Examining the Impact of Social Video Game Tournaments on Gamers' Mental Well-Being

Tanesha Jones, Adriane B. Randolph, Sweta Sneha

Kennesaw State University, Department of Information Systems and Security, Kennesaw, Georgia, USA
{tjone148@students., arandol3@, ssneha@} kennesaw.edu

Abstract. We examine the impact that gaming on a social tournament platform while playing multiplayer games has on the mental well-being of college students. In this early-stage study, we used the Scale of Positive and Negative Experiences and the Player Experience and Need Satisfaction Scale to measure well-being, gaming motivation, and enjoyment. We complement these survey tools with facial expression analysis of students during gameplay for a more holistic understanding of their emotional states and the impact of social gaming.

Keywords: Mental well-being · motivation · video game tournaments · gaming· game skill level · facial expression analysis.

1 Introduction

There has been a recent push to research positive mental health and gaming [1,2,3,4] in contrast to a focus on the negative effects [5,6]. It is believed that players who experience a high degree of relatedness during video game play (or "gaming") will likely experience higher well-being [4]. For the purpose of this study, mental well-being is defined as feeling good about oneself and life, while mental health encompasses emotional, psychological, and social well-being. We will be looking at well-being and the emotional and social well-being aspects of mental health [7,8].

Nonvoluntary isolation, as with the COVID-19 pandemic, may cause individuals to suffer negative mental well-being effects. It is our belief that playing games and connecting virtually can produce similar positive mental well-being effects as in-person social experiences. Gaming is a non-physical activity that can be done alone or socially and is absent of any need for physical contact through touching.

Touch is a sense that contributes to well-being and can overshadow or mask other contributing factors affecting a person's well-being. Touch and touch therapy are relatively

new methods being researched and used to combat poor mental health and well-being [9]. This makes gaming a great opportunity to isolate other factors that may also affect well-being as the study will look at an activity where touch and physical presence of others have been removed. We will use self-reported measures through surveys for primary data collection.

However, neuroIS researchers have found that self-reported data has its limitations. With added neurophysiological measures, we may find a wealth of knowledge untapped and unknown even to the participants, themselves, to create a more holistic picture [10]. It has been found that these methods can complement more common study methods by using neurophysiological measures to explain additional variances beyond what psychological measures can offer.

In this study, we attempted to use supplementary facial expression analysis of emotion to complement insights gleaned from traditional surveys on mental well-being, gaming motivation, and enjoyment. The overall goal to determine if participants experience changes in mental well-being from playing in social tournaments. The results may serve as fuel for further studies to find if these virtual gaming experiences create similar positive effects as in-person gaming experiences.

2 Methodology

This work examined the mental well-being of college students at a large university in the southeastern United States. For our study, we used the validated Scale of Positive and Negative Experiences (SPANE) [11,12,13] to measure well-being. We asked participants how they had been feeling in the past four weeks and how often they experienced each of six positive and six negative feelings according to the SPANE tool. Participants were surveyed pre- and post- competing in the tournaments for their well-being and gaming motivation.

We used Player Experience and Need Satisfaction Scale (PENS) for post tournament experience [14]. This survey was administered post tournament and as a final questionnaire near the end of the study to record participants' overall experience of the tournaments. We intended to break the participants into two groups: 1) a cohort that plays all or most of the tournaments for a historical look at their experience and emotions over time, and 2) rotations of participants who play in one tournament, for a total of 125 targeted participants.

The participants played multiple rounds of Rocket League, League of Legends, or Overwatch in individual tournaments, playing one game throughout the tournament session. Separate analysis will be done on each group. Within each group there are subgroups of participants who label themselves as Elite Gamer, Aspirational Gamer, Casual Gamer, or Beginner. These are self-assigned gaming skill levels that serve as control variables.

The participants were randomly sampled and categorized post-hoc according to characteristics captured in a demographics portion of the survey. They shared their username/gamer name for longitudinal tracking in the surveys but are anonymized in final reporting. We asked for participants to voluntarily record video of their facial expressions

during gameplay and share the recordings with the research team for post-hoc analysis of emotion using iMotions AFFDEX, a recording and analytic software based on the Facial Action Coding System (FACS) [15]. A metric for overall positive/negative emotion experienced during gameplay analyzed against the survey measures of well-being and supplemented with their facial recordings to create a more in-depth profile of the gamer's experience and mental health as participants may not be fully attuned with their emotions and self-assess incorrectly. Having the visual data of their facial emotions will is used to supplement the survey responses [13].

The model we used, as illustrated in Figure 1, was inspired by the research of Deci and Ryan's Self Determination Theory (SDT) [16] which resulted in the creation of the Gaming Motivation Scale (GAMS) [18,19] and another model by Sterling [17] that looks at the relationship between online gamers' psychological needs and gaming behavior and motivation. Self Determination Theory looks at human motivation and personality being constructed of three components: autonomy, competence, and relatedness [16]. We based our study on gaming motivation as used in Sterling's study that was measured using GAMS. Gaming behavior was measured using frequency and duration among online gamers, and psychological needs were measured using the Basic Needs Satisfaction in General Scale (BNSG-S) [17].

For this study, we looked at gaming motivation as the independent variable and mental well-being as the dependent variable. We are hypothesizing that within gaming skill levels like Elite Gamer, Aspirational Gamer, Casual Gamer, and Beginner, that the player's gaming motivation will have a direct correlation to the well-being level of the player.

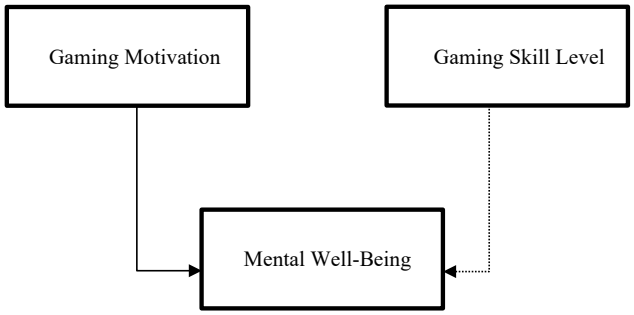

Fig. 1. Model of video gamer's mental well-being.

3 Results

During the first pilot tournament, we found that participants were overwhelmed by the instructions on the tournament website. We reduced the number of words and added text

formatting like bolding and italics for emphasis. Participants also were not finishing the post survey, which is believed to be due to the last question which implied a mandatory submission of their video recording without optional language to convey they could submit the survey without the video. The participants, not having done the recordings, thus exited out of the survey rather than submitting without the recording. We changed the survey to ask if they had done the optional recording and if not then they were given a submit button, otherwise they were given the link to submit the video.

We found that the next tournament did not have any participants that signed up, so we increased recruitment efforts by adding flyers in the school weekly news email and emphasized the gaming platform was offering prize raffle incentives. We also decided to remove the Game Experience Questionnaire (GEQ) section from the survey. We found it to be too tedious and made the survey much longer which we feared would reduce the number of participants who would complete the survey. The PENS was found to be validated more heavily and more in line with the type of question we are trying to answer. The tournament after this had nine completed post surveys which showed that our changes were effective.

We did not meet our goal size of 125 but were successful in a sample size of 68, from a total of 98, participants who completed both the pre and post survey. For this study the independent variable is Motivation, what motivates the participants to play games, and a second layer independent of Game Skill Level. The below Figure 2 shows most participants chose “liking to compete” and “play with others”.

Motivation

		Count
Motivators	I like the game mechanics	34
	I like to compete against others	35
	I like to make friends	32
	I like to earn achievements	6
	I like to progress through the game	16
	I like to play with others	35
	I like to explore the game	16
	I like to find hidden things	13
	I like the story line	12
	I like the characters	20
	I like to customize my character	7
	I like to escape from real life	15
	I use it to relax	26
	Other (please specify)	4

Fig. 2. Frequency of Participants' Gaming Motivations

Game Skill Level

	Frequency	Percent	Cumulative Percent
Elite Gamer	15	22.1	22.1
Aspirational Gamer	35	51.5	73.5
Casual Gamer	17	25.0	98.5
Beginner	1	1.5	100.0
Total	68	100.0	

Fig. 3. Frequency of participants within each game skill level

There was a large number of participants who self-assigned themselves as Aspirational and an almost equal amount of Elite and Causal gamers. Only one participant self-identified as a Beginner, as can be seen in Figure 3.

SPANE B is the mental well-being score summed from SPANE P (positive score) minus SPANE N (negative score). The SPANE B score ranges from -24 (lowest unhappiness score) to 24 (highest happiness score) [5],[18]. This is the dependent variable of our model. Before participating in the tournaments, we saw participants had a mean SPANE B of 3.86 and post tournament mean SPANE B of 3.10 as shown in Figure 4. This signifies, on average, that participants had a low level positive mental well-being score and also their score decreased after the tournament. Many factors could be attributed to this such, as losing their match or fatigue from playing causing them to answer erroneously.

SPANE B

	Pre SPANE B	Post SPANE B
Mean	3.8636	3.1045
N	66	67
Std. Deviation	4.82904	4.90249

Fig. 4 SPANE B Pre & Post Mean

SPANE B Change Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		3	4.4	4.4	4.4
	Decrease	27	39.7	39.7	44.1
	Increase	26	38.2	38.2	82.4
	No Change	12	17.6	17.6	100.0
	Total	68	100.0	100.0	

Fig. 5 Frequency of SPANE B changes from pre to post by change group

SPANE B Changes

SPANE Change Group		Pre SPANE B	Post SPANE B
	Mean	7.0000	-1.0000
	N	1	2
	Std. Deviation	.	1.41421
Decrease	Mean	6.2593	.8889
	N	27	27
	Std. Deviation	5.78853	4.61880
Increase	Mean	2.8462	6.9615
	N	26	26
	Std. Deviation	3.18361	3.64945
No Change	Mean	.4167	.4167
	N	12	12
	Std. Deviation	2.27470	2.27470
Total	Mean	3.8636	3.1045
	N	66	67
	Std. Deviation	4.82904	4.90249

Fig. 6 Mean of SPANE B changes from pre to post by change group

Further investigation showed that there was an equal split of participants who experienced a decrease in mental health verses those that showed in increase. This is shown above in Figure 5. Figure 6 shows that 12 participants had low positive, almost neutral, SPANE B scores which didn't change. Participants that had a decrease in their SPANE decreased by an average of 5.37 and participants that increased, did so by an average of 4.11. Of those who decreased in mental well-being, the magnitude of their change was larger than that of the SPANE B change for those that increased. This explains why, even though equal numbers of participants increased and decreased, the net result was a decrease in mean SPANE B amongst participants.

Skill Level SPANE B

Game Skill Level	Pre SPANE B Mean	Post SPANE B Mean
Elite Gamer	2.87	1.14
Aspirational Gamer	4.15	3.71
Casual Gamer	4.44	3.65
Beginner:	.00	.00

Fig. 7 Skill Level Vs Pre & Post SPANE B

In Figure 7, the Elite Gamer group had the largest change, of 1.73, and also started with the lowest SPANE B score. In contrast, Casual Gamers started with the highest score and decreased by 0.79. Aspirational gamers had the lowest SPANE B decrease amount.

Commented [TJ3]: Right here mentions gamer skill level but figure 6 has nothing to do with that

Motivation Vs SPANE B

		SPANE B Mean	Post SPANE B Mean
Motivators	I like the game mechanics	3.52	2.94
	I like to compete against others	4.29	3.60
	I like to make friends	4.60	5.13
	I like to earn achievements	6.00	2.83
	I like to progress through the game	4.94	3.27
	I like to play with others	4.15	4.74
	I like to explore the game	3.75	3.06
	I like to find hidden things	4.23	3.08
	I like the story line	3.92	2.58
	I like the characters	3.75	2.70
	I like to customize my character	1.33	1.43
	I like to escape from real life	3.20	2.67
	I use it to relax	3.76	4.65
	Other (please specify)	3.00	.75

Fig. 8 Motivation Vs Pre & Post SPANE B

Positive reinforcing motivators like liking to make friends, playing with others and customizing the character, show positive or no change while the more competitive or negative reinforcement motivators for game play, like using it to escape real life, show negative changes. This can possibly be contributed to the players who chose motivators that correlate to winning and negative well-being, like wanting to escape their life, not winning the game and thus it not fulfilling their need to win or feel like their reality is different than the world outside the game, removing their sense of control.

We had hoped to collect and analyze supplementary facial expression analysis in an effort to offer more insights to determine if more negative emotions were experienced. However, none of the videos we received were clear enough to analyze. Using iMotions' AFFDEX, we analyzed a sample video of a student engaged in gameplay and were able to gain insights as to the person's emotions and facial expressions during gameplay. The software accurately identified, at an 80% threshold, attention, engagement, negative emotions, lip suck and press, open mouth, chin raise, dimpler, and jaw drop. With these cues it identified moments of anger, contempt, joy, sadness, engagement, and disgust throughout the video as illustrated in Figure 2.

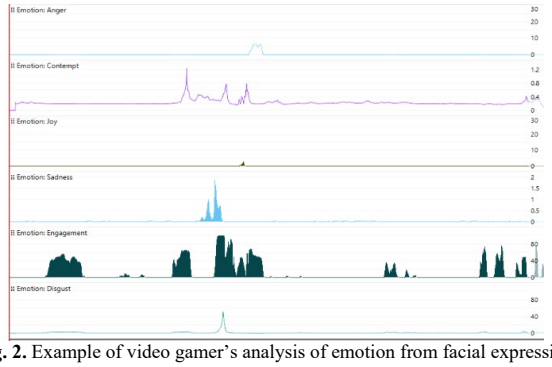

Fig. 2. Example of video gamer's analysis of emotion from facial expressions.

iMotions identified other facial expressions outside the threshold like lip stretch and lid tighten, brow rise, eye widen, smile, and smirk. We hoped to pair this analysis with the survey to confirm or enhance the participants' self-assessments of their emotions and mental well-being. The intention was that facial expression analysis would help ensure we have accurate measurements when looking to see if playing the social tournaments had an impact on their mental well-being.

4 Conclusion, Limitations, and Future Work

4.1 Conclusion

We have found ways to improve our data collection process by changing the language of our outreach and participation directions, emphasizing incentives and optional steps, creating recruitment videos to better explain directions, implementing

a project website for participants to reference, and modifying the flow of the survey. Most participants self-identified themselves as Aspirational gamers. The most selected motivators were " liking to play with others" and " liking to compete" which aligned with the games being played – multiplayer, tournament style team-based games. One average there was a decrease in SPANE B or mental well-being which might be contributed to most players losing and their motivations for play being to compete or win. There was an almost even split of participants who's well-being score decreased and increased but the participants who decreased did so a much greater amount that caused the average to decrease. We found that Causal gamers on average had the highest staring SPANE B score and Elite gamers had the largest decrease between their starting and ending score. In addition, those participants that had positive reinforcing motivators like wanting to play with others, or make friends showed increases in their SPANE B score from the pre-game to post game.

4.2 Limitations

This study should be looked at as a pilot study to gain an understanding of where future research should focus. One major limitation to the study was time. A longer time to introduce and onboard participants may have resulted in stronger survey response as participants would be more educated on the answer mechanisms. This could have led to videos that could have been analyzed for facial analysis. The breakdown of gamer skill level was skewed as only one self-identified as a beginner. More attention needs to be paid when recruiting to gain more beginner gamer participants. It would have been useful to also include a post survey question about who won or lost their games to compare to the SPANE B and win/competitive motivators. A larger sample size would also increase the accuracy of the comparison for skill level breakdown. Lastly, a question to verify participants are answering correctly and not selecting random numbers in order to finish the survey would help to ensure answers were valid.

4.3 Future Work

The games we looked at were multiplayer competitive games, so motivators like wanting to win and compete will skew the results based on the player winning or losing. Perhaps games that are not competitive, but more social in nature, like multiplayer simulations, will give more information on the well-being change based on the gamer motivation when wining won't adversely affect the participants well-being.

References

1. Daugette, A. (2019, December 13). The Psychological Benefits of Video Games. Sekg. https://www.sekg.net/psychology-benefits-video-games/.
2. Granic, I., Lobel, A., & Engels, R. C. M. E. (2014). The benefits of playing video games.
3. Johannes, N., Vuorre, M., & Przybylski, A. K. (2020, November 13). Video game play is positively correlated with well-being. https://doi.org/10.31234/osf.io/qrjza.
4. Jones, C. M., Scholes, L., Johnson, D., Katsikitis, M., & Carras, M. C. (2014). Gaming well: Links between videogames and flourishing mental health. *Frontiers in Psychology, 5*. doi:10.3389/fpsyg.2014.00260.
5. Ryan, R. M., Rigby, C., & Przybylski, A. (2006). The motivational pull of video

games: A self- determination theory approach. Motivation and Emotion, 30(4), 347-363. doi:10.1007/s11031-006-9051-8.

6. Smyth, J. M. (2007). Beyond self-selection in video game play: An experimental examination of the consequences of massively multiplayer online role-playing game play. Cyberpsychology & Behavior, 10(5), 717-721. doi:10.1089/cpb.2007.9963.
7. National Center for Chronic Disease Prevention and Health Promotion , Division of Population Health. (2018). Well-Being Concepts | HRQOL | CDC. Centers for Disease Control and Prevention. https://www.cdc.gov/hrqol/wellbeing.htm
8. Laidlaw, A., McLellan, J., & Ozakinci, G. (2015). Understanding undergraduate student perceptions of mental health, mental well-being and help-seeking behaviour. Studies in Higher Education, 41(12), 2156–2168. https://doi.org/10.1080/03075079.2015.1026890
9. Field, T. (2014). Touch. Cambridged, MA: The MIT Press.
10. Tams, Stefan, Hill, Kevin, Ortiz de Guinea, Ana, Thatcher, Jason, & Grover, Varun. (2014). NeuroIS -- Alternative or Complement to Existing Methods? Illustrating the Holistic Effects of Neuroscience and Self-Reported Data in the Context of Technostress Research. Journal of the Association for Information Systems, 15(10), 723-752.
11. Diener, E., Wirtz, D., Tov, W., Kim-Prieto, C., Choi. D., Oishi, S., & Biswas-Diener, R. (2009). New measures of well-being: Flourishing and positive and negative feelings. Social Indicators Research, 39, 247-26.
12. Scale of Positive and Negative Experience (SPANE) – NovoPsych Psychometrics. (2018). NovoPsych. https://novopsych.com.au/assessments/scale-of-positive-and-negative-experience-spane/.
13. Scale of Positive and Negative Experience (SPANE). (n.d.). Retrieved January 21, 2021, from http://labs.psychology.illinois.edu/~ediener/SPANE.html
14. Johnson, D., Gardner, M. J., & Perry, R. (2018). Validation of two game experience scales: The player experience of Need SATISFACTION (PENS) and game Experience questionnaire (geq). International Journal of Human-Computer Studies, 118, 38-46. doi:10.1016/j.ijhcs.2018.05.003.
15. Farnsworth, B., Ph.D. (2019, August 18). Facial action coding SYSTEM (FACS) - a Visual guidebook. Retrieved March 04, 2021, from https://imotions.com/blog/facial-action-coding-system/.
16. Deci, E. L., & Ryan, R. M. (1985). Intrinsic motivation and self-determination in human behavior. New York, NY: Plenum.
17. Sterling, R. (2017). Influence of Psychological Needs and Gaming Motivation on Well-Being of Adult Gamers. Scholarworks. https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=4829&context=dissertations.
18. Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. American Psychologist, 55(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68
19. Lafrenière, M. A. K., Verner-Filion, J., & Vallerand, R. J. (2012). Development and validation of the Gaming Motivation Scale (GAMS). Personality and Individual Differences, 53(7), 827-831.