

# Sensation Seeking, Self Forgetfulness, and Computer Game Enjoyment

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**Abstract.** This paper investigates the relationship between enjoyment of computer game play and two personality traits (sensation seeking and self-forgetfulness). Hypotheses were proposed based on a review of computer game enjoyment, game characteristics, personality theories, and effects of computer game play. A survey is conducted in two US universities. Results and implications are discussed.

**Keywords:** Sensation seeking, self forgetfulness, personality, computer game, enjoyment.

## 1 Introduction

The majority of prior psychological game research has focused on two specific areas of investigation: (a) the effects of excessive playing on children and adolescents and (b) whether or not playing (violent or nonviolent) video games makes children and adolescents more violent ([1], [2], and [3]). However, computer game play has become a prominent form of entertainment and a comprehensive framework for examining the interaction between player characteristics and game features is needed for a better understanding of the process of game play and its impacts on users.

As a first step towards building such a comprehensive framework, this research attempts to investigate the impact of two personality traits (sensation seeking and self forgetfulness) on enjoyment of computer game play. The following sections discuss prior research on computer game enjoyment and personality, theoretical framework, method, and results.

## 2 Background Literature

Prior research in the following allied fields was examined: enjoyment of computer game play and personality.

### 2.1 Computer Game Play and Enjoyment

In several comprehensive studies, Sherry and his colleagues [4] have enumerated a set of factors of video game uses related to gratifications. Their studies used focus group

research and surveys of over 1,000 participants ranging in age from 10 to 24 years old. They have identified that five factors -- competition, challenge, social interaction, diversion, and fantasy -- could lead to a sense of gratification. Grodal [5] explains that much of the fascination with video games can be attributed to the ability of players to control the game in terms of outcomes (i.e., deciding how the "plot" will unfold), the speed at which the game progresses, and mastery of the game or mastery over other players. Vorderer, Hartmann, and Klimmt [6] have provided support for the idea that game play is more enjoyable when there are a variety of ways to solve a challenge offered in a video game. Agarwal and Karahanna [7] propose a model of deep involvement with software. They analyze user intentions to use IT technology and emphasize the cognitive determinants.

Hoffman and Novak [8] present a model of flow in computer-mediated environments. The flow model involves "positive affect," "exploratory behaviors," and "challenge/arousal," which could be considered as elements of enjoyment. A stream of recent studies has used the flow model to interpret and understand user experience during game play [9], [10], [11], [12]. Flow is widely considered to have eight elements: concentration, challenge, skills, control, clear goals, feedback, immersion, and social interaction.

Fang, Chan, Brzezinski, and Nair [13] develop an instrument to measure enjoyment of computer game play based on tripartite media enjoyment model ([14]). This instrument measures three types of reactions during computer game play: cognitive, behavioral, and affective.

## 2.2 Personality

Personality can be defined as a stable set of tendencies and characteristics that determine the commonalities and differences in people's psychological behavior (thoughts, feelings and actions) that have continuity in time [15]. Over the years, the five-factor model (e.g. [16], [17], [18], [19], and [20]) has gained acceptance among researchers because it establishes a common taxonomy [21]. It contains the following five dimensions of personality: Extraversion - outgoing and stimulation-oriented vs. quiet and stimulation-avoiding; Neuroticism - emotionally reactive, prone to negative emotions vs. calm, imperturbable, optimistic; Agreeableness - affable, friendly, conciliatory vs. aggressive, dominant, disagreeable; Conscientiousness - dutiful, planful, and orderly vs. laidback, spontaneous, and unreliable; Openness to experience - open to new ideas and change vs. traditional and oriented toward routine.

In an alternative five-factor model, Zuckman and his colleagues [22] add Impulsive Unsensitized Sensation Seeking, Aggression-Hostility, and Activity, to Sociability and Neuroticism-Anxiety. Sensation seeking is a personality trait defined by the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experience [23].

Cloninger, Przybeck, and Svrakic [24] describe a psychobiological model of the structure and development of personality that account for dimensions of both temperament and character. There are three character dimensions in this model: self-directedness, cooperativeness, and self-transcendence. Self-transcendence refers generally identification with everything conceived as essential and consequential parts of a unified whole. The staple of Self-forgetfulness has been described as the same as

experienced transiently by people when they are totally absorbed, intensely concentrated, and fascinated by one thing. In such one-pointed concentration, people may forget where they are and lose all sense of the passage of time.

### 3 Theoretical Framework

Some researchers [25] have suggested that two personality traits, sensation seeking and self-forgetfulness, may lead to higher engagement in computer game play.

Sensation seeking is a personality trait defined by the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experience [23]. Computer games are designed to offer thrills and excitement. It is likely that highly sensation seeking players may find a computer game more entertaining. Therefore, it is hypothesized that:

H1. Sensation seeking is positively related to enjoyment of computer game play.

Self-forgetfulness has been described as the same as experienced transiently by people when they are totally absorbed, intensely concentrated, and fascinated by one thing [24]. In such one-pointed concentration people may forget where they are and lose all sense of the passage of time. Given these characteristics, highly self-forgetful individuals would be expected to experience higher presence when playing computer games and thus perceive higher level of enjoyment.

H2. Self-forgetfulness is positively related to enjoyment of computer game play.

### 4 Method

A survey was conducted in two U.S. universities to investigate the relationships between enjoyment of computer game play and the two personality traits: sensation seeking and self-forgetfulness. In total, 173 students responded to the survey. Table 1 shows the demographic information of the participants.

There are two sections in the questionnaire. Section 1 contains 21 items about participant's demographic information and personality traits. Responses from the first 6 items were summarized in Table 1. Sensation seeking trait was measured by 12 items (e.g., "I sometimes like to do things that are a little frightening.") taken from the sensation seeking scale introduced by Zuckerman [23]. Self-forgetfulness trait was measured by 3 items taken from the Temperament and Character Inventory [24]. All questions about personality traits were rated on a 7-point scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

Section 2 of the survey questionnaire contains questions about enjoyment of computer game play. Enjoyment was measured by 15 items from the computer game enjoyment scale developed by Fang et al. [13]. This instrument has 3 subscales: affect, behavior, and cognition.

A printed questionnaire was handed to students in classes, in a gaming lab, and in other public places on campus. The survey could be completed on the spot or completed at the participant's leisure time and returned to the research team via campus mail. A gift certificate was provided as an incentive for participation. All the responses were kept anonymous. Participants were required to answer all the 21 questions in Section 1. In Section 2, participants were asked to rate their enjoyment of

**Table 1.** Demographic Information of Participants

Variables		
Gender	Male (%)	59.5
	Female (%)	40.5
Age	Mean	22.8
	Std.	5.02
How long have you been playing computer/video games?	Mean (years)	12.1
	Std.	5.95
How many hours on average do you play?	Mean	2.0
	Std.	2.02
How often do you play computer/video games?	Daily (%)	8.1
	Weekly (%)	25.4
	Monthly (%)	30.1
	Seldom (%)	35.3
On average, how many hours do you play in each week?	Mean	5.8
	Std.	8.27

five categories of games. The five categories of computer games (Action/ Adventure/ Shooting/Fighting, Role playing, Sport Games/Racing, Family Entertainment/ Simulation, and Strategy) were primarily derived from the classification scheme adopted by the Entertainment Software Association (<http://www.theesa.com>). For each category of games, some sample games were listed. Participants were instructed to choose a game they played most frequently and answer questions about their experience with it. If they had never played any game in a particular category, they might skip this category. They were not allowed to skip any questions though once they started to evaluate a game category.

## 5 Results

### 5.1 Data Analysis Procedure

For responses to each of the five categories of games, the following data analysis procedure was applied.

A factor analysis was conducted to establish the discriminant and construct validity. Only items highly loaded (loadings > 0.5) on one of the following constructs were retained in the analysis: sensation seeking, self-forgetfulness, affect, behavior, and cognition. In some cases, a whole construct might be excluded from the analysis if none of its items converged together. Complex items loaded on multiple constructs were also excluded from the analysis.

Subsequently, reliability analysis was performed. Cronbach's Alpha values were calculated to check the internal consistency of the items. Only constructs with a Alpha value of greater than 0.7 were retained and used for further analysis.

Finally, a correlation matrix was computed and linear regression was conducted to explore the relationships between enjoyment of computer game play and the two personality traits: sensation seeking and self-forgetfulness.

In the following 5 subsections, the data analysis results for each of the five categories of games will be presented and discussed in detail.

5.2 Action/Adventure/Shooting/Fighting Games

154 participants evaluated this category. Constructs affect, behavior, cognition, and sensation seeking passed both the factor and reliability analyses. Self-forgetfulness was excluded due to low reliability of the items (Cronbach’s Alpha value=0.417). Tables 2 and 3 present the correlation matrix and the regression analysis results respectively.

Table 2. Matrix of Action/Adventure/Shooting/Fighting Games

		Affect	Sensation Seeking	Behavior	Cognition
Affect	Pearson Correlation	1	.080	.218(**)	.177(*)
	Sig. (2-tailed)		.325	.007	.028
Sensation Seeking	Pearson Correlation	.080	1	.256(**)	-.055
	Sig. (2-tailed)	.325		.001	.501
Behavior	Pearson Correlation	.218(**)	.256(**)	1	-.103
	Sig. (2-tailed)	.007	.001		.205
Cognition	Pearson Correlation	.177(*)	-.055	-.103	1
	Sig. (2-tailed)	.028	.501	.205	

Table 3. Regression Analysis of Action/Adventure/Shooting/Fighting Games

Model	R-Square	Beta	T-Value	P Value
Behavior=Sensation Seeking + Errors	0.059	0.256	3.267	0.001

Both the correlation and regression analyses suggest that sensation seeking is positively related to and has a significant effect on behavior (correlation coefficient=0.256, p-value=0.001; r-square=0.059, p-value=0.001). This result implies that a higher sensation seeking personality leads to more engagement in computer game play. Because behavior is a sub-factor of enjoyment of computer game play ([13]), indications of higher engagement suggest higher enjoyment. Therefore, hypothesis 1 is supported for action/adventure/shooting/fighting games.

Because self-forgetfulness construct was excluded from the analysis due to low reliability, it is impossible to assess its relationship with enjoyment. In the future study, more items on this construct may improve its reliability and make it possible to examine its effect on enjoyment.

5.3 Role Playing Games

76 participants evaluated this category. Constructs affect, behavior, sensation seeking, and self-forgetfulness passed both the factor and reliability analyses. Cognition was excluded because its items didn’t converge in the factor analysis. Tables 4 and 5 present the correlation matrix and the regression analysis results respectively.

**Table 4.** Correlation Matrix of Role Playing Games

		Affect	Behavior	Sensation Seeking	Self Forgetfulness
Affect	Pearson Correlation	1	-.003	-.037	-.068
	Sig. (2-tailed)		.977	.750	.562
Behavior	Pearson Correlation	-.003	1	.258(*)	.300(**)
	Sig. (2-tailed)	.977		.025	.009
Sensation Seeking	Pearson Correlation	-.037	.258(*)	1	.363(**)
	Sig. (2-tailed)	.750	.025		.001
Self-Forgetfulness	Pearson Correlation	-.068	.300(**)	.363(**)	1
	Sig. (2-tailed)	.562	.009	.001	

**Table 5.** Regression Analysis of Role Playing Games

Model	R-Square	Beta	T-Value	P Value
Behavior=Self-Forgetfulness + Errors	0.077	0.300	2.702	0.009

The correlation analysis suggests that behavior is significantly correlated to both sensation seeking (correlation coefficient=0.258, p-value=0.025) and self-forgetfulness (correlation coefficient=0.300, p-value=0.009). A further regression analysis (r-square=0.077, p-value=0.009) shows that self-forgetfulness has a bigger effect than sensation seeking and sensation seeking didn't enter the model. These results support both hypotheses 1 and 2. They also suggest that a higher sensation seeking personality results in higher engagement in computer game play and a higher self-forgetfulness personality also leads to higher engagement in computer game play. The higher the engagement, the higher the enjoyment [13].

#### 5.4 Sport and Racing Games

125 participants evaluated this category. Constructs affect, behavior, and sensation seeking passed both the factor and reliability analyses. Both cognition and self-forgetfulness were excluded due to low reliability of the items (Cognition: Cronbach's Alpha value=0.597; Self-forgetfulness: Cronbach's Alpha value=0.493). Tables 6 and 7 present the correlation matrix and the regression analysis results respectively.

Both the correlation and regression analyses show the significant relationship between sensation seeking and behavior (correlation coefficient=0.276, p-value=0.002; r-square=0.076, p-value=0.002). This result suggests that a higher sensation seeking personality is associated with higher engagement in computer game play. Higher engagement implies higher enjoyment [13]. Therefore, hypothesis 1 is supported.

Because self-forgetfulness construct was excluded from the analysis due to low reliability, it is impossible to assess its relationship with enjoyment. In the future study, more items on this construct may improve its reliability and make it possible to examine its effect on enjoyment.

**Table 6.** Correlation Matrix of Sport and Racing Games

		Affect	Sensation Seeking	Behavior
Affect	Pearson Correlation	1	.067	.354(**)
	Sig. (2-tailed)		.457	.000
Sensation Seeking	Pearson Correlation	.067	1	.276(**)
	Sig. (2-tailed)	.457		.002
Behavior	Pearson Correlation	.354(**)	.276(**)	1
	Sig. (2-tailed)	.000	.002	

**Table 7.** Regression Analysis of Sport and Racing Games

Model	R-Square	Beta	T-Value	P Value
Behavior= Sensation Seeking + Errors	0.076	0.276	3.182	0.002

**5.5 Family Entertainment/Simulation Games**

136 participants evaluated this category. Constructs affect, behavior, cognition, and sensation seeking passed both the factor and reliability analyses. Self-forgetfulness was excluded due to low reliability of the items (Cronbach’s Alpha value=0.426). Tables 8 and 9 present the correlation matrix and the regression analysis results respectively.

Both the correlation and regression analyses indicate that sensation seeking has a significant effect on cognition (correlation coefficient=0.171, p-value=0.047; r-square=0.022, p-value=0.047). This result suggests that a high sensation seeking personality is linked to a higher cognition value in computer game play. Because cognition is a sub-factor of enjoyment of computer game play [13], a higher cognition value implies higher enjoyment. Therefore, sensation seeking is positively related to enjoyment of computer game play and hypothesis 1 is supported.

**Table 8.** Correlation Matrix of Family Entertainment and Simulation Games

		Affect	Behavior	Cognition	Sensation Seeking
Affect	Pearson Correlation	1	.209(*)	.492(**)	.044
	Sig. (2-tailed)		.015	.000	.610
Behavior	Pearson Correlation	.209(*)	1	.114	.150
	Sig. (2-tailed)	.015		.188	.081
Cognition	Pearson Correlation	.492(**)	.114	1	.171(*)
	Sig. (2-tailed)	.000	.188		.047
Sensation Seeking	Pearson Correlation	.044	.150	.171(*)	1
	Sig. (2-tailed)	.610	.081	.047	

**Table 9.** Regression Analysis of Family Entertainment and Simulation Games

Model	R-Square	Beta	T-Value	P Value
Cognition= Sensation Seeking + Errors	0.022	0.171	2.008	0.047

It is interesting to observe that sensation seeking impacts on enjoyment through cognition for family entertainment/simulation games instead of through behavior like most of other games. This fact may suggest that one primary reason of enjoying this type of games is the perceived value of game characters' actions.

Because self-forgetfulness construct was excluded from the analysis due to low reliability, it is impossible to assess its relationship with enjoyment. In the future study, more items on this construct may improve its reliability and make it possible to examine its effect on enjoyment.

**Table 10.** Correlation Matrix of Strategy Games

		Affect	Behavior	Sensation Seeking
Affect	Pearson Correlation	1	.263	.080
	Sig. (2-tailed)		.052	.560
Behavior	Pearson Correlation	.263	1	.153
	Sig. (2-tailed)	.052		.265
Sensation Seeking	Pearson Correlation	.080	.153	1
	Sig. (2-tailed)	.560	.265	

### 5.6 Strategy Games

55 participants evaluated this category. Constructs affect, behavior, and sensation seeking passed both the factor and reliability analyses. Cognition was excluded because its items didn't converge in the factor analysis. Self-forgetfulness was excluded due to low reliability of the items (Cronbach's Alpha value=0.389). Table 10 presents the correlation matrix.

No significant correlation was found in the analysis. Because the sample size (55) is much smaller than other types of games, it probably doesn't have enough statistic power to test the hypotheses. In the future study, a larger sample should help boost the power and make it possible to test the hypotheses.

## 6 Conclusion

This paper reports a survey that the authors conducted to investigate the impact of two personality traits (sensation seeking and self forgetfulness) on enjoyment of computer game play. Major findings from this survey include: 1) Sensation seeking has a significant and positive effect on enjoyment of computer game play through enhanced engagement during game play for action/ adventure/shooting/fighting, role playing, and sport/racing games. 2) Sensation seeking has a significant and positive effect on enjoyment of computer game play through enhanced cognition values for family entertainment/simulation games. 3) Self-forgetfulness has a significant and positive



effect on enjoyment of computer game play through enhanced engagement during game play for role playing games.

Previous research has primarily focused on impact of exposure to violent video games on game player's behavior ([1], [2], and [3]). There have been few studies investigating how personality is linked to computer game enjoyment. This study attempts to start the process of filling this gap. It shows that personality traits can be linked to computer game enjoyment and the type of games plays an important role. Our endeavor probably raises more questions than painting a complete picture but we definitely see strong research potential.

Future research is called on expanding the personality traits associated with computer game play and improving the measurement of both personality traits and computer game enjoyment.

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