Positively playful: When videogames lead to player wellbeing

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ABSTRACT
Videogames are an increasingly popular entertainment choice, yet we have a limited understanding of their potential wellbeing benefits. The current research used an online survey (N = 429) to investigate how gameplay choices and the psychological experience of gameplay impact on player wellbeing. Specifically, a hierarchical multiple regression was conducted to determine if, controlling for age and gender, current gameplay choices (amount of play, game genre, mode of play) and play experience (flow, psychological need satisfaction) predicted current wellbeing. Results indicated that age, social play, relatedness during gameplay and flow were positively associated with player wellbeing. Implications for our understanding of player wellbeing, as well as directions for future research are discussed.

Author Keywords
Videogames; flow; self-determination theory; psychology; well-being; computer-human interaction.

ACM Classification Keywords
K.8.0; H1.2

INTRODUCTION
Forty-nine percent of U.S. households own a dedicated game console (excluding games played on smartphones or computers), the average age of a gamer is 30, females make up 47% of the game-playing population, and 62% of gamers play games with other people, either online or in person [1]. The games industry is thriving and clearly has wide reaching influence. Yet its successes have at times been over-shadowed by media interest in the potential negative effects of playing videogames. Bringing depth and complexity to the debate is a trend in recent research to focus on the psychological experience of gameplay [2-5], and the potential wellbeing benefits of gameplay. For example, research has found moderate levels of play correlated with lower anxiety levels [6] and greater self-esteem compared to no-play [7]. In addition, while there has been a strong focus on high amounts of play and possible links with pathology and negative outcomes [8], recent research suggests that rather than the amount of play the key issue is the style of the engagement or the nature of players' passion for play. Specifically, harmonious passion has been shown to have a positive influence (e.g., enhanced post-play energy), while obsessive passion has been linked to negative outcomes (e.g., higher post-play tension and less game enjoyment) [2].

Game genre has also been linked to player wellbeing. For example, action-adventure games have been linked to positive outcomes such as flow [4], and strategy and role-playing games have been linked to feelings of autonomy [9], while explorations of MMORPGs and other forms of online play suggest another focus for exploring player wellbeing: social modes of play. There is evidence that social modes of play may be associated with greater player wellbeing, as social networks may be enacted online via gameplay, resulting in increased social support [10] and meaningful friendships [11]. Research has also found that online gameplay can augment offline relationships if play occurs with existing social ties, and may displace them if not [12]. However, research is yet to determine how social modes of play may interact with game genre to impact on player wellbeing.

Self-determination theory (SDT) posits that intrinsic motivation and wellbeing result from the satisfaction of three psychological needs: autonomy, competence and relatedness [13]. The Player Experience of Need Satisfaction Scale (PENS), a measure of these experiences within gameplay [5], has led to a better understanding of how vitality is maintained or enhanced [5], how personality interacts with need satisfaction [9], and what compels people to play as opposed to why people choose to play [2]. The impact of one or more psychological needs being met in gameplay on a multidimensional measure of player wellbeing is yet to be determined.

Finally, the construct of flow is uniquely suited to describing the immediate pleasures of gameplay, and perhaps its association with hedonic wellbeing. It describes

Gamification'13, October 2 – 4, 2013, Stratford, ON, Canada.

a state of consciousness associated with complete absorption in an activity [14] and overlaps with SDT in that it explains this deep enjoyment as originating from engagement with tasks that match an individual's abilities [15], just as feelings of competence result in intrinsic motivation [13]. The association of flow with harmonious gameplay, autonomous regulation and positive affect [3] also suggests a more direct association with wellbeing.

Research has only just begun to explore the potential wellbeing benefits of gameplay. The present research aims to determine how gameplay characteristics (amount of play, social modes of play, genre) and the psychological experience of gameplay (i.e. SDT and flow) impacts on player wellbeing.

METHOD

Participants

Four hundred and twenty nine participants (aged 12 to 52 years, M = 25.78, SD = 8.3; 82.5% male) with an interest in recreational videogames completed an online survey. Approximately 31% were university students.

Procedure

The sample was recruited from a videogame studies course at a university, and the general public via advertisements in gaming forums, online social media, and an email list of participants from prior studies who had agreed to be contacted for future research. Snowball sampling techniques were also used. Respondents were asked to complete the survey based on their 'most recently purchased and played at least once' videogame, referred to hereafter as the current game. A guided recall process was used to prime respondents about the detail of their most recent gaming experience with the current game. Survey completers had the opportunity to enter a draw to win one of ten $100 gift voucher to either Amazon.com, or an Australia-wide electronics store (JB Hi Fi).

Measures

Amount of Play

This was measured as the total amount of hours spent playing the current game. The responses analysed (after removal of outliers, detailed below) ranged from less than 1 to 2,000 hours (M = 99.87, SD = 253.14).

Game Genre

Respondents' were asked to indicate the genre of their current game. Participants' responses were checked for consistency, and in some cases changed (e.g. *Angry Birds* was recoded as a casual game instead of a strategy game). To avoid having a large number of genre categories, some of which had very few cases, genres were re-coded into conceptually similar meta-genres: Action-Adventure (action-adventure, action-roleplaying, text-adventure), Casual (board or card game, casual, dance, music, puzzle, platform), Role-Playing Games (MMORPG, role-playing game), Shooters (first-person, third-person), Sports & Simulation games (fighting, flight, racing, simulation non-flight and sports), and Strategy (real-time and turn-based).

Mode of Play

Mode of play referred to whether the current game was most often played online with people they knew, online with people they didn't know, offline with people they knew, or on their own.

Player Experience of Need Satisfaction Scale (PENS)

The PENS [5] is a validated measure of the player experience of autonomy, competence, relatedness, presence and intuitive controls. It consists of 21 items, measured on a 7-point scale from "Do not agree" to "Strongly agree"; an example from the competence subscale being "I feel very capable and effective when playing". Subscale items were averaged to create separate scores for each of the subscales.

Flow State Scale (FSS-2)

The FSS-2 [16] is a validated measure for assessing the experience of flow in a chosen activity. Participants were asked to respond to items in relation to their experience of playing the current game. It is comprised of 36 items measured on a 5-point scale, from "Strongly disagree" to "Strongly agree", an example being "I did things spontaneously and automatically without having to think." A total flow score was obtained by summing the item-average dimension scores and entered into the analysis.

Mental Health Continuum Short Form (MHC-SF)

The MHC-SF [17] is a validated measure of wellbeing that provides both a total score and emotional, social and psychological wellbeing subscale scores. It is comprised of 14 items, measured on a 6-point "Never" to "Every day" scale and asks respondents how often they have experienced certain feelings over the past month, an example being "satisfied with life". Only the total wellbeing score is reported in the current study.

STATISTICAL ANALYSIS

Analysis of the sample data was conducted using SPSS 21.0. A hierarchical multiple regression analysis was conducted to determine if demographic variables (age, gender), current game characteristics (amount of play, game genre, mode of play) and experiences (PENS, FSS-2) were associated with current wellbeing (MHC-SF). Age and gender were entered at Step 1, followed by game genre at Step 2, amount of play at Step 3, mode of play at Step 4, and the PENS subscales and total flow at Step 5.

Data Screening and Preparation

The responses of 43 participants who did not complete at least the first of the play experience items were excluded, as were two participants under the age of 12, and three participants identified as univariate or multivariate outliers.

Missing values were excluded listwise resulting in the analysis being based on 329 responses (76.7% effective response rate). Mode of play was dummy coded into discrete variables (each compared to 'playing on your own'), as was genre (each compared to 'casual games'). The variable 'amount of play' was found to be positively skewed, so a logarithmic transformation was applied.

RESULTS

The full model of age, gender, genre, amount of play, mode of play, player need satisfaction and flow to predict player wellbeing was statistically significant, $R^2 = .142$, F (17, 311) = 3.027, $p < .0001$). The adjusted R^2 value of .095 suggests that 9.5% of the variance in player wellbeing is predicted by the full model. Steps 1, 2 and 3 did not significantly predict player wellbeing. The R became significantly different from zero at the end of Step 4. At Step 4, the addition of mode of play to the IVs age, gender, amount of play and genre, produced an R^2 change of .029, F (11, 317) = 1.823, $p < .05$. At Step 5, the addition of play experience variables produced an R^2 change of .082. This indicates that after controlling for the impact of demographics, genre and amount of play, mode of play was significantly associated with player wellbeing. Furthermore, after allowing for the impact of mode of play, the experience of gameplay, reflected in measures of flow and need satisfaction, was also significantly associated with player wellbeing.

Of the variables included in the full model only age, relatedness, flow, and the mode of play 'playing offline with people you know' (compared to playing on your own) were significantly associated with player wellbeing (see Table 1). The displayed beta weights (β) indicate the expected change in the standardised predictor measure for one SD change in the outcome measure when the other independent measures are kept constant. The squared semi-partial correlations (sr^2) indicate the effect size expressed as the proportion of unique variance in the outcome measure explained by each predictor variable. Age accounted for 3.8%, mode of play 'offline with people you know' accounted for 1.3%, flow accounted for 1.1% and relatedness accounted for 2% of the unique variance in player wellbeing.

DISCUSSION

Overall, the results show that of the variables considered only mode of play and the experience of play significantly predicted player wellbeing. It is particularly notable that no relationship was found between hours of play or genre of game and player wellbeing. This suggests that it is not how much or what is played that impacts player wellbeing, but the way in which players engage with games, and the psychological experiences that result. This is an important finding in that it contradicts the common assumption that playing the wrong games or playing for too long will have a negative impact. In fact, this finding suggests that how much you play and what you play is far less relevant than who you play with and your experiences while playing for player wellbeing. However, it is possible that our sample may not have included those most at risk of engaging in pathological gaming and future research with a broader sample should explore whether total hours played or play of specific genres can have a negative impact on player wellbeing [9]. Relatedly, the gender distribution in our sample differs from that identified in the larger population of gamers [1]. Future work should explore whether our pattern of results is confirmed with a more gender-balanced sample.

In terms of other individual predictors, age was found to be the strongest predictor of player wellbeing, such that wellbeing was found to increase with age in the sample. Interpreting this finding is beyond the scope of the current paper, but it is important to note that this relationship is accounted for on the first step of the regression and all findings connecting videogame play and wellbeing exist after allowing for this connection. The finding that mode of play ('playing offline with people you know') is a significant predictor, suggests that the social component of videogame play is a key contributor to player wellbeing, such that when players are familiar with each other and physically co-located, playing together has a positive influence on wellbeing. This result is consistent with other

Step	*Independent variables*	*B*	*S.E. B*	*β*	*sr^2*
1	Age	.362	.097	.222**	.038
	Gender	3.278	2.005	.092	.007
2	Genre: Act-Adv.	-.169	2.784	-.006	.000
	Genre: RPG	-3.405	3.461	-.073	.003
	Genre: Shooters	-1.106	2.685	-.040	.000
	Genre: Sports & Simulation	-4.711	3.332	-.103	.005
	Genre: Strategy	-.404	3.347	-.009	.000
3	Total Hrs Play	-1.771	1.250	-.087	.005
4	Mode: OnPK	2.058	2.349	.056	.002
	Mode: OnPDK	3.379	2.084	.099	.007
	Mode: OffPK	7.351	3.370	.123*	.013
5	PENS: Competence	1.378	.882	.110	.007
	PENS: Autonomy	.796	.713	.077	.003
	PENS: Relatedness	1.683	.634	.195**	.020
	PENS: Presence	-.679	.730	-.070	.002
	PENS: Intuitive Controls	-.222	.706	-.019	.000
	Flow	.461	.228	.140*	.011

Table 1: Predictors of player wellbeing
$p < 0.05$ * , $p < 0.01$ **

(**Note**: Mode of play- OnPK: online with people you know; OnPDK: online with people you don't know; OffPK: offline with people you know)

research finding co-located play significantly adds to player enjoyment, challenge and perceived competence [19]. Of interest is that 'playing online with people you know' was not a significant predictor of total wellbeing, however further research will determine if this is replicable and if so, if it indicates that physical co-location is essential for any wellbeing benefits associated with playing with friends. Certainly, the finding that relatedness also predicts wellbeing suggests that (regardless of whether playing online or offline, with known or unknown others) the experience of feelings of relatedness during play leads to wellbeing – and it seems likely that this is a function of associated social support, feelings of social connectedness or community [20].

Finally, the finding that flow is a predictor of player wellbeing suggests that the positive feelings associated with the experience of flow promotes greater wellbeing in players. This is supported by research that finds flow in gameplay associated with positive affect and harmonious gameplay [3].

CONCLUSION

The current study offers further evidence of the positive relationship between videogame play and player wellbeing, Specifically, our findings suggest that in term of the impact of videogame play on wellbeing, what you play and how much you play are not as important as who you play with and whether you experience relatedness and flow while playing (at least for the population sampled). Based on the support for the social components of play (playing with others and experiencing relatedness), we plan in future studies to explore in more depth the impact of contrasting qualities of social play (e.g., competitive versus cooperative play) on player wellbeing.

ACKNOWLEDGMENTS

We thank all the participants for their time and the Young and Well Cooperative Research Centre for partially funding this research.

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