SINGLE-PLAYER GAME GENRES AND EMOTIONAL PERFORMANCE: RELATIONSHIPS BETWEEN GAMEPLAY EXPOSURE AND PLAYER EXPERIENCE

Suomiya Bao[1a]

[a] *University of Tsukuba, Japan, bao.suomiya.ka@u.tsukuba.ac.jp*

ABSTRACT

Digital games provide diverse experiential structures that may influence players' psychological experiences and emotional functioning. While previous studies have frequently examined multiplayer interaction in relation to social well-being and motivation, less attention has been given to how different single-player game genres support psychological need satisfaction and player experiences.

Grounded in Self-Determination Theory (SDT), this study investigates the emotional performance of single-player game genres through player experience dimensions including relatedness, competence, autonomy, immersion, and intuitive control. From a Kansei perspective, emotional performance refers to the extent to which interactive systems facilitate desirable affective and psychological experiences during interaction. An online survey was conducted with 122 adult digital game players to examine gameplay exposure across multiple single-player genres and player experiences measured using the Player Experience of Need Satisfaction (PENS) framework. Correlation and multiple regression analyses were performed to examine relationships between gameplay exposure and experiential outcomes.

The results showed that gameplay exposure generally demonstrated positive associations with player experience dimensions. However, after controlling for demographic variables and overlapping gameplay behaviors, most genre effects became non-significant. Fighting game exposure was the only genre that significantly predicted relatedness and immersion. The findings suggest that broad genre classifications alone may have limited explanatory power for emotional performance and that specific experiential characteristics embedded within games may play a more important role in shaping psychological experiences.

Keywords: *Single-player games, Self-Determination Theory, Player Experience, PENS*

[1] Corresponding author.

1 INTRODUCTION

Digital games increasingly function not only as entertainment systems but also as interactive environments capable of influencing users' emotional and psychological experiences. Through narrative structures, challenges, exploration, and player agency, game systems shape motivational and affective responses during interaction. Understanding how specific game design structures facilitate desirable psychological experiences has therefore become an important topic within Kansei Engineering and emotion-oriented interactive system research.

Different game genres provide distinct interaction structures and experiential characteristics that may influence players in different ways. Although video game genre classification remains complex and inconsistent in psychological research (Starosta et al., 2024), previous studies have suggested that game genres influence player engagement, satisfaction, and behavioral outcomes. For example, action and puzzle games have been shown to produce different patterns of player engagement and cognitive responses (Kumar & Singla, 2022), while certain genres such as role-playing and real-time strategy games have been associated with stronger patterns of problematic gameplay behaviors (Eichenbaum et al., 2015, 2017). These findings suggest that game genres may shape psychological experiences through different design characteristics.

Self-Determination Theory (SDT) has frequently been applied to explain psychological experiences within digital games. SDT proposes that human motivation and well-being are supported through satisfaction of three fundamental psychological needs: relatedness, competence, and autonomy (Deci & Ryan, 1985; Ryan & Deci, 2000; Ryan, R. M. & Deci, E. L., 2017). Previous studies have shown that digital games can satisfy these needs through different gameplay structures and interaction mechanisms. Existing research has frequently focused on multiplayer games because direct social interaction naturally facilitates psychological need satisfaction (Kowert et al., 2014). However, single-player games rely on different experiential mechanisms, including narrative engagement, exploration, environmental interaction, and player-controlled progression. Moreover, the increasing use of generative AI in digital environments expands possibilities for game experiences that do not necessarily depend on interactions with other human players. Understanding player experiences in single-player games therefore becomes increasingly important for future game design. Despite the importance of SDT in digital game research, relatively limited studies have examined how different game genres influence player experiences from an SDT perspective. Existing studies suggest that genres may differ in their ability to satisfy psychological needs and shape gameplay experiences (Johnson et al., 2015; Li et al., 2024), yet systematic comparisons across single-player genres remain limited.

Therefore, this study investigates how gameplay exposure across different single-player genres relates to player experience dimensions measured using the SDT framework. By examining relationships between gameplay exposure and psychological experiences, this study contributes to understanding emotional and motivational aspects of game design within Kansei-oriented interactive systems research.

2 OBJECTIVE

The present study investigates emotional performance in single-player digital game genres from the perspective of Self-Determination Theory (SDT). Different game genres provide distinct interaction structures and experiential affordances that may influence players' psychological experiences during gameplay. From a Kansei perspective, emotional performance is defined as the extent to which interactive systems facilitate desirable affective and psychological experiences. In this study, emotional performance is operationalized through player experience dimensions derived from the Player Experience of Need Satisfaction (PENS) framework.

The objectives of this study are:

1. to examine gameplay exposure across different single-player game genres;
2. to investigate relationships between single-player game genre exposure and player experience dimensions;
3. to evaluate emotional performance through psychological need satisfaction and experiential qualities during gameplay.

3 METHODOLOGY

3.1 Participants and Procedure

An online survey was conducted with adult digital game players aged between 18 and 60 years. Participants were recruited through online survey platforms and voluntarily completed the questionnaire. Prior to participation, respondents were screened to confirm that they played digital games at least once per week. Responses with incomplete data were excluded from analysis. The survey consisted of five sections: demographic information, gameplay habits, gameplay exposure measures, player experience measures, and loneliness.

3.2 Survey Design

3.2.1 Demographic Measures

Participants were asked to report demographic information including age, gender.

3.2.2 Gameplay Exposure Measures

Participants reported overall gameplay duration per week and weekly gameplay exposure across nine single-player genres:

- Role-playing games (RPG)
- Story-driven / Adventure games
- Simulation games
- Strategy games
- Puzzle games
- Sandbox games
- Sports games
- Fighting games
- First-person shooter (FPS) games

Participants additionally reported multiplayer gameplay duration as a control variable.

3.2.3 Player Experience Measures

Player experience was assessed using constructs derived from the Player Experience of Need Satisfaction (PENS) framework (Ryan et al., 2006):

- Competence
- Autonomy
- Relatedness
- Immersion
- Intuitive control

Participants responded using a Likert-type agreement scale.

3.2.4 Loneliness

Although the UCLA Loneliness Scale (Russell et al., 1978) was included in the survey for subsequent research, loneliness analyses are beyond the scope of the present paper and are therefore not reported.

3.3 Data Analysis

Descriptive statistics were calculated for demographic characteristics, gameplay exposure, and player experience variables. Internal consistency of all constructs was evaluated using Cronbach's alpha.

Pearson correlation analyses were conducted to examine relationships among gameplay exposure and player experience variables. Multiple regression analyses were subsequently performed to investigate whether gameplay exposure across different single-player genres predicted player experience dimensions while controlling for age, gender, and multiplayer gameplay duration.

4 RESULT

4.1 Descriptive Statistics and Reliability

A total of 122 participants completed the survey. Participants ranged in age from 18 to 60 years (M = 42.16, SD = 11.54). The sample consisted of 59 male participants (48.4%) and 63 female participants (51.6%).

Descriptive statistics for weekly gameplay duration are presented in Table 1. Participants reported an average total gameplay duration of 8.96 hours per week (SD = 7.57). Multiplayer gameplay accounted for an average of 5.78 hours per week (SD = 7.02).

Among single-player game genres, strategy games showed the highest average gameplay duration (M = 4.57, SD = 6.20), followed by shooter games (M = 4.21, SD = 6.35), adventure games (M = 4.14, SD = 5.71), and puzzle games (M = 4.04, SD = 5.56). Relatively lower average gameplay durations were observed for fighting games (M = 3.28, SD = 4.78), sandbox games (M = 3.59, SD = 5.89), sports games (M = 3.68, SD = 5.98), and role-playing games (M = 3.68, SD = 5.71). Large

standard deviations across genres suggest considerable variation in gameplay preferences among participants.

Table 1. Weekly Gameplay Duration by Genre (Hours per Week)

Genre	Mean (hours/week)	SD
Total	8.96	7.57
RPG	3.68	5.71
Adventure	4.14	5.71
Simulation	3.74	5.68
Strategy	4.57	6.20
Puzzle	4.04	5.56
Sandbox	3.59	5.89
Sports	3.68	5.98
Fighting	3.28	4.78
Shooter	4.21	6.35
Multi-player	5.78	7.02

Reliability analyses were conducted to evaluate the internal consistency of the psychological measures used in this study (Table 2). Overall, the scales demonstrated acceptable to good reliability, with Cronbach's alpha values ranging from .82 to .91, indicating satisfactory internal consistency across all constructs.

Initial reliability analysis of the relatedness dimension revealed relatively lower internal consistency. Examination of item-level statistics indicated that one item referring specifically to closeness with non-player characters (NPCs) showed poor consistency with the remaining relatedness items and substantially reduced the overall reliability of the construct. Conceptually, this item was considered less suitable for the present study because not all single-player game genres involve meaningful NPC interactions. Therefore, the item was removed from subsequent analyses. The final relatedness construct consisted of two items and demonstrated high reliability ($\alpha = .91$).

Among the PENS dimensions, relatedness demonstrated the highest reliability ($\alpha = .91$), followed by immersion ($\alpha = .87$), intuitive control ($\alpha = .84$), autonomy ($\alpha = .83$), and competence ($\alpha = .82$).

Regarding descriptive statistics, participants reported relatively high levels of competence ($M = 5.60$, $SD = 1.17$), autonomy ($M = 5.66$, $SD = 1.24$), and intuitive control ($M = 5.48$, $SD = 1.24$) during gameplay experiences. Relatedness showed comparatively lower ratings ($M = 4.95$, $SD = 1.85$), suggesting greater variability in perceived relational experiences across single-player games. Immersion demonstrated a moderate to high level ($M = 4.99$, $SD = 1.25$).

Table 2. Means, Standard Deviations, and Internal Consistency of Measured Constructs

Construct	items	mean	SD	Cronbach's α
PENS_ competence	3	5.60	1.17	0.82
PENS_ autonomy	3	5.66	1.24	0.83
PENS_ relatedness	2	4.95	1.85	0.91
PENS_ immersion	9	4.99	1.25	0.87
PENS_ Intuitive control	3	5.48	1.24	0.84

Note: One relatedness item ("I don't feel close to other NPCs") was removed due to low internal consistency and conceptual incompatibility across game genres.

4.2 Correlation Analysis

Pearson correlation analysis was conducted to examine relationships among gameplay exposure, player experience dimensions. The results are presented in Figure 1.

Strong positive correlations were observed among gameplay durations across different game genres ($r = .44–.76$, $p < .001$), indicating that participants who spent more time on one genre also tended to engage with multiple other genres. Multiplayer gameplay duration also showed significant positive correlations with most single-player genres ($r = .44–.71$, $p < .001$).

Regarding player experience dimensions, gameplay exposure generally demonstrated weak to moderate positive relationships with PENS measures. Relatedness showed significant positive associations with most game genres, including role-playing games ($r = .34$, $p < .001$), strategy games ($r = .31$, $p < .001$), sports games ($r = .30$, $p < .01$), and fighting games ($r = .40$, $p < .001$). Similar patterns were observed for competence, autonomy, immersion, and intuitive control, suggesting that greater gameplay engagement was generally associated with higher levels of perceived psychological need satisfaction and positive player experiences.

Strong interrelationships were also observed among the PENS dimensions themselves. Relatedness demonstrated particularly strong correlations with immersion ($r = .86$, $p < .001$), competence ($r = .62$, $p < .001$), autonomy ($r = .64$, $p < .001$), and intuitive control ($r = .62$, $p < .001$). Competence and autonomy were also strongly correlated ($r = .85$, $p < .001$), indicating substantial overlap among experiential dimensions during gameplay.

4.3 Effects of Game Genre Exposure on Player Experience

Multiple regression analyses were conducted to examine whether gameplay exposure across different single-player genres predicted player experience dimensions while controlling for age,

gender, and multiplayer gameplay exposure. Separate models were estimated for competence, autonomy, relatedness, immersion, and intuitive control. Figure 2 shows the results.

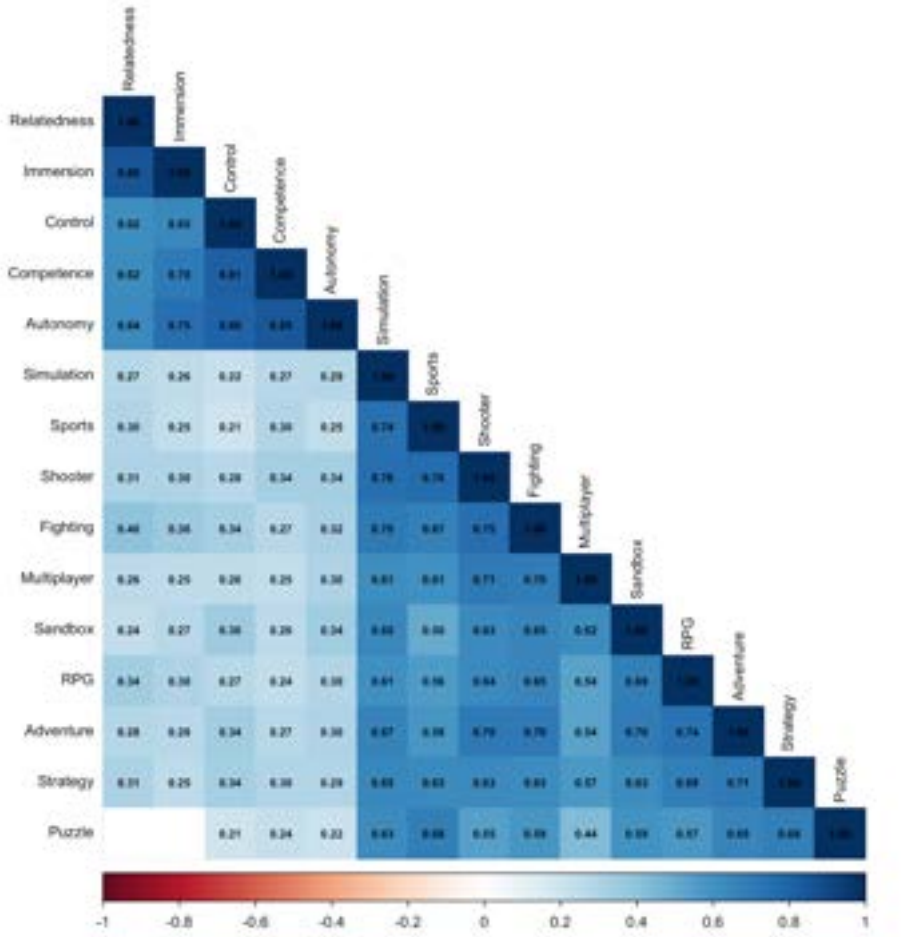

Figure 1. Pearson correlation matrix among gameplay exposure and player experience dimensions. Only statistically significant correlations ($p < .05$) are displayed

Overall, genre exposure demonstrated limited predictive effects across the five player experience dimensions. Among the genre variables, fighting game exposure emerged as the only significant predictor of multiple experiential outcomes. Specifically, fighting game exposure positively predicted relatedness ($\beta = .41$, $p = .007$) and immersion ($\beta = .32$, $p = .038$). No significant effects were observed for role-playing, adventure, simulation, strategy, puzzle, sandbox, sports, shooter, or multiplayer gameplay exposure. Gender also demonstrated significant effects across several experiential dimensions. Male participants reported significantly higher relatedness ($\beta = .46$, $p = .015$), competence ($\beta = .48$, $p = .017$), and immersion ($\beta = .45$, $p = .022$) compared with female participants. Age did not significantly predict any player experience dimensions.

The regression models explained between 16.9% and 25.9% of variance across player experience dimensions ($R^2 = .169–.259$). Multicollinearity diagnostics indicated acceptable variance inflation factor values across predictors (VIF = 1.17–4.35), suggesting that predictor overlap did not substantially affect model stability.

These findings suggest that broad genre categories alone may have limited influence on psychological gameplay experiences. Instead, emotional performance may be influenced more strongly by specific experiential characteristics embedded within games than by genre classification itself.

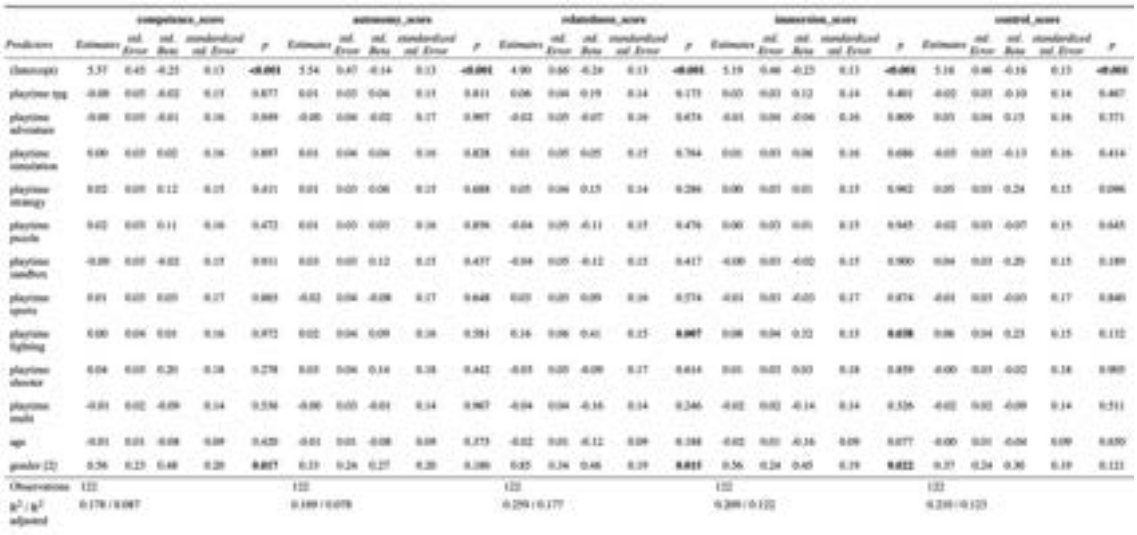

Figure 2. Multiple regression coefficients predicting player experience dimensions (relatedness, competence, autonomy, immersion, and intuitive control) from single-player gameplay exposure while controlling for age, gender (1 = female, 2 = male), and multiplayer gameplay duration. Significant effects are indicated by asterisks ($p < .05$, *$p < .01$, $p < .001$).

5 DISCUSSION

The present study investigated the emotional performance of single-player digital game genres through the lens of Self-Determination Theory and Kansei-oriented perspectives on interactive experience. Specifically, the study examined whether gameplay exposure across different single-player genres was associated with psychological need satisfaction and player experience dimensions, including relatedness, competence, autonomy, immersion, and intuitive control.

Contrary to the initial expectation, broad game genre categories demonstrated relatively limited predictive effects on player experience dimensions. Although positive associations between gameplay exposure and psychological experience were observed in the correlation analysis, most genre effects disappeared after controlling for overlapping gameplay behaviors and demographic variables in the regression models. These findings suggest that broad genre classifications alone may not sufficiently explain variations in emotional performance. One possible explanation is that genre categories represent relatively coarse descriptions of game characteristics and may contain substantial internal variability. For example, role-playing games may differ considerably in narrative depth, social interaction opportunities, character attachment, or exploration mechanics. Similarly, adventure and simulation games can provide highly diverse emotional and experiential structures despite belonging to the same genre category. Consequently, psychological experiences may be shaped more strongly by specific design elements and experiential affordances than by genre labels themselves.

Interestingly, fighting game exposure positively predicted both relatedness and immersion. This finding differs from the common assumption that relatedness in games primarily emerges from explicit social interaction or narrative engagement. A possible interpretation is that repeated engagement with recognizable characters, avatar identification, mastery processes, and emotional attachment to game systems may contribute to a sense of connection even within traditionally less socially oriented game genres. Because the present study focused on gameplay exposure rather than specific interaction mechanisms, additional investigation is needed to clarify the underlying processes responsible for this relationship. Gender differences were also observed, with male participants reporting higher relatedness, competence, and immersion scores. However, gender was not a primary focus of this study, and further investigation is required before drawing broader conclusions regarding gender-related differences in gameplay experiences.

From a Kansei Engineering perspective, the findings suggest that emotional performance may not be adequately represented through broad content classifications such as game genres. Instead, experiential qualities such as narrative engagement, perceived agency, emotional attachment, and interaction characteristics may provide more direct indicators of affective performance within digital environments. This perspective aligns with the view that emotional outcomes emerge from interactions between users and specific design structures rather than from categorical system labels alone.

The present study has several limitations. First, the use of self-reported gameplay exposure may introduce recall bias and estimation inaccuracies. Second, the cross-sectional design limits causal interpretation of the observed relationships. Third, the current study focused on general genre exposure and did not examine specific game titles or detailed design characteristics. Future studies should investigate more fine-grained experiential variables and explore potential relationships between player experience dimensions and psychological outcomes such as loneliness and well-being.

6 CONCLUSION

This study examined the emotional performance of single-player digital game genres by investigating relationships between gameplay exposure and player experience dimensions grounded in Self-Determination Theory. Although gameplay exposure across genres generally showed positive associations with player experience variables, broad genre classifications demonstrated limited predictive effects after controlling for demographic characteristics and overlapping gameplay behaviors. Among the examined genres, only fighting game exposure significantly predicted relatedness and immersion, suggesting that certain experiential characteristics embedded within games may contribute to psychological experiences independently of traditional assumptions regarding social interaction or narrative structure.

Overall, the findings suggest that emotional performance in digital games may be better understood through specific experiential and design characteristics rather than through broad genre categories alone. These findings contribute to Kansei-oriented perspectives on interactive

systems by highlighting the importance of examining how design structures shape psychological experiences within digital environments.

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