International Journal of Mental Health and Addiction
https://doi.org/10.1007/s11469-019-00070-9

ORIGINAL ARTICLE

Near Miss in a Video Game: an Experimental Study

Turi Reiten Finserås[1] · Elfrid Krossbakken[2] · Ståle Pallesen[2] · Rune Mentzoni[2] · Daniel L. King[3] · Mark D. Griffiths[4] · Helge Molde[1]

Published online: 29 March 2019

Abstract

Models to explain persistent and excessive gaming behavior have proposed that reward characteristics in video games influence gaming behavior, yet these characteristics have received minimal empirical attention to date. The present study employed an experimental approach to examine how a near miss and other different outcomes (a win or loss with small and large margin, respectively) influence gaming behavior and subjective experiences and evaluations of the game. A total of 40 participants competed against four avatars in a counterbalanced repeated measure design with four scenarios: (a) losing by a large margin, (b) losing by a small margin, (c) winning by a small margin, and (d) winning by a large margin. Outcome measurements included the urge to continue playing, affective response, game evaluation, and regret. Repeated measure ANOVAs with post hoc tests were employed to assess outcomes across the scenarios. Participants reported greater frustration and regret when losing compared to winning and tended to evaluate the games they won more positively than the games they lost. Participants felt more bored and less excited when they experienced a near miss compared to winning by a large margin. The results show that winning in video games influences players' experiences and perceptions differently than losing.

Keywords Gaming · Reward characteristics · Structural characteristics · Near miss · Internet gaming disorder · Video game psychology

Video gaming has become one of the most popular recreational activities for children, adolescents, and adults. For example, it has been reported that 59% of all Americans play video games (Entertainment Software Association 2014) and that 48% of Europeans have played video games (Entertainment Software Association 2012). Video games offer diverse

✉ Turi Reiten Finserås
tfi043@uib.no

[1] Department of Clinical Psychology, University of Bergen, Christies gate 12, 5015 Bergen, Norway

[2] Department of Psychosocial Science, University of Bergen, Bergen, Norway

[3] School of Psychology, The University of Adelaide, Adelaide, Australia

[4] School of Social Sciences, Nottingham Trent University, Nottingham, UK

playing experiences where players feel motivated, can develop skills, and be social (King et al. 2010). However, a small minority of players may develop problems due to over-involvement in gaming. While the etiology of Internet gaming disorder, proposed as a health condition for further study, is complex and involves multiple factors (Brand et al. 2016), the nature of games themselves is often recognized as a factor in the development of persistent gaming behavior (Griffiths and Nuyens 2017). Currently, little is known about how the different features within video games may contribute to problematic video game playing.

Research on gambling has revealed that structural characteristics can influence a person's behavior or thought processes while gambling (Parke and Griffiths 2007). A review identified reward characteristics as one of the six major categories of structural characteristics that can be found within gambling products (Parke and Griffiths 2007). Reward characteristics concern the various ways in which rewards are provided and how they influence gambling behavior. Although it is assumed that reward characteristics can also play an important role in excessive gaming, the empirical evidence on this topic is limited, and to the best of the authors' knowledge, only three experimental studies on this topic have been published to date (Bracken and Skalski 2009; Chumbley and Griffiths 2006; Wolfson and Case 2000). One paper on this topic concluded that this research area would benefit from a more rigorous study of the features within video games, particularly those pertaining to the reward delivery systems (King et al. 2010).

In a taxonomy of structural characteristics in video games (King et al. 2010), reward and punishment features were one of the five types of characteristics referring to "the ways in which players are reinforced for skillful play (i.e., winning) and punished for losing" (pp. 99). Punishment features demonstrate to the player that skill is needed in order to master the game, and they establish the worth of in-game rewards. However, video games are generally positively reinforcing and somewhat negatively reinforcing because video game developers want to reinforce players' actions and decision to play (King et al. 2010). In general, a video game with more reward features than punishment features should generate more positive evaluations from players.

Reward mechanisms may evoke positive emotions in gamers, while punishment features may evoke negative emotions. One experimental study on video games showed that a more difficult game scenario resulting in more experiences of failure caused less excitement, more frustration, and more boredom compared to an easier game scenario with fewer failure experiences (Chumbley and Griffiths 2006). In addition, the feeling of regret may occur when a player makes a mistake in a video game that results in a losing outcome (Loftus and Loftus 1983). Consequently, losing in a video game is expected to be associated with more regret than winning.

A specific reward characteristic that has been studied in gambling is the "near miss," which refers to the perception of a gambling-related outcome as being close to winning (Reid 1986). Studies have shown that near misses maintain gambling behavior (Sundali et al. 2012) and may also trigger activity in brain reward centers (i.e., dopaminergic pathways) similar to those associated with winning (Habib and Dixon 2010). In keeping with this, an interview study indicated that near-miss effects may not be limited to gambling, as gamers have reported experiencing the near-miss phenomenon and that this motivates them to continue gaming (Karlsen 2011). A recent study on the video game *Candy Crush* found that participants experienced a greater urge to continue playing and more feelings of frustration when they experienced the near-miss event (Larche et al. 2017).

In order to develop and increase understanding of factors that contribute to problematic video game playing, research on reward characteristics in video games is needed. The present study examined how big and small wins and big and small losses affect participants' evaluation of the video game, regret, urge to continue playing, and affect. The hypotheses were as follows: (i) winning will yield a more positive affect than losing, (ii) winning will yield a better evaluation of the game than losing, (iii) losing by a small margin will yield a higher urge compared to the other three scenarios, and (iv) losing will yield higher regret than winning.

Method

Participants

A total of 40 students (21 females) from the University of Bergen and Bergen University College participated. The mean age was 22.1 years (range 19–32 years), and 22.5% reported playing video games daily or almost daily, while 37.5% reported playing 1 day a month or less.

Procedure

The study was conducted at the University of Bergen and carried out during the last quarter of 2016. Participants played a cycling video game which was reprogrammed from an existing commercial game (TurboTape Games 2015). The original *Full Cycle* is a tactical racing game where the player controls a cyclist who is part of a cycling team (Full Cycle n.d.). The experimental version was adjusted by the original developers in collaboration with the authors, so that the participants competed solo against four computer cyclists. The game comprised five different tracks where one was used as a tutorial. The game was played on a Windows computer (Dell OptiPlex 9020) connected to a PC monitor (Asus VG248 24″) and using an Xbox 360 controller. Figures 1 and 2 depict screen shots from the game.

The experiment consisted of a counterbalanced repeated measure design with four scenarios: (a) losing by a large margin (~ 10 s), (b) losing by a small margin (~ 0.5 s) (i.e., the "near miss" scenario), (c) winning by a small margin (~ 0.5 s), and (d) winning by a large margin (~ 10 s). Several pilot tests were carried out to ensure that participants were not able to spot the experimental manipulation (that the outcome was set in advance). The scenarios (a–d) were counterbalanced according to a Latin square approach with four different orders of scenarios. More specifically, each scenario occurred once in every order and a specific scenario preceded and followed another specific scenario once in the matrix (i.e., cbad, bdca, dabc, acdb) (Kirk 1995). Four participants at a time were randomized to one of the four scenario orders by a randomization calculator (www.randomizer.org). Before participating, all participants completed a questionnaire about demographic variables and watched an informational short video about how the game worked. The participants then played a test track in order to familiarize themselves with the game. It was possible to play the test track three times before moving on to the experimental scenarios. On each track, the participants were able to choose and pick up different objects that could either speed them up or slow them down. The participants had to choose the correct object in order to get ahead. However, the objects did not affect the final outcome of the game. After playing on each of the four tracks, the participants completed a

Fig. 1 Track 4 start area and track 2 finish line

questionnaire assessing how they evaluated the track, how much urge they had to continue playing, mood state, and regret for choices made in the track. Each participant received a gift voucher worth NOK 400 (approx. USD 48) following completion of the experiment.

Instruments

The Bergen Evaluation of Games Scale (BEGS), comprising nine items, was used to assess how participants evaluated each track (Mentzoni et al. 2012). Respondents indicated their responses on a seven-point scale (from 1 = completely disagree to 7 = completely agree). Internal consistency (Cronbach's alpha) for the scale in the present study ranged between .90 and .92 for the four scenarios. Higher scores reflect more positive evaluations. BEGS is reproduced in Appendix A.

A visual analogue scale was used to assess the urge to continue playing after each track. The scale was 100 mm. One end was marked with 0 (weak urge) and at the other with 10 (strong urge).

A seven-point Likert scale was used to assess participants' moods after completion of each track by asking to what extent the participant had experienced specific feelings (1 = completely disagree and 7 = completely agree) reflecting negative reactions (four items: frustration, irritation, boredom, restlessness) and positive reactions (four items: excitement, energy, relaxation, calm) (Chumbley and Griffiths 2006). The adjectives were divided in to four groups based on high positive inter-item correlations ranging from .55–.95 ($p = 0.01$): frustration (frustration and irritation), boredom (boredom and restlessness), excitement (excitement and energy), and calmness (relaxation and calm) (Chumbley and Griffiths 2006).

The Bergen Regret After Game Scale (BRAGS) was constructed for the purpose of the present study and comprises 11 items. BRAGS was inspired by the Regret Scale (Schwartz et al. 2002), which comprises five items. Respondents indicated their responses on a seven-point Likert scale (from 1 = completely disagree to 7 = completely agree). Internal consistency (Cronbach's alpha) for the scale in the present study ranged from .91 to .94 across the four scenarios. The higher the score, the more regret. BRAGS is reproduced in the Appendix B.

Power Analysis

Power analysis was conducted with G*Power 3.17 (Faul et al. 2007). Setting the effect size (d) to .50 (medium), alpha to .05, and power to .90 revealed that at least 30 participants would be needed in order to detect statistical significant effects.

Statistics

The statistical analysis was conducted using IBM SPSS Statistics, version 25. Descriptive statistics of all variables were calculated. Means were calculated for time of completion in each scenario, urge to continue playing, mood (frustration, boredom, excitement, calm), evaluation, and regret within the four scenarios. Repeated measure ANOVAs were performed where outcome of the game comprised the independent variable, and evaluation of the game, urge to continue playing, mood, and regret were dependent variables. Bonferroni correction was used to adjust for multiple comparisons. Cohen's d was calculated in order to determine the effect sizes of the results. As a benchmark for interpreting d, 0.2 is regarded as small, 0.5 is regarded as medium, and 0.8 is regarded as a large effect size, respectively (Cohen 1988).

Results

Table 1 shows results of the within-participant effects from the repeated measure ANOVAs. Mauchly's test of sphericity indicated that the assumption of sphericity had been violated for track time ($\chi^2(5) = 13.09$, $p < .02$), frustration ($\chi^2(5) = 12.09$, $p < .03$), and boredom ($\chi^2(5) = 18.94$, $p < .002$); therefore, Greenhouse–Geisser correction was used. Results from the repeated measure ANOVAs indicated that participants rated frustration, boredom, excitement, calmness, evaluation, and regret differently across scenarios. The duration of the tracks was significantly different across scenarios ($F(3,117) = 4.68$, $p < .05$), but ANCOVA analyses showed that this did not affect the findings (detailed results are not reported here but are available on request).

Table 1 Within-subject effects in repeated measure in ANOVA

	Mean (SD)					
	Small win	Big win	Small loss	Big loss	*df*, *df* error	*F*
Track time[a]	4.07 (0.33)	4.09 (0.3)	4.28 (0.36)	4.32 (0.35)	3, 117	4.68**
Urge	3.91 (2.55)	4.26 (2.5)	3.91 (2.46)	4.24 (2.51)	3, 117	.95
Frustration	3.5 (2.24)	3.03 (1.86)	5.65 (3.24)	5.5 (3.46)	2.52, 117	15.47**
Boredom[a]	4.9 (2.45)	4.7 (2.34)	5.53 (2.51)	5.73 (3.0)	2.31, 114	3.15*
Excitement	7.93 (2.27)	8.13 (2.56)	7.0 (2.36)	7.13 (2.24)	3, 117	4.83**
Calm	7.48 (3.24)	8.2 (2.97)	7.2 (3.1)	8.45 (3.06)	3, 117	3.59*
Evaluation	40.4 (8.48)	42.15 (8.22)	33.33 (9.54)	35.18 (9.26)	3, 114	11.84**
Regret	32.7 (11.93)	29.5 (11.26)	43.9 (14.89)	44.28 (14.54)	3, 111	21.43**

*$p < .05$; **$p < .01$

[a]Greenhouse–Geisser correction

Table 2 shows pairwise comparisons based on the repeated measure ANOVA which demonstrated statistically significant differences across scenarios. Participants reported feeling more frustrated and more regret when they lost compared to when they won. They evaluated the game more positively when they won in comparison with when they lost. Participants also reported feeling more boredom and less excitement when they experienced a small win (~ 0.5 s) compared to a big loss (~ 10 s). No statistically significant differences were found between small and big wins, or small and big losses. Of the statistically significant results, the largest effect was for regret (big win vs. small win; $d = .38$) and the smallest was for evaluation (small win vs. big loss; $d = .20$).

Discussion

The aim of the present study was to investigate the influence of different reward scenarios on gaming-related perceptions and behaviors. In line with previous findings, winning scenarios elicited more excitement, but less boredom and frustration than losing (Chumbley and Griffiths 2006), which supported hypothesis 1. There were no significant differences in terms of calmness, which was also in line with previous findings (Chumbley and Griffiths 2006). The

Table 2 Pairwise comparisons between the different scenarios (small win, big win, small loss, and big loss) and the independent variables (urge to continue playing, frustration, boredom, excitement, calm, evaluation and regret)

	Small win/ small loss Cohen's *d*	Small win/ big win Cohen's *d*	Small win/ big loss Cohen's *d*	Big win/ small loss Cohen's *d*	Small loss/ big loss Cohen's *d*	Big win/ big loss Cohen's *d*
Urge	.00	.06	.04	.06	.04	.01
Frustration	.28**	.06	.25**	.34**	.03	.32**
Boredom	.08	.03	.12	.12*	.03	.13
Excitement	.13	.03	.12	.16*	.01	.15
Calm	.03	.08	.11	.11	.15	.03
Evaluation	.28**	.07	.20*	.35**	.08	.27**
Regret	.28**	.08	.30**	.36**	.02	.38**

*$p < .05$; **$p < .01$

scenarios associated with winning outcomes tended to evoke more positive evaluations (e.g., enjoyed playing the game), as predicted in hypothesis 2. This supports the assumption that players tend to enjoy playing video games if they are more positively reinforcing. Participants tended to regret their decisions more when they lost, compared to when they won. This supports the notion that regret occurs when the player experiences a losing outcome (Loftus and Loftus 1983) and supports hypothesis 4. These results suggest that punishment features make participants believe they should have done something different in order to win. There were no statistical differences between small and big wins or between small and big losses in any of the outcomes. This suggests that the size of the win or loss is less significant than that of winning or losing, per se. Taken together, the results suggest that reward mechanisms create a sense of mastering the game.

There were no statistically significant differences between scenarios regarding the urge to continue playing in the present study, which means that hypothesis 3 was not supported. Thereby, as opposed to the results of previous studies (Habib and Dixon 2010; Karlsen 2011), no support for the near-miss effect in relation to the urge to continue playing was found. However, the participants interviewed in Karlsen's study were excessive players of *World of Warcraft*, a massively multiplayer online role-playing game (MMORPG). As the participants were excessive players, they might have had greater reward sensitivity than the participants in the present study, which might explain why the former experienced the near-miss effect (Brand et al. 2016). The game studied by Karlsen (2011) is also more complex, as his participants played at home, and because he used a retrospective interview design, in sum making his study difficult to compare directly to the present one.

It is also possible that the near-miss effect might more readily occur for gamers who play games over-extended periods, as their skill level improves and they become more psychologically engaged. In the present study, the participants did not have as much time and effort invested in the game, as opposed to the gamers in the previous studies (Habib and Dixon 2010; Karlsen 2011), and thus had limited time to improve their skill level and become invested in the game. As such, the near miss might have been experienced in another way in the present study, such as the desire to meet the expectations of the research situation (e.g., demand characteristics). This may explain why participants in the present study felt more bored and less excited when comparing the near miss to the big win. Furthermore, both *World of Warcraft* and *Candy Crush* are very different video games structurally in comparison to the bicycle racing game used in the present study. The near-miss effect might only be present in specific types of video games.

Clinical Implications

Although this study concerns basic reward scenarios, the results have some clinical and public health implications. Knowledge about how wins and losses affects players' evaluation of games, their mood, and regret can be used in terms of psychoeducation, just as knowledge about reinforcement schedules has educated interventions for pathological gambling (Hansen 2006). Furthermore, knowledge about reward characteristics in video games may pave the way for similar preventive efforts. Within the gambling field, structural restrictions have been implemented in order to reduce problems with some success (Auer and Griffiths 2013). For video games, this could comprise restrictions, regulations, and the use of warning labels for video games with structural elements known to trigger excessive and addictive behavior in some gamers. However, more knowledge is needed in order to determine if this is feasible.

Strengths and Limitations

The present study has several limitations of note. The regret scale that was used in the present study has not been validated previously. However, its Cronbach's alpha values were high, suggesting that the scale has good internal consistency. Although there were a low number of participants in the present study, power analysis indicated that the number of participants was adequate. Furthermore, all participants were from a student population and therefore not representative of the general population. A benefit in the present study was that an existing commercial game was used in the experiment as opposed to an artificial game created specifically for the experiment. However, because of the experimental design, the ecological validity was still low. No manipulation checks were conducted after the experiment, which means that participants may have noticed the differences between scenarios. However, the pilot tests carried out prior to the experiment showed no manipulation detection. The fact that a repeated measure design was used implied that individual idiosyncrasy in terms of game experience and evaluation did not influence the findings. Further studies should replicate the present study with the playing of other types of video games and with other populations of gamers. Additionally, studies on other game reward characteristics (e.g., sound effects, identification with avatar, etc.) should receive empirical attention in the future.

Conclusion

The results of the present study demonstrate that reward characteristics for video games influence players' evaluation of the game, their mood state, and feelings of regret. Video games often include an array of winning and losing situations that are likely to evoke different perceptions and mood states. This variability may be part of the appeal of the activity that develops players' reward sensitivity. Furthermore, video games may be designed with sophisticated systems to elicit different scenarios under the guise that the player believes that their skill affects the outcome. Knowledge about game reward scenarios can help us better understand maintenance of excessive and pathological video game playing.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Appendix A

The Bergen Evaluation of Games Scale (BEGS)

Below, you will find a list of claims regarding the game you just played. Please read every claim carefully and rate the degree to which you agree or disagree by circling the appropriate number (1–7).

1. All in all, I enjoyed playing the game.
   Completely disagree 1 2 3 4 5 6 7 Completely agree

2. The game was a positive experience for me.
   Completely disagree 1 2 3 4 5 6 7 Completely agree
3. The speed of the game suited me fine.
   Completely disagree 1 2 3 4 5 6 7 Completely agree
4. I would recommend the game to a friend.
   Completely disagree 1 2 3 4 5 6 7 Completely agree
5. If given the opportunity, I would like to play the game again.
   Completely disagree 1 2 3 4 5 6 7 Completely agree
6. The game did not suit me
   Completely disagree 1 2 3 4 5 6 7 Completely agree
7. I was quickly bored by the game.
   Completely disagree 1 2 3 4 5 6 7 Completely agree
8. I was engaged by the game.
   Completely disagree 1 2 3 4 5 6 7 Completely agree
   Items 6 and 7 are reverse scored.

Appendix B

The Bergen Regret After Game Scale (BRAGS)

Below, you will find a list of statements that we wonder wether apply to you now that you have played the cycle game. Please read each statement carefully and indicate how much you agree or disagree by marking the appropriate number (1–7).

a. I am thinking about how I could have played better.
Completely disagree 1 2 3 4 5 7 Completely agree
b. If I were able to play again, I would change a number of things about the way I played.
Completely disagree 1 2 3 4 5 7 Completely agree
c. I am thinking about the choices I made during the game, and feel I should have done things differently.
Completely disagree 1 2 3 4 5 7 Completely agree
d. I believe I made some stupid decisions during the game.
Completely disagree 1 2 3 4 5 7 Completely agree
e. I am not thinking about how I played, or the choices I made.
Completely disagree 1 2 3 4 5 7 Completely agree
f. I wish I could have mastered the game better.
Completely disagree 1 2 3 4 5 7 Completely agree
g. I am annoyed about some of the things I did during the game.
Completely disagree 1 2 3 4 5 7 Completely agree
h. I now realize I should have done some things differently in the game.
Completely disagree 1 2 3 4 5 7 Completely agree
i. I should have chosen a different strategy than I did in the game.
Completely disagree 1 2 3 4 5 7 Completely agree
j. I am angry with myself due to mistakes I made during the game.
Completely disagree 1 2 3 4 5 7 Completely agree
k. I wish I could have been able to play again, so I could avoid the mistakes I made in the game.

Completely disagree 1 2 3 4 5 7 Completely agree
Item e is reverse scored.

References

Auer, M., & Griffiths, M. (2013). Voluntary limit setting and player choice in most intense online gamblers: An empirical study of gambling behaviour. *Journal of Gambling Studies, 29*, 647–660. https://doi.org/10.1007/s10899-012-9332-y.

Bracken, C. C., & Skalski, P. (2009). Telepresence and video games: The impact of image quality. *PsychNology Journal, 7*(1), 101–112.

Brand, M., Young, K. S., Laier, C., Wölfling, K., & Potenza, M. N. (2016). Integrating psychological and neurobiological considerations regarding the development and maintenance of specific internet-use disorders: An interaction of person-affect-cognition-execution (I-PACE) model. *Neuroscience and Biobehavioral Reviews, 71*, 252–266. https://doi.org/10.1016/j.neubiorev.2016.08.033.

Chumbley, J., & Griffiths, M. (2006). Affect and the computer game player: The effect of gender, personality, and game reinforcement structure on affective responses to computer game-play. *Cyberpsychology & Behavior, 9*, 308–316. https://doi.org/10.1089/cpb.2006.9.308.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York, NY: Lawrerence Erlbaum Associates.

Entertainment Software Association. (2012). Videogames in Europe: Consumer study. *European summary report*. http://www.isfe.eu/sites/isfe.eu/files/attachments/euro_summary_-_isfe_consumer_study.pdf. Accessed April 20 2018.

Entertainment Software Association. (2014). *The 2014 essential facts about the computer and video game industry*. http://www.theesa.com/wp-content/uploads/2014/10/ESA_EF_2014.pdf. Accessed April 20 2018.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191. https://doi.org/10.3758/BF03193146.

Full Cycle. (n.d.) *In Facebook [Game page]*. https://www.facebook.com/fullcyclegame/. Accessed April 20 2018.

Griffiths, M. D., & Nuyens, F. (2017). An overview of structural characteristics in problematic video game playing. *Current Addiction Reports, 4*, 272–283. https://doi.org/10.1007/s40429-017-0162-y.

Habib, R., & Dixon, M. R. (2010). Neurobehavioral evidence for the "near-miss" effect in pathological gamblers. *Journal of the Experimental Analysis of Behavior, 93*, 313–328. https://doi.org/10.1901/jeab.2010.93-313.

Hansen, M. (2006). Treatment of problem and pathological gambling in the Nordic countries: Where we are now and where do we go next? *Journal of Gambling Issues*, (18), 91–105. https://doi.org/10.4309/jgi.2006.18.2.

Karlsen, F. (2011). Entrapment and near miss: A comparative analysis of psycho-structural elements in gambling games and massively multiplayer online role-playing game. *International Journal of Mental Health and Addiction, 9*, 193–207. https://doi.org/10.1007/s11469-010-9277-2.

King, D., Delfabbro, P., & Griffiths, M. (2010). Video game structural characteristics: A new psychological taxonomy. *International Journal of Mental Health and Addiction, 8*, 90–106. https://doi.org/10.1007/s11469-009-9206-4.

Kirk RE. (1995) *Experimental design. Procedures for the behavioral sciences* Belmont, CA: Books/Cole Publishing Company.

Larche, C., Musielak, N., & Dixon, M. (2017). The candy crush sweet tooth: How 'near-misses' in candy crush increase frustration, and the urge to continue gameplay. *Journal of Gambling Studies, 33*, 599–615. https://doi.org/10.1007/s10899-016-9633-7.

Loftus, G. R., & Loftus, E. F. (1983). *Mind at play; the psychology of video games*. New York, NY: Basic Books, Inc.

Mentzoni, R. A., Laberg, J. C., Brunborg, G. S., Molde, H., & Pallesen, S. (2012). Tempo in electronic gaming machines affects behavior among at-risk gamblers. *Journal of Behavioral Addictions, 1*, 135–139. https://doi.org/10.1556/JBA.1.2012.004.

Parke, J., & Griffiths, M. D. (2007). The role of structural characteristics in gambling. In G. Smith, D. C. Hodgins, & J. R. Williams (Eds.), *Research and measurement issues in gambling studies* (pp. 217–249). London: Academic Press.

Reid, R. L. (1986). The psychology of the near miss. *Journal of Gambling Behavior, 2*, 32–39.

Schwartz, B., Ward, A., Monterosso, J., Lyubomirsky, S., White, K., & Lehman, D. R. (2002). Maximizing versus satisficing: Happiness is a matter of choice. *Journal of Personality and Social Psychology, 83*, 1178–1197. https://doi.org/10.1037//0022-3514.83.5.1178.

Sundali, J. A., Safford, A. H., & Croson, R. (2012). The impact of near-miss events on betting behavior: An examination of casino rapid roulette play. *Judgment and Decision making, 7*(6), 768–778.

TurboTape Games AS. (2015). Full Cycle (PC game). Bergen, Norway: TurboTape Games AS.

Wolfson, S., & Case, G. (2000). The effects of sound and colour on responses to a computer game. *Interacting with Computers, 13*, 183–192. https://doi.org/10.1016/S0953-5438(00)00037-0.