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# The moderating effect of intrinsic motivation to accomplish on temperament, and computer game playing

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**ABSTRACT**

The current study examined the moderating effect of adolescent's intrinsic motivation to accomplish on the relationship between temperament and computer game playing among 400 Iranian adolescents. The findings highlighted that moderating effects of intrinsic motivation to accomplish moderated the relation between novelty seeking with video game playing (b= 2.15, p≤.001). As a conclusion, intrinsic motivation to accomplish would influence on the relationships between novelty seeking and video game playing.



## Introduction

Computer and video games as new business were raised by this technology and emerged in the market and it brought huge advantages for capitalist (Loton, 2007). Studies in Iran have shown that adolescents spend an average of 6.3 hours per week and 47% of them play games expansively (Allahverdipour, Bazargan, Farhadinasab, & Moeini, 2010). Among the different users of these computer games are children and adolescents who are interested in playing computer games more than other people (Hauge & Gentile, 2003; Shojaei, Dehdari, Noori Jelyani, & Dowran, 2013). Regarding frequency of computer game, researchers have attempted to find causes of having this much interest in playing computer games. In fact, computer games dependency is one of the most critical dimensions of psycho-social faces of the issue (Collins, Freeman, & Chamarro- Premuzic, 2012). According to Griffiths and Wood (2005), there are some factors such as biological, psychological, social, structural, and situational characteristics which may combine together to make the gamers play computer games.

Previous studies have suggested that there is a relationship between temperament and the tendency to use online games excessively, for instance, Lang (2006) has down a research and showed that biological differences may guide to kind of option associated with media. Huh and Bowman (2008) found that personality factors (i.e., temperament) is significantly related to online game playing. Largely, most of the studies focus on temperament with regard to internet addiction (Lee, Hong, & Joung, 2007). For instance, Kim, Lee, Suh and Kee (2006) was focused on temperament and genetic polymorphism based on Cloninger's theory of personality in Korean male adolescents with internet addiction tendency. The results have revealed that novelty Seeking (NS) and harm avoidance scores (HA) were significantly higher among adolescents with internet addiction tendency.

Moreover, motivation of games might be another variable that encourage engagement to computer games and internet addiction. King and Delfabbro (2009) studied the relationship between motivation of games to explain the tendency toward video games. The results revealed that intrinsic motivation to play computer games is important predictor toward video game. It is simple to pinpoint when activities are based on personal value or interest, people commit their autonomy for choice and utilize rewards as informational feedback. Thus, people possess intrinsic motivation. In contrast, less sense of control, freedom and or choice by influence of events or conditions that either the means or ends of activity interfere with perceived autonomy. Therefore, this situation can undermine intrinsic motivation (Deci, Koestner & Ryan, 1999). As a conclusion, according to above perceived concepts; it results that particularly intrinsic motivation may associate to dimensions of temperament.

The present study expand previous studies by concentrating on the moderating influence of adolescent's intrinsic motivation to accomplish on the relationships between novelty seeking (NS), harm avoidance (HA), reward dependence (RD), and persistence (P) and computer game. Therefore, this study aimed (1) to examine direct relationship between NS, HA, RD, and P with computer game playing, (2) to identify whether this relation is moderated by adolescent's intrinsic motivation to accomplish, and (3) to evaluate the specific conditioning which follow up under this moderating effect.

Sharifi Fard, Neshatdoost, Mazaheri, and Talebi (2013) have examined computer games dependency among high schools in Ahvaz city located in Iran. Mentioned study has found high frequency of computer dependency in this city. Consequently, based on these observations, performing a research about the behavior of the adolescents in relation to playing computer games in Ahvaz will be beneficial. Therefore, according to this result and regarding few researches in this city, it is considerable to search on this topic in this city. The study also aimed to examine the extent to which motivation of games moderates the relationships between temperament's dimensions and computer game playing among adolescents.

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The target population for current study consisted of adolescents aged 15 to 18 years old in Ahvaz located in Iran. However, The Ministry of Education in Ahvaz is divided by four districts (1, 2, 3, and 4). Whole districts were chosen because of lack of homogeneous effects of social- economic states in to the districts. The method of sampling in present study was the multi-stage cluster random sampling. The population of these four districts was 42507 in high school students (males= 21574 and female= 20933) (Statistical center of Iran, 2011). The questionnaires administered to 470 adolescents; however, only 400 questionnaires were completed and used for data collection. Thus, the current study is based on 400 respondents.

**Measurement and Instruments**

**Demographic characteristics**

Table 1 considered instruments and sources such as problematic video game (PVGT) with 20 items, Short Version TCI 125-PV with 125 items, and video game playing motivation (VGMS) with 28 items. The PVGT modified by King and Delfabbro in 2009, Short Version TCI 125-PV designed by Cloninger, svrakic, and Przybeck (1993), and the VGMS adopted by King and Delfabbro in 2009

**Table 1. Considered instruments and sources**.

| Instruments | Items | Range | Primary author |
|---|---|---|---|
| PVGT | 20 | 20/100 | modified by Kin & Defabbro (2009) |
| Short Version TCI 125-PV | 125 | 1/125 | Cloninger, svrakic & Przybeck (1993) |
| VGMS | 28 | 4/28 | Adopted by King & Delfabbro (2009) |

Note: PVGT=problematic video game test, TCI=temperament and character inventory, and VGMS= video game playing motivation

**Problematic Video Game Playing Test (PVGT)**

According to version of the Internet Addiction Test (IAT), the Problematic Video Game Test (PVGT) is modified by King and Delfabbro (2009). IAT is established by a 20-item questionnaire to consider and measure futures such as preoccupation, withdrawal, tolerance, mood modification, harm and relapse of Internet use. Based on this questionnaire, every item was scored on a five-point Likert scale which is ranged from "1 = Never" to "5 = Always". Thus, total scores range from 20 to 100. That is, lower score is 20 and higher score is 100.

This instrument was modified the IAT to measure aspects of problematic involvement in video games by King, Delfabbro, and Griffiths (2010) and it termed the Problematic Video Game Playing Test (PVGT). PVGT items were put on the six core features of addiction within Brown's (1997) addiction components model, such as preoccupation, withdrawal, tolerance, mood modification, harm and relapse. The Preliminary validation was measured by King, Delfabbro, and Griffiths (2010) and the researchers have shown that the PVGT determined high internal consistency and good convergent validity. Based on this results the researchers recommended that the PVGT be applied as a continuous measure of problem video game play, rather than a diagnostic instrument, with higher scores demonstrating a greater level of problematic involvement.

**.Temperament and Character Inventory (Persian version of Short version of TCI- 125-PV)**

Temperament and Character Inventory (Short version of TCI- 125-PV) designed by Cloninger, svrakic, and Przybeck (1993).This inventory is a force-choice and true-false self-report instrument to evaluate individual distinctions in the fundamental dimensions of biosocial model of personality according to the Cloninger theory. In Iran, Kaviani and pournaseh (2005) validated TCI in an Iranian sample of men and women with different ages. The results showed that Cronbach's alpha coefficient has obtained .73 to .90 for the 7 dimensions. Kaviani and Pournaseh (2005) have found a good internal consistency for each subscale in Iranian sampling.

**Video Game Playing Motivation Scale (VGMS)**

Video Game Playing Motivation Scale (VGMS) designed by Chantal, Vallerand, and vallieres, (1995) and it is an adapted version of the Gambling Motivation Scale by King and Delfabbro (2009). This questionnaire considered motivation of games by 28 items and each item is scored on a 7- point likert scale, which rated from "Not at all" to "exactly". The VGMS measures seven types of motivation (intrinsic motivation to know, intrinsic motivation to accomplish, intrinsic motivation experience stimulation, extrinsic identified, extrinsic introjected, extrinsic external regulation, and Amotivation). Higher scores on each motivation subscales state higher motivation.

**Results**

Normality of the distribution of scores for all variables of the study was assessed by taken EDA, skewness and kurtosis values before data analyses. The distribution of scores on the measures used in this study was within the predictable values (Table 2). According to table 2 and based on Exploratory Data Analysis, the distribution of scores for problematic video game playing test (PVGT) was slightly and positively skewed at (0.43), intrinsic motivation to accomplish was slightly and positively skewed at (0.40, novelty seeking was slightly and positively skewed at (0.15), harm avoidance was slightly and negatively skewed at (-0.20), reward dependence was slightly and positively skewed at (0.23), persistence was slightly and negatively skewed at (-.0.49). As a conclusion, all variables were within acceptable limits (-2 and +2) and was imminent to normal distribution.

**Table 2. Assessment of Normality of Distribution: Mean, and5 % Trimmed Mean, Skewness and Kurtosis (N=400).**

| Scale | M | 5% Trimmed M | Skewness | Kurtosis |
|---|---|---|---|---|
| PVGT | 54.02 | 52.78 | 0.43 | -0.62 |
| IM-to accomplish | 12.76 (7.58) | 12.43 | 0.40 | -1.08 |
| NS | 9.33 (3.61) | 9.30 | 0.15 | -0.58 |
| HA | 6.43 (2.70) | 6.53 | -0.20 | -0.96 |
| RD | 7.41 (2.99) | 7.44 | 0.23 | -1.21 |
| P | 3.01(1.61) | 3.06 | -0.49 | -0.95 |

The Table 3 shows multicollinearty such as tolerance and VIF. Based on the results the Tolerance values for all the independent variables were found to be above .10 and VIF values are below the cut off 10. Therefore, this study had no major deviations from multicollinearty assumption. Pearson Product-Moment correlation was applied for evaluating the relations between all the variables of study. Based on scientific research tradition, all calculations were conducted at alpha 0.05 (2-tailed). As presented in Table 3, the results from the correlation analyses determined significant associate on related to NS ($r=.30$, $p\leq 0.001$), RD ($r=.10$, $p\leq 0.001$), P ($r=-.16$, $p\leq 0.001$), and IM-accomplish ($r= .82$, $p\leq 0.001$) with video game playing.

**Table 3. Assessment of Multicolonearity (tolerance and VIF).**

| Dimensions | Tolerance | VIF |
|---|---|---|
| IM-to accomplish | .38 | 2.57 |
| NS | .74 | 1.35 |
| HA | .81 | 1.23 |
| RD | .82 | 1.21 |
| P | .84 | 1.17 |

Note: IM= intrinsic motivation, NS= novelty seeking, HA= harm avoidance, RD= reward dependence, P= persistence

**Table 4. The correlation between variables of study (N=400).**

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| 1-PVGT | - | | | | | | |
| 2-NS | .30** | - | | | | | |
| 3-HA | .02 | -.01 | - | | | | |
| 4-RD | .10* | .06 | .34** | - | | | |
| 5-P | -.16** | -.26** | .04 | -.15** | - | | |
| IM-TO accomplish | .82** | .17** | .03 | .08 | -.08 | - | |
| Adolescent's gender | -.04 | -.08 | -.21** | -.18** | .11* | .05 | - |

Note: IM= intrinsic motivation, NS= novelty seeking, HA= harm avoidance, RD= reward dependence, P= persistence, * P ≤ 0.005, ** p ≤0.01

Moreover, to assess the moderating effect of intrinsic motivation to accomplish, a hierarchical regression analyses were used. According to Table 5, control variable accounted in a minimal $R^2$ of 0.2% variance to computer game playing which was not significant in step 1. In the step 2, independent variable entered and accounted for 9% variance to PVGT. In this step, the total $R^2$ increased to 9.2% (F {2,397} =20.210, P≤0.001). In the step 3, intrinsic motivation to accomplish was also significant. The moderating effects of intrinsic motivation to accomplish on the relationships between novelty seeking and computer game playing showed at step 4. These interactions accounted 1.2% variation to PVGT (F {4,395} =80.23, P≤0.001). Finally, examination of the variables within the step 4 shows that the interactions of NS and intrinsic motivation to accomplish emerged significant (β= .111, $p \leq$ .003).

**Table 5. Hierarchical Multiple Regression Analyses for Predicting Adolescent's computer from Novelty Seeking (NS) and intrinsic motivation to Accomplish (N=400).**

| Predictor | F Test (P) | $R^2$ | $\Delta R^2$ | B | β |
|---|---|---|---|---|---|
| Step 1 | .976 (.324) | .002 | .002 | | |
| Gender | | | | -3.395 | -.049 |
| Step 2 | 20.210(.000) | .092 | .090 | | |
| NS | | | | 2.177 | .301 |
| Step 3 | 102.130(.000) | .436 | .344 | | |
| IM-To Accomplish | | | | 2.056 | .597 |
| Step 4 | 80.238(.000) | .448 | .012 | | |
| NS ×IM-To Accomplish | | | | .104 | .111 |

Note: For F test, dfs were as follows: Step 1= 1,398; Step 2= 2,397; Step3= 3,396; Step4=4,395. B denotes unstandardized regression coefficient; β denotes Standardised regression coefficient, *p≤0.05, ***p≤0.001

Examination of these interaction effects at two levels of intrinsic motivation to accomplish obtained at Figure 1 and indicated that NS was significantly related to computer game playing for adolescents who have high intrinsic motivation to accomplish (b = 2.15, t=2.940, p≤0.003). Therefore, it showed that the interaction was significant for adolescents who had high intrinsic motivation to accomplish. Similarity, Vallerand, Pelletier, Blais, Brière, Senécal, & Vallières (1992) defined intrinsic motivation to accomplish as a tendency for doing an activity and satisfy which an individual obtain by accomplishing or innovation novel things. King and Delfebbro (2009) utilized term of internal need to finish gaming or overcoming its challenges as well as improving one′s skill at the game.

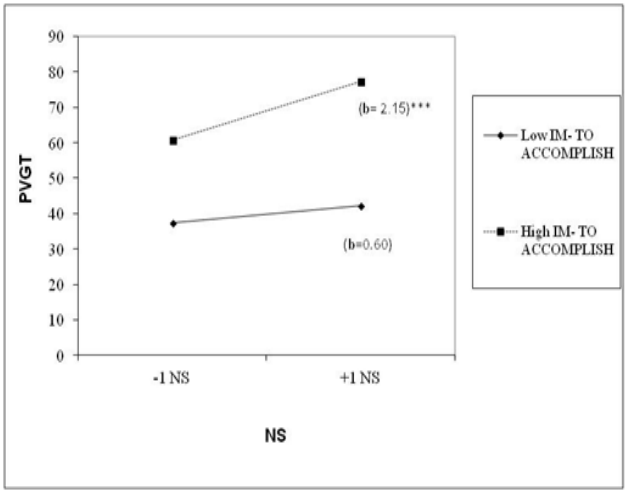


**Figure 1. Plotting the Interaction Between Novelty Seeking and Intrinsic Motivation to Accomplish with adolescent's video game b= Unstandardized, Regression Coefficient (i.e., Simple Slope); SD= Standard Deviation.**

As it has been revealed in Table 6, entering gender in to step 1 accounted for 0.2% minimal variance to video game playing. The reward dependence in to step 2 was not significant and the $R^2$ change for the step 3 was significant. Examination of the variables within the step 4 shows that significant interaction has not been existed in the regression equation in which intrinsic motivation to accomplish was the predictor variable.

**Table 6. Hierarchical Multiple Regression Analyses for Predicting Adolescent's Video from reward dependence (RD) and intrinsic motivation to accomplish (N=398).**

| Predictor | F Test (P) | $R^2$ | $\Delta R^2$ | B | β |
|---|---|---|---|---|---|
| Step 1 | .976 (.324) | .002 | .002 | | |
| Gender | | | | -3.395 | -.049 |
| Step 2 | 2.414 (.091) | .012 | .010 | | |
| RD | | | | .867 | .099 |
| Step 3 | 88.221(.000) | .401 | .389 | | |
| IM-To Accomplish | | | | 2.163 | .628 |
| Step 4 | 66.093(.000) | .401 | .000 | | |
| RD ×IM-To Accomplish | | | | -.022 | -.019 |

Note: For F test, dfs were as follows: Step 1= 1,398; Step 2= 2,397; Step3= 3,396; Step4=4,395. B denotes unstandardized regression coefficient; β denotes Standardised regression coefficient, *p≤0.05, ***p≤0.001

Table 7 indicated that control variables in to step 1 accounted for 0.2% variance to video game playing which was not significant in step 1. In the step 2, independent variable entered that did not account any significant additional variance in computer game playing. The $R^2$ change for intrinsic motivation to accomplish was significant but the interaction between intrinsic motivation to accomplish in step 4 were not significant.

**Table 7. Hierarchical Multiple Regression Analyses for Predicting Adolescent's Video from harm avoidance (HA) and intrinsic motivation to accomplish (N=398).**

| Predictor | F Test (P) | $R^2$ | $\Delta R^2$ | B | β |
|---|---|---|---|---|---|
| Step 1 | .976 (.324) | .002 | .002 | | |
| Gender | | | | -3.395 | -.049 |
| Step 2 | .524 (.592) | .003 | .000*** | | |
| RD | | | | .136 | .014 |
| Step 3 | 87.868(.000)*** | .400 | .397 | | |
| IM-To Accomplish | | | | 2.177 | .632 |
| Step 4 | 65.747(.000)*** | .400 | .000*** | | |
| RD ×IM-To Accomplish | | | | -.010*** | -.007 |

Note: For F test, dfs were as follows: Step 1= 1,398; Step 2= 2,397; Step3= 3,396; Step4=4,395. B denotes unstandardized regression coefficient; β denotes Standardised regression coefficient, *p≤0.05, ***p≤0.001

The result of the hierarchical multiple regression for moderating role of intrinsic motivation to accomplish on the relationships between persistence and adolescent′s video game presented. As it has been shown (table 8), gender entered at step 1 and accounted for 0.2% minimal variance to PVGT. The persistence entered at step 2 which accounted significant additional variance in video game. The $R^2$change for intrinsic motivation to accomplish at step 3 accounted for 38.3% variance to video game playing. The interaction between persistence and intrinsic motivation to accomplish at step 4 were not significant.

**Table 8. Hierarchical Multiple Regression Analyses for Predicting Adolescent's Video from Persistence (P) and intrinsic motivation to accomplish (N=398).**

| Predictor | F Test (P) | $R^2$ | $\Delta R^2$ | B | β |
|---|---|---|---|---|---|
| Step 1 | .976 (.324) | .002 | .002 | | |
| Gender | | | | -3.395 | -.049 |
| Step 2 | 5.473(.005) | .027 | .024 | | |
| P | | | | -2.557 | .157 |
| Step 3 | 91.556(.000) | .410 | .383 | | |
| IM-To Accomplish | | | | 2.144 | .622 |
| Step 4 | 68.880(.000) | .411 | .001 | | |
| P ×IM-To Accomplish | | | | -.077 | -.037 |

Note: For F test, dfs were as follows: Step 1= 1,398; Step 2= 2,397; Step3= 3,396; Step4=4,395. B denotes unstandardized regression coefficient; β denotes Standardised regression coefficient, *p≤0.05, ***p≤0.001

Therefore, intrinsic motivation to accomplish had moderating influences on the relationship between novelty seeking and computer game.

**Discussion**

There were positive relationships between novelty seeking, reward dependence, and computer game playing. In the present study, there is an association between novelty seeking (NS) and video game playing. This is consistent with SharifiFard et al. (2013), who found that novelty seeking is higher in computer game player. Similarity, other studies have confirmed these results on video games and internet addiction (i.e., Kim, Han, Park, Min, Na, Won, & Park, 2010; Cho, Kim, Kim, Lee, and Kim, 2008; Ko, Yen, Chen, Chen, Wu, Yen, 2006). This is because of the fact that novelty seeking involves a tendency toward exploratory activity and enthusiasm in response to novelty and is related to brain systems involving behavior activation (Cloninger, svrakic, & Przybeck, 1933). Thus, in their attempts to seek pleasure, the players agree to be involved in the activities. In fact, highly Novelty Seeking individuals are excitable, quick-tempered, exploratory, ardent, curious, enthusiastic, impulsive, disorderly, and easily bored, Enthusiastic and quick engagements quickly with new subjects are advantages of high novelty seeking that may be for the reason that they potentially explore reward.

Another dimension of temperament was reward dependence (RD). Han, Lee, Yang, Kim, Lyoo, and Renshaw (2007) have found that there is a relationship between reward dependence and excessive internet video game playing and the players engaged to games who are higher in reward dependence. An individual who has high reward dependent and unable to find rewards and approval through family support or other kinds, will look for reward during other ways (i.e., substance use or video games). Negative relationships have been found between persistence, and computer game playing. The negative association between persistence and computer game playing has been supported with previous studies proving the negative association between persistence and video game playing. For instance, June, Sohn, So, Yi, and Park (2007) and Gross (2004) reported negatively relationship between persistence and internet addiction. However, there were no significant relationships between harm avoidance, and computer game playing. These findings rejected Ha and colleague's results in 2007.

Based on relationships between IM-to accomplish and computer game, there were positively relationships between IM-to accomplish and computer game playing. This finding accepted the King and Delfabbrs' results (2009). As a conclusion, players engage to games because players intrinsically may fill an emotional fallings toward games or these games have features which players attract to games extrinsically. Cortese (2012) has found that motivations associated with genre preference to smart phone games and game playing time.

Hartmann and Klimmt (2006) have emphasized on conscious decision to replace a significant view of time to an activity. Mood as a situational construct and personality as a consistent constructs are able affect on decision for engaging in behavior. Therefore, personality traits provide conditions to choose patterns of computer games. On the other hand, computer and video games affect on the information, modification, and maintenance of personality (Borders, 2012). Motivation is also one of the driving energy sources which lead to high engagement rates of games. Davis, Bagozzi and Warshaw (1992); Teo, Lim and Lai (1999) concluded that intrinsic motivation is an important topic on computer and internet. Deci (1971), Deci and et al. (1991) have explained that gamers attract toward video games because these games have extrinsic motivation for becoming famous. These games may also approach toward other things regarding to rewards and punishment which comes through the environment. However, Deci et al (1991) and Decharms (1968) have pointed out that gamers engage because of curiosity, exploration, and a feeling of belonging. Alexandris, Tsorbatzoudis, and Grouios (2002) emphasized on higher satisfaction and intrinsic motivation. Gamers request games that are gratifying and finally, they create pleasure (Ryan, Rigby, & Przybylski, 2006). They have stated that gaming environments can conduct a tremendous request and then gamers excessive toward them.

Sung and Choi (2009) has found that intrinsic motivation indicates a situation that related to interest and

exploresomething new. Therefore, intrinsic motivations are one of the driving energy which leads to high engagement rates of playing. Clarke (2004) and Chantal et al. (1995) have found that gamblers would like to find new games, strategies as well as contexts related to games (intrinsic to know). Perhaps, players engage in video game to raise a particular purpose, such as increasing skill or knowledge then emotional need. Chantal et al. (1995) and Clarke (2004) has reported that gamblers play because they would get pleasure by arise their ability and increase their efficacy. If a player engages in a computer and video game to obtain a skill than chance, she or he would attempt to accomplish a game; therefore, it seems that intrinsic motivation to accomplish is also important when a player challenges to gain a skill. Reports indicate that traditional game genres evoke ″emotional excitement″ during accomplishment (King, Delfabbro, and Griffiths, 2012). Hoffman and Nadelson (2010) have been emphasized on multiple- level video game because of the high level of engagement which is as a natural characteristic of these. The player persists on the continuance of the game and finally stares for discovering ways to win at accomplishing game issues.

De Sevin (2009) has investigated the relationship between motivations and personality traits for autonomous virtual humans and supported this notion that there is a relationship between motivation intensity and personality traits. Therefore, intrinsic motivation may lead to engage to computer game playing as a critical role rather than extrinsic motivation. Przybylski et al. (2012) have pointed out that video games typically are intrinsic motivation with a great deal of influence on emotions, especially when gamers gain approval between experience of themselves and conceptions of their ideal selves. Griffiths and Delfabbro (2001) have been investigated in relationship between motivation and gambling. They have resulted that gamblers play in order to obtain opportunity to improve their ability as well as pleasure by an engagement with the game. Intrinsic motivation for accomplishing and stimulation, extrinsic motivation for identifying regulation were higher in motivation for males, (King and Delfabbro, 2009).

These results have shown; first, personality traits may affect on engagement toward computer games. Second, novelty seeking is as one of dimensions of temperament which play critical role in video game playing. Third, intrinsic motivation lead to tend toward video game playing. Forth, persons′ motivation correlates with personality traits for playing games. Finally, this position would be associated with an emotional experience through computer games.

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