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ARTICLE in JOURNAL OF MEDIA PSYCHOLOGY THEORIES METHODS AND APPLICATIONS · JANUARY 2010

Impact Factor: 1.66 · DOI: 10.1027/1864-1105/a000022

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The Pleasures of Success: Game-Related Efficacy Experiences as a Mediator Between Player Performance and Game Enjoyment

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Abstract

In the present study, the interplay of player performance, game-related self-efficacy experiences, and the resulting effects on game enjoyment are investigated. We hypothesized that a player's performance stimulates enjoyment via its potential to stimulate game-related self-efficacy experiences. In a laboratory setting, participants ($N = 213$) played a jump 'n' run game. Their performance during game play was recorded by log-file software, and efficacy and enjoyment were assessed with questionnaires. As predicted, both player performance and game-related self-efficacy experience were significant predictors of enjoyment. Furthermore, the results demonstrate that game-related self-efficacy experience significantly mediates the relationship between player performance and game enjoyment.

Introduction

THE INTERACTIVITY OF VIDEO and computer games poses a challenge for entertainment scholars, as new or extended theoretical models of media enjoyment are needed to understand the appeal of this genre. The aim of the present study is to explore the function of player performance in the enjoyment of video games and to identify the underlying psychological processes that transform objective performance into subjective game enjoyment.

According to Bandura's self-efficacy theory,^{1,2} an efficacy expectation is the subjective belief that one can successfully execute the behavior required to produce certain outcomes. Perceived self-efficacy has a direct influence on the choice of activities, the amount of effort people will expend, and how long they will persist in the face of obstacles and aversive experiences.

In most games, the course of events is unpredictable for the player. The actions that have to be taken to master a certain task are very often unclear in advance. Therefore, game-related self-efficacy is usually regarded as an ex-post experience that takes place during the course of in-game events.³ Players evaluate their competence to master game challenges after they have received performance feedback from the game environment. The idea of game-related self-efficacy experiences is predominantly related to White's "feeling of efficacy."⁴ White distinguished between effectance motivation and feelings of efficacy. Effectance motivation is defined as the

motivation for exploratory and playful activities in the service of competence, whereas efficacy may be described as a positive experience produced by such exploratory and playful behavior. Game-related self-efficacy experience is thus defined as a player's ex-post assessment of his/her ability to master and to control the game.

The concept of self-efficacy appears to be a promising theoretical approach to explore the effects of player performance on game enjoyment, when taking into account that video games provide players with constant feedback on their in-game performance³ and that past accomplishments positively influence subjective feelings of self-efficacy⁴ and efficacy expectations.^{1,2}

The Effects of Player Performance and Efficacy Experiences on Game Enjoyment

A growing number of studies address aspects of the gaming experience that are directly or indirectly linked to in-game performance, mastery experience, and self-efficacy. The results of a survey by Sherry et al. on the gratifications of playing video games suggest that challenge and competition are key components of game enjoyment.⁵ The stream of events within a game can be considered a "continuous exchange between players and the game software."^{3(p137)} The player's actions have immediate consequences within the gaming environment. As a consequence of this steady feedback from the game environment, the player's accomplishments

represented by positive or appealing in-game events can be expected to be highly salient to the player and thus are likely to positively influence game enjoyment.⁶ Accordingly, Hypothesis 1 predicts that:

H1: Player performance will be positively related to game enjoyment.

Based on the theoretical considerations of self-efficacy theory,^{1,2,4} we furthermore suggest that player performance has a positive influence on game-related self-efficacy experiences. According to Bandura and White, past performance influences an individual's efficacy expectations.^{1,2,4} As discussed above, all player actions are immediately followed by consequences within the gaming environment.³ Consequently, the player is provided with a constant stream of performance-related information. As most positive events within the game are primarily attributable to the player's skills, better performance can be expected to lead to higher levels of game-related efficacy experiences. This assumption is addressed in Hypothesis 2:

H2: Player performance will be positively related to game-related self-efficacy experiences.

A number of studies demonstrate that self-efficacy or related concepts such as mastery and control play a crucial role in the gaming experience.⁷ The results presented by Tamborini et al. demonstrate that the satisfaction of the need for competence, that is, the feeling that the personal skills match the game's requirements, and the need for autonomy, that is, the feeling of being in control of the game, explain a significant amount of variance in game enjoyment.⁷ Furthermore, Klimmt et al. demonstrated in an online experiment that under conditions of reduced effectance, players perceived a game as being less enjoyable.⁸ These findings support the assumption that feelings of mastery and game-related self-efficacy experiences are crucial components of game enjoyment. We therefore hypothesized that:

H3: Game-related self-efficacy experiences are positively related to game enjoyment.

Based on the assumption that player performance is positively related to game-related self-efficacy (cf. H2) and on the strong relationship between efficacy experiences and enjoyment found in previous research⁸ (cf. H3), it appears reasonable to assume that game-related self-efficacy experiences may be a psychological mechanism that transforms objective player performance into subjective game enjoyment. In other words, player performance leads to the experience of game-related self-efficacy, which, in turn, has a positive effect on game enjoyment. Therefore, we propose that:

H4: The relationship between player performance and game enjoyment is mediated by game-related self-efficacy experiences.

Methods

Participants

A total of 213 students participated in the experiment. The sample comprised 159 women (74.6 percent). Ages ranged between 18 and 43 years ($M = 23.62$ years, $SD = 4.26$ years).

Stimulus material

We used the jump 'n' run game *Crazy Chicken: Heart of Tibet* (phenomedia publishing) as stimulus material. The game was chosen owing to its simple controls that are easy to understand even for players with little or no gaming experience. The prequel of the main game *Crazy Chicken: The Good, the Egg and the Ugly* (phenomedia publishing) was used for a training session. Both games are identical in terms of game controls and basic game mechanisms, but differ slightly in their narrative and graphics.

Procedure

Upon arrival in the computer lab, participants were given 15 minutes to practice the training game. Afterward, participants played the main game for 30 minutes until the game stopped automatically. Subsequently, participants responded to a questionnaire.

Measures

Player performance. Log files were recorded to assess the frequency of 20 game events for each participant, including collecting items (e.g., coins and diamonds), defeating opponents, activating save points, and reaching new levels. The frequency scores of all 20 events were standardized using z-transformation and then averaged to form a single index of player performance.

Game-related self-efficacy experience. A scale developed by Klimmt et al. comprising 11 items (e.g., "I had the impression that I could immediately affect things on the screen") was used to assess game-related self-efficacy experiences.⁸ Participants rated the items on a 5-point scale ranging from 1, "does not apply at all," to 5, "does fully apply" (Cronbach's $\alpha = 0.891$).

Game enjoyment. Five items were used to measure game enjoyment (e.g., "Playing the game was fun" or "I liked playing the game"). Participants rated the items on a 6-point scale ranging from 1, "does not apply at all," to 6, "does fully apply" (Cronbach's $\alpha = 0.919$).

Results

Hypotheses 1 to 4 were tested using structural equation modeling. Game enjoyment and game-related self-efficacy experience were modeled as latent variables, whereas player performance was entered as an observed variable. With a comparative fit index (CFI) of 0.927 and an root mean square error of approximation (RMSEA) of 0.075, the model exhibited an acceptable fit.

As predicted in H1, player performance had a significant and positive total effect on game enjoyment ($\beta = 0.221$, $p < 0.001$). Furthermore, confirming H2, the data revealed that player performance was a significant predictor of game-related self-efficacy ($\beta = 0.416$, $p < 0.001$). As predicted in H3, game-related self-efficacy significantly predicted game enjoyment ($\beta = 0.367$, $p < 0.001$).

When controlling for the influence of game-related self-efficacy, the previously significant effect of player performance on enjoyment (cf. H1) was no longer significant

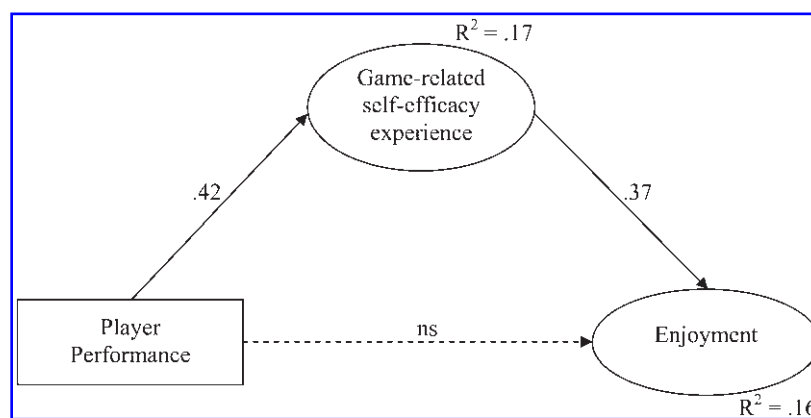


FIG. 1. Structural equation model of the tested hypotheses. CFI = 0.927, RMSEA = 0.075. Standardized betas are significant with $p < 0.001$. CFI, comparative fit index; RMSEA, root mean square error of approximation.

($\beta = 0.068$, $p = 0.354$). A Sobel test yielded a significant mediation effect of self-efficacy ($z = 3.55$, $p < 0.001$). The indirect effect of player performance on enjoyment through game-related self-efficacy was bootstrapped with 5,000 bootstrap samples with replacement. The point estimate of the indirect effect was 0.153 with a standard error of 0.042 and a 95 percent bias-corrected confidence interval from 0.082 to 0.253. Hypothesis 4 was therefore supported. The final model is presented in Figure 1.

Discussion

This study explored the relationship between player performance, game-related self-efficacy experience, and media enjoyment. We argued that self-efficacy is interrelated with enjoyment and that the relationship between game performance and enjoyment is mediated by efficacy experiences. The results supported our hypotheses, indicating that game-related self-efficacy experiences seem to be a crucial variable in understanding game enjoyment. Thus, not only the mere objective performance but also the user's subjective experience of accomplishment, competence, and control over the gaming environment constitute game enjoyment.

The results of this study may underlie methodological limitations. All in-game events that were logged to assess performance were positive events; consequently, the performance measure used in this study is solely an indicator of game success. Although the measure does provide information on the absence of positive game events, it does not include any indicators of player failure. However, success and failure may have differential effects on game enjoyment. Future studies should therefore assess both positive and negative in-game events.

The implications of this study go beyond research on game enjoyment. In the health domain, educational games aim at strengthening the player's feelings of health-related self-efficacy.⁹ However, it remains a task for future research to explore the factors that determine whether and how efficacy experiences produced by video games are transferred into real-life experiences and behavior. Overall, the present study demonstrates that self-efficacy is a promising concept for future research that may help to broaden our understanding of the use of games for entertainment and educational purposes alike.

Disclosure Statement

No competing financial interests exist.

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