RUNNING HEAD: Emotions and gaming

What makes male gamers angry, sad, amused, and enthusiastic while playing violent video games?

Maciej Behnke[1], Patrycja Chwiłkowska[1], Lukasz D. Kaczmarek[1]

[1]Faculty of Psychology and Cognitive Science, Adam Mickiewicz University

Author Notes

Correspondence concerning this article should be addressed to Maciej Behnke, Faculty of Psychology and Cognitive Science. Adam Mickiewicz University, 89 Szamarzewskiego Street, 60-658 Poznań, Poland. E-mail: macbeh@amu.edu.pl

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Abstract

Gaming elicits strong emotional responses. However, little is known about which situations within the gameplay elicit specific emotions. Thus, we aimed to identify which gaming situations elicit positive and negative emotions. We asked *Counter-Strike: Global Offensive* gamers (*N* = 652) to recall and write about a situation when they felt amused, angry, enthusiastic, or sad. In our analysis, we used semantic coding and affective words analysis using Linguistic Inquiry and Word Count (LIWC). We found that gamers described emotional situations (e.g., clutch, victory, or hacking) that we clustered into 12 broader categories (e.g., positive performance outcomes, underperforming, and technical issues). Gamers reported similar (rather than specific) situations for anger and sadness and similar for amusement and enthusiasm. We documented a wider than usually considered range of positive and negative emotions related to gaming along with specific gaming themes that produce these emotions. These findings contribute to a broader and more specific (events-based) understanding of the emotional aspects of video gaming.

Keywords: video games, positive emotions, negative emotions, LIWC

Highlights:

- We identified which gaming events produce anger, sadness, amusement, and enthusiasm.
- Semantic coding and affective words analysis documented the validity of identified events.
- These findings can be used by game developers to make informed decisions regarding emotions elicited by their games

1. Introduction

Gaming offers diverse emotional experiences ranging from intense positive emotions (e.g., amusement) to intense negative emotions (e.g., anger)[1]. However, research on gaming and emotions has been biased towards the negative consequences of playing videogames [2]. Studies have identified the game-design as one factor that elicits strong negative emotions [3,4,5,6]. For instance, the game's violent content (e.g., graphic presentation of death) is associated with increased emotional arousal observed at physiological and subjective level [3,4,5]. Whereas the darkness, presence of disfigured humans, and zombies are the most common stimuli eliciting fear while gaming [6]. Furthermore, studies identified specific gaming behaviors that elicit negative emotions such as poor communication, criticism within the team, underperforming, and losing matches that were expected to win [7, 8].

More recently, studies have started to emphasize the positive influences of video gaming on human emotional experience [9]. For instance, playing some videogames make gamers happier, less distressed, and less frustrated [10,11]. Gamers identified that making progress and successful performances elicit positive emotions [12]. Even playing violent games has the potential to increase positive emotions [1,13]. Gamers indicated that playing against 'evil' elicit positive emotions [14]. Although the emotions elicited by gaming situations might seem intuitive, studies on the emotional experience of playing first-person shooter games show its complexity. For instance, wounding and killing an opponent causes an increase of positive emotions that could result from the game's progress [15] but also leads to an increase of negative emotions like fear and anger that could result from shooting the rivals [16]. Similarly, wounding or killing one's character (a negative event in the game) leads to positive emotions that could result from alleviating the stress associated with playing [1], but also leads to negative emotions that could result from the game's failure [15].

Despite the growing body of research on video-gaming emotional consequences, little is known what scripts or specific in-game triggers elicit specific positive and negative emotions. Establishing a link between the behavioral content of gaming and specific affective outcomes is important to make informed decisions regarding the game use, game development, and treatment of gamers that exhibit problematic gaming patterns. For instance, in anger management therapy for gamers, practitioners might use the list of gaming situations that cause problematic behavior, such as rage-quitting - the act of disconnecting gaming equipment, sometimes violently [17]. Furthermore, gamers and their coaches might use a specific situation to train emotion regulation skills to enhance future performance. Finding new methods and strategies to facilitate performance is essential in esports. Players often present similar gaming skills, and winning or losing depends on peripheral factors such as emotions [18,19].To address these problems, we aimed to examine what behavioral scripts gamers associate with specific emotions using semantic coding. Furthermore, we investigated the descriptions of emotional experiences with computerized affective language analysis. Thus, our secondary aim was to determine whether gamers would use specific affective language to describe the emotional experiences.

In studying emotions, we focused on four types of emotions that resulted from the combination of two dimensions of emotional experience, namely valence and approach-avoidance tendencies [20]. Thus, we targeted amusement (positive affect, low approach tendency), enthusiasm (positive affect, high approach tendency), sadness (negative affect, low approach tendency), and anger (negative affect, high approach tendency). Considering both dimensions of emotional experience – valence and approach-avoidance tendencies - it is not yet clear which one is responsible for affective costs and benefits that gamers reap from gaming. This is not an extensive list of dimensions that characterize emotional experience (e.g., arousal or dominance)[21]. We start with valence because it is the most basic aspect of the emotional

experience. We contrasted it with the motivational tendency that is a rather novel and not fully investigated dimension that might be crucial in a gaming context. A recent study has shown that approach motivation directly influences gaming performance [22].

We expected that the gaming situations' descriptions would fit the core theme of the examined emotions. Amusement would be linked to humorous events that are mostly elicited by events that violate expectations due to others' actions [23]. Enthusiasm would be linked to opportunities for imminent resource acquisition [23]. Anger would be triggered by external factors that may harm (physically or psychologically) something important for an individual and impede the pursuit of a valuable goal [24]. Sadness would be linked to losses of an object or person to which individuals are very attached [24].

To study emotional scenarios that were related to gaming, we focused on one of the most popular PEGI 18 games *Counter-Strike: Global Offensive* (*CS:GO*). *CS:GO* is a multiplayer team-based first-person shooter where two teams compete against each other in simulated military combat. *CS:GO* is one of the leading games in the esports team-play category that engages up to 600,000 daily active players worldwide [25]. In this game, individuals form two teams with opposing motives: counter-terrorists vs. terrorists. The mission of the counter-terrorists is to disarm explosives planted by the terrorists or eliminate all terrorists.

2. Material and Methods

2.1 Participants

Participants were 652 *CS:GO* players (617 male gamers) in the age between 18 and 39 years (M = 20.75, SD = 3.58). Participants reported how many years ago they started to play *CS:GO* (M = 5.20, SD = 4.19), and how many hours per week they usually played (M = 19.57, SD = 19.81). A power analysis using G*Power 3.1 [26] indicated that detection of expected effect sizes [27] of d = 0.30 for the difference between the conditions, with the power of .80, would

require a sample size of 536 participants (139 per group). The study was in accordance with the Declaration of Helsinki and ethical guidelines provided by the National Science Centre in Poland. All participants were informed about the study, and all provided signed informed consent.

2.2 Procedure

Players were recruited via a Facebook advertisement targeted at *CS: GO* players in English-speaking countries. We created four groups and asked players to recall the moments of enthusiasm *(n = 162),* amusement *(n = 169),* sadness *(n =146),* or anger *(n =175)* that they experienced during *CS:GO* playing. Gamers were asked to think about moments of amusement (enthusiasm or sadness or anger) related to playing CS: GO. Furthermore, gamers were asked to think about situations when they felt intensely excited or zealous (enthusiasm), amused or entertained (amusement), sad or miserable (sadness), enraged or angry (anger) during the gameplay. We asked participants to write about one such situation focusing on emotions they felt while gaming.

2.3 Open Coding

To determine which situations elicited specific emotion, the gaming event descriptions were submitted to open coding. First, two judges coded the situations with keywords, to sum up what participants were sharing. In open coding, the text is coded to find as many codes as possible without considerations of relevance (e.g., "clutch", "hacking", “playing with friends” or “victory”) [28]. The specific events and situations constituted for identification of broader events categories based on their conceptual similarity (e.g., “successful performance”, “performance context”, “underperforming”, and “technical issues”) [28]. Raters assigned the statements to the appropriate categories. The interrater agreement was high (Krippendorff’s $\alpha = .84$). Finally, the raters resolved disagreements by consensus.

2.4 Affective Language Analysis

Measures of affective expressions were obtained by analyzing text (events descriptions) produced by gamers with Linguistic Inquiry and Word Count (LIWC) [29]. The program counts target words or word stems from an extensive dictionary and categorizes them into linguistic and affective dimensions. The software converts the raw counts to percentages of total words. Several research studies (involving the generation, expression, and regulation of emotions) have shown the validity of the LIWC [27,30]. To determine the characteristic affective style of reported situations, we performed multivariate ANOVAs with emotion categories as the independent variables and 12 LIWC categories as the dependent variables using SPSS 23 (Inc., Chicago, Illinois). Post hoc tests with Bonferroni correction for multiple comparisons were used to determine differences between the conditions. To account for multiple comparisons (e.g., the difference in positive emotions between amusement and enthusiasm, amusement and sadness, amusement and anger), we adjusted probability values using the false discovery rate (FDR) formula [31]. This resulted in adjusting confidence intervals to balance Type I and Type II error.

3. Results

3.1 Open Coding

Participants used from 1 to 229 words (M = 20.04, SD = 27.19) to describe events that elicited emotions during the gameplay. Gamers listed unique 87 situations clustered into 12 broader categories (Table 1). Amusing gamers' scenarios were related to performance context, humorous events, positive performance outcomes, successful performance, and underperforming (Table 1). Gamers mostly mentioned victories, skillful kills, winning clutch situations, playing with friends, and ridiculous shots. For enthusiasm, gamers described situations related to their successful performance, positive performance outcomes, performance context, and positive team performance (Table1). The most frequent situations were clutch play (a player wins a round after being the last man standing for their team), victories, and competitive matches.

Angry scenarios described by gamers were related to negative behaviors of own-team, negative performance outcomes, negative behaviors of rival-team, communication issues, underperforming, and technical issues (Table 1). Gamers pointed out situations such as playing with weak teammates, playing against hackers, someone sabotaging a team-play, internet lagging, losing the match, dying, or teammate throwing a game. Gamers reported sad situations that were related to negative performance outcomes, underperforming, negative behaviors of own-team, negative behaviors rival-team, and communication issues (Table 1). Gamers described losing situations, playing with weak teammates, losing the game that should be won, and underperforming. Sad events were characterized by more expressions related to sadness (e.g., grief, sad, miserable), risk (e.g., danger, doubt) compared to other conditions.

[Table 1 near here]

3.2 Affective Language Analysis

We found that participants characterized situations related to discrete emotions by using specific affective language, F (36, 1917) = 7.51, $p < .001$; Pillai's Trace = 0.37, partial $\eta^2 = .12$. (Table 2). Because of the significant results of the null hypothesis testing of equality of covariance matrices, Box's M = 3515.12, F (234, 870444.56) = 14.54, $p < .001$, we interpreted Pillai's Trace, not Wilks' λ. We observed differences between conditions for twelve affective language subcategories (Table 2). Descriptions of amusing situations had a higher percentage of expressions related to positive emotions (e.g., happy, relax, fun, laugh) than for anger conditions and more expressions related to friends (e.g., friend, mates, team) compared to sadness (Table 2). Descriptions of enthusiastic events had the highest percentage of expressions related to achievements (e.g., win, competitive, playing very well, comeback) compared to other conditions (Table 2). Situations related to enthusiasm were described with more positive emotions (e.g.,

pleasure, happy, amazing, ecstasy) compared to anger and sadness, and more expressions related to power (e.g., kill, fire, hit) compared to anger.

The description of the anger-provoking situation was characterized by more expressions of negative emotions (e.g., toxic, weakness, losing), anger (e.g., kick, smash, kill, annoyed, f**k), and social words (e.g., teammate, they, team) compared to enthusiasm (Table 2). Furthermore, situations related to sadness were described with more expressions related to negative emotions (e.g., bad, losing, rude), feelings (e.g., choke, feel), achievements (e.g., better, beat) compared to amusement (Table 2). Sad events were described with more words related to negative emotions compared to enthusiasm, and with more words related to feelings compared to anger.

[Table 2 near here]

4. Discussion

We aimed to identify gaming situations that elicit specific emotions while *CS:GO* gaming. We found that gamers produced descriptions that were grouped into several unique categories. We identified several core scenarios that are common in generating specific positive and negative emotions among gamers, such as ridiculous shots (amusement), clutching (enthusiasm), playing with weak teammates (anger), or deranking (sadness). Furthermore, we found meaningful differences in affective language used to describe these situations. These findings present a novel perspective on affective experience among gamers.

We found that specific gaming scenarios that elicited emotions in gamers fit the core characteristics of targeted emotions. For amusement, gamers reported mindless game mistakes or ridiculous shots during recreational gaming, whereas for enthusiasm, gamers reported successful games in competitive or tournament settings. For anger, gamers often reported unfair situations - hacking, cheating, trolling, smurfing. Finally, gamers reported losing as the most common saddening scenarios. In sum, we found typical situations that elicited amusement, anger,

enthusiasm, and sadness. Although it is not surprising, we found the replicative part of this research is essential because several analyses indicate that the effects reported in the psychological literature often fail to replicate [32].

Furthermore, we applied computerized text analysis to complement semantic coding that examined affective language used to describe gaming situations. In our study, gamers used specific language to characterize different gaming moments. Our findings extend the methodological perspective that language is an effective tool in detecting individuals' emotional states. We presented that this method is adequate for studying affective experience in video gamers. Future studies might progress with our findings to identify gamers' emotions from within the game communication between gamers. With new research technologies' maturation, their common use is likely to contribute to more versatile evidence and new research ideas.

Although we found several specific situations that elicited targeted emotions, we also found several similar situations that elicited anger and sadness (e.g., underperforming) and enthusiasm and amusement (e.g., successful performance). For both positive emotions, gamers mostly mentioned victories, skillful kills, and good performances such as the clutch play. For both negative emotions, gamers usually described defeating scenarios due to their poor performance, weak teammates, or other gamers' unfair behavior such as hacking. Furthermore, not all affective expressions categories presented expected patterns. For instance, there were no differences between amusement and sadness in positive words or anger and amusement in negative words. These findings are consistent with a constructionist view of emotion [33]. Within a constructionist framework, people construct emotions in their minds based on the similarities and differences in functions and purposes of specific actions. Therefore, affective reactivity is expected to vary within the discrete emotion and overlap with other discrete emotions from person to person. It is not the automatic, inherent response to the stimuli.

This study has practical implications. We presented situations that elicit specific emotions in *CS:GO*. Game developers may implement our findings to make games such as *CS:GO* more emotionally arousing or to streamline the affective experience towards specific emotions. For instance, by targeting a wider range of specific emotions, video games might offer a means to maintain high-quality entertainment. This is particularly important in increased social isolation and deficits in real-world entertainment, such as during the COVID-19 pandemic. Furthermore, gamers and their coaches might use our findings to create pre-performance emotion regulation strategies to enhance future performance. For instance, gamers might create personal clips presenting their best plays to elicit enthusiasm, which is effective tool for esport performance optimization [22]. Finally, our findings might be relevant to practitioners. Using our list, practitioners could target situations within gaming that cause problematic behavior. Practitioners might select specific situations related to problematic emotions and evaluate gamers' treatment progress when facing these situations.

4.1 Limitations and Future Directions

This study has several limitations. First, individuals self-selected to participate in our study. Thus, this study is more likely to overrepresent players highly involved in gaming. Second, we examined four emotions accounting for positive-negative and approach-avoidance dimensions of emotional experience. Including additional discrete emotions into the analyses (e.g., pride or fear) would provide a complete repertoire of emotional situations within the gameplay. Future studies may provide evidence, which specific moments make gamers experience pride, gratitude, contentment, or awe. Third, this study included participants from countries where English is the first language, such as the US, UK, or Australia. There are, however, likely cultural differences that might produce different results in participants residing in other countries and using different languages. Fourth, our participants were mostly male gamers. It reflects the situation among first-

person shooter-type gamers, where the vast majority, up to 93%, are male [34]. Therefore, our results apply to male gamers, whereas future studies might focus on whether the results generalize to female gamers. Female participants might reveal different experiences. Fifth, in this study, we focused only on the single-game context, namely *CS: GO* gamers. Although *CS:GO* represents the leading genre in esports competition – first-person shooter genre - future studies may examine whether emotional events are likely to translate well to other competitive games. This would help to identify emotion eliciting general situations for esports (i.e., problems with the computers) and specific situations for the particular games. Finally, we used self-reports while controlling for physiological or behavioral emotional reactions that would have provided further insights into the specific situation that elicit emotional experience.

4.2 Conclusion

Our research offers novel evidence and a detailed description that playing video games offers a versatile affective experience. With this study, we defocused from negative emotions typically studies in the context of first-person shooter games and extended the scope with positive emotions. We demonstrated that playing *CS:GO* offers a positive experience from recreational and competitive matches with other players. Using semantic coding and computerized affective text analysis, we found that similarities outweighed the differences within positive and within negative emotions. Gamers reported similar (rather than specific) situations for anger and sadness and similar for amusement and enthusiasm. Our study broadened the understanding of the affective costs and benefits that gamers reap from gaming. Knowing which specific gaming situations elicit specific emotions is important for the gaming community. Our findings may help make informed decisions regarding esport performance optimization and the treatment of problematic gaming behaviors.

5. Disclosure Statement: No potential competing interest was reported by the authors.

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Table 1

Emotional Categories, Events and their Frequency

Emotion	Category (Frequency)	Most popular events (Frequency)	Gamers quote
Amusement	Performance context (37%)	Playing with friends (15%), good communication (12%), close games (8%), recreational matches (7%), playing with low ranks (3%), kids yelling (2%)	"When I was playing in a team of 4 with my friends and one stranger. We were losing by a significant margin but decided to just have fun with it, so we joked along with the other player on our team and just tried to kill people in funny ways or would all play with a generally unadvisable strategy. It was funny and enjoyable/amusing because of how wrong the game was going but since we disengaged with trying our hardest to win (we weren't just throwing the game, just playing in unconventional ways) and instead just had a laugh."
	Humorous events (36%)	Ridiculous shots (15%), other stupid mistakes (7%), team-kill (5%), wall bang (2%)	
	Positive performance outcomes (35%)	Victory (34%), learning (2%)	
	Successful performance (33%)	Skilful kill (18%), clutch (15%), ninja defuse (3%)	
	Underperforming (11%)	Defeat (4%), death from falling (4%), whiffing (3%)	
Enthusiasm	Successful performance (71%)	Clutch (45%), skillful performance (24%), skillful kill (10%), bomb defuse (4%),	"This was my first time playing in a league with a real team, we had spent a good portion of the previous week practicing for this specific match. The match didn't end up going so well, we ended the half down 12-3. We rallied together and came back and made it to match point. We couldn't seem to close out the match and eventually 15-14. I was the last one left alive versus 4 other enemies. The intensity of this 1v4 was insane. My heart was essentially beating out of my chest. I clutched the round and we won. The feeling of excitement that was flowing through me was unreal, my team was enthusiastic the whole time, and after clutching we allot you screams
	Positive performance outcomes (38%)	Winning (32%), up-ranking (5%), learning (1%)	
	Performance context (33%)	Competitive games (12%), close matches (10%), playing with friends (7%), match beginning (2%) pressure (2%),	
	Positive team performance (13%)	Successful team performance (10%), good cooperation 6%)	

			and yells of excitement. Such an enjoyable moment of victory."
Anger	Negative own team (43%)	Weak teammates (27%), team sabotage (15%), throwing the game (7%)	"When I play against a cheater. I can't leave the game because I risk a temporary ban, I can't win the game because the enemy cheating. Only wait and rage. I feel really angry in this situation because I can't do anything, and I think about *Valve* who do nothing against cheats. Sometimes I only want to teleport myself in the cheater room and destroy his face in his computer."
	Negative performance outcomes (28%)	Defeat (10%), dying (9%), killed by headshot (4%), losing a clutch (3%)	
	Negative rival-team (20%)	Hacking (18%), trolling (2%), smurfing (1%), exiting the game (1%)	
	Communication (16%)	Cursing and criticizing (7%), toxic behavior (7%), racism (2%), power abuse (1%)	
	Underperforming (14%)	Silly mistake (6%), losing a game that should be won (4%), lack of control (2%)	
	Technical issues (13%)	Internet lagging (10%), game-bugs (3%), invisible shots (2%)	
Sadness	Negative performance outcomes (45%)	Defeat (29%), derank (8%), losing close match (6%), losing a clutch (2%)	"A game on overpass where we almost beat a hacker. It had been fairly obvious from the start of the game but due to them being a bad player that is just aim botting me and my friend could easily out play them with game sense. When we got to 14-11 to our team, he began rage hacking meaning we couldn't win, very saddening knowing we could have won even when he was cheating. It made me so sad I didn't want to play anymore."
	Underperforming (25%)	Underperformance (12%), losing a game that should be won (9%), tilt (3%), silly mistake (3%), killing teammates (1%)	
	Negative own team (17%)	Weak teammates (15%), throwing the game (3%)	
	Never (10%)		
	Negative rival-team (9%)	Hacking (7%),	
	Communication (7%)	Toxic behavior (6%), racism (2%), insulting (7%)	

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Table 2

Text Analysis of the Emotional Situations During the Gameplay

LIWC subcategories	*F*	η^2	Post hoc
Positive emotions	15.70***	0.08	E>An***, E>S***, Am>An**
Negative emotions	28.21***	0.12	An>E***, S>Am***, S>E***
Anger	6.55***	0.03	An> E***
Sadness	37.40***	0.15	S>E***, S>Am***, S>An***
Social	6.33***	0.03	An>E***
Friend	5.44**	0.02	Am>S***
Feeling	8.29***	0.04	S>Am***, S>An***
Achievement	10.64***	0.04	S>Am***
Power	7.66***	0.04	E>An***
Reward	11.41***	0.05	E>Am***, E>An***, E>S***,
Risk	18.13***	0.08	S>E***, S>Am***, S>An***
Work	4.92**	0.02	

Note. Significance adjusted for FDR. Am = Amusement, An = Anger, E = Enthusiasm, S = Sadness. *Df*s for ANOVAs = 3, 648.

**$p < .01$, ***$p < .001$.

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