonably explain to me why their decisions should be accepted.
- Q142A18. My parents/guardians explain to me why I am not right before scolding my wrongdoing.
- Q142A21. When I make an unreasonable demand, my parents/guardians explain to me why they do not accept it.

### Harsh-negative parenting (HNP)/second-order (*adapted from Myo-yeon Huh [84]*) Over-interference (INT)

- Q142A5. My parents/guardians are so anxious that they do not let me do what ordinary children can do.
- Q142A7. I hope my parents/guardians do not worry too much about me.
- Q142A17. Parents/guardians are heavily involved in the little things I do.
- Q142A20. My parents/guardians frequently prohibit my desired activities.

### Over-expectation (EXP)

- Q142A4. I am burdened with parents/guardians when they want me to do more than I can.
- Q142A6. My parents/guardians seem to force me to be able to do everything.
- Q142A10. My parents/guardians show more enthusiastic interest in good school grades than in other specialties about me.
- Q142A16. My parents/guardians emphasize that I should be better than others in all respects.

### Inconsistency (INC)

- Q142A9. My parents/guardians scold me for the same wrongdoing, but sometimes overlook it.
- Q142A13. The way my parents/guardians treat me depends on their mood.
- Q142A14. In front of others or outside home, my parents/guardians treat me differently than usual.

**Self-control (SCT) (adapted from Tangney et al. [85])**

- Q150A1. I am good at resisting temptation.
- Q150A2. I have a hard time breaking bad habits.
- Q150A3. I am lazy.
- Q150A4. I say inappropriate things.
- Q150A5. I do certain things that are bad for me if they are fun.
- Q150A6. I refuse things that are bad for me.
- Q150A7. I wish I had more self-discipline.
- Q150A8. People would say that I have iron self-discipline.
- Q150A9. I have trouble concentrating.
- Q150A10. Pleasure and fun sometimes keep me from getting work done.
- Q150A11. I can work effectively toward long-term goals.
- Q150A12. Sometimes I cannot stop myself from doing something, even if I know it is wrong.
- Q150A13. I often act without thinking through all the alternatives.

**Aggression (AGR)/second-order (adapted from Diamond et al. [86])***Physical Aggression (PHY)*

- Q148A1. Given enough provocation, I may hit another person.
- Q148A4. There are people who pushed me so far that we came to blows.
- Q148A8. I have threatened people I know.

*Anger (ANG)*

- Q148A6. Sometimes I fly off the handle for no good reason.
- Q148A10. I have trouble controlling my temper.
- Q148A12. When frustrated, I let my irritation show.

**Maladaptive game use (MAU)/second-order (adapted from Young [89])***Time Management (TMP)*

- Q134A1. How often do you find that you stay online longer than you intended?
- Q134A2. How often do you neglect household chores to spend more time playing games?
- Q134A6. How often do your grades/schoolwork suffer because of the amount of time you spend playing games?
- Q134A7. How often do you check your email before something else that you need to do?
- Q134A8. How often does your job performance or productivity suffer because of the game?
- Q134A16. How often do you find yourself saying “just a few more minutes” when playing games?
- Q134A17. How often do you try to cut down the amount of time you spend playing games and fail?

*Withdrawal & Social Problem (WSP)*

- Q134A3. How often do you prefer the excitement of the Internet to intimacy with your partner?
- Q134A4. How often do you form new relationships with fellow game players?
- Q134A5. How often do others in your life complain to you about the amount of time you spend playing games?
- Q134A9. How often do you become defensive or secretive when anyone asks you what games you play?
- Q134A13. How often do you snap, yell, or act annoyed if someone bothers you while you play games?
- Q134A15. How often do you feel preoccupied with the game when off-line, or fantasize about playing games?
- Q134A18. How often do you try to hide how long you’ve played games?
- Q134A19. How often do you choose to spend more time playing games over going out with others?

- Q134A20. How often do you feel depressed, moody, or nervous when you are not playing games, which goes away once you are back to play games?  
*Reality Substitute (RSS)*
- Q134A10. How often do you block out disturbing thoughts about your life with soothing thoughts of the game?
- Q134A11. How often do you find yourself anticipating when you will play games again?
- Q134A12. How often do you fear that life without playing games would be boring, empty, and joyless?
- Q134A14. How often do you lose sleep due to playing games?
- Life satisfaction (SAT) (adapted from Diener et al. [90])**
- Q166A1. In most ways my life is close to my ideal.
- Q166A2. The conditions of my life are excellent.
- Q166A3. I am satisfied with my life.
- Q166A4. So far, I have gotten the important things I want in life.
- Q166A5. If I could live my life over, I would change almost nothing.

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