

Frustration Buddy: Using An Interactive Stress Ball To Control Frustration In Online Games

Michel Wijkstra
 Departement of Information and
 Computing Science
 Utrecht University
 Utrecht, Utrecht, Netherlands
 m.wijkstra@uu.nl

Remco C. Veltkamp
 Department of Information and
 Computing Sciences
 Utrecht University
 Utrecht, Utrecht, Netherlands
 r.c.veltkamp@uu.nl

Julian Frommel
 Departement of Information and
 Computing Science
 Utrecht University
 Utrecht, Utrecht, Netherlands
 j.frommel@uu.nl

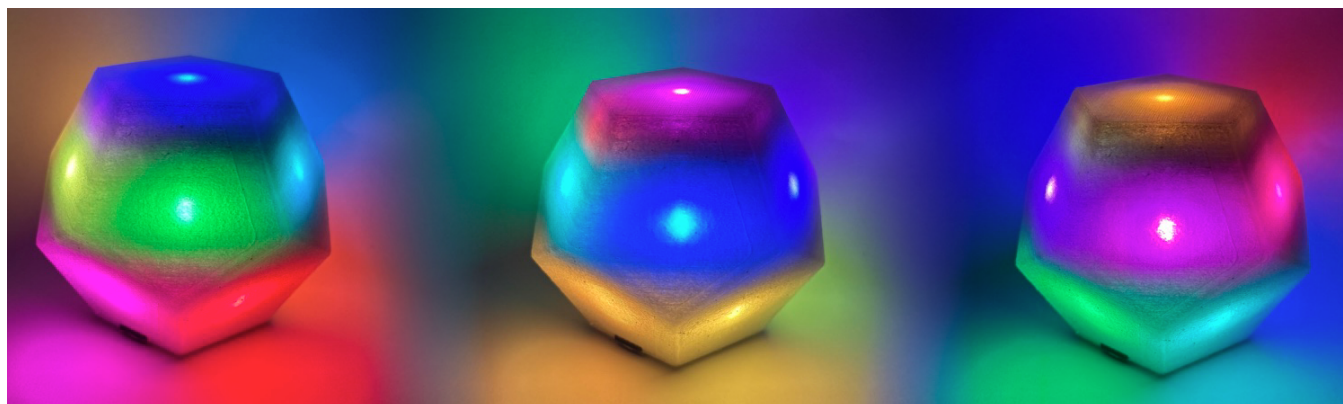


Figure 1: We present *Frustration Buddy*, an interactive stress ball to manage frustration from playing online games. This figure demonstrates different frames of the soothing animation used to calm the player.

Abstract

Players of online video games often experience frustration during their gaming sessions, for example, because of the competitive nature, high pressure, or toxic behaviors of others. Managing this frustration is important but often difficult because games are designed to keep players' attention and engagement. In this interactivity, we reflect on the design process of *Frustration Buddy*, a novel system for managing frustration in online games. We leverage the concept of distraction by using light and sound signals to transfer a player's frustration to a smart stress ball device. By moving their frustration from the stressor to a soothing device, we enable them to regain control over their emotions. By managing these complex emotions, we prevent the loss of enjoyment in the video game and could potentially prevent that frustration escalates into other more serious harms like toxic behavior.

CCS Concepts

• **Human-centered computing** → **Haptic devices**; **Collaborative and social computing**; • **Applied computing** → **Computer games**; • **Software and its engineering** → **Interactive games**.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).
 CHI PLAY Companion '25, Pittsburgh, PA, USA
 © 2025 Copyright held by the owner/author(s).
 ACM ISBN 979-8-4007-2023-9/25/10
<https://doi.org/10.1145/3744736.3749193>

Keywords

frustration, online games, distraction, soothing, light and sound signals, coping, emotion regulation, toxicity

ACM Reference Format:

Michel Wijkstra, Remco C. Veltkamp, and Julian Frommel. 2025. Frustration Buddy: Using An Interactive Stress Ball To Control Frustration In Online Games. In *Companion Proceedings Annual Symposium on Computer-Human Interaction in Play (CHI PLAY Companion '25)*, October 13–16, 2025, Pittsburgh, PA, USA. ACM, New York, NY, USA, 6 pages. <https://doi.org/10.1145/3744736.3749193>

1 Introduction

Online gaming is one of the most common hobbies for people all across the world [2, 6]. Many players find enjoyment [12], social connectedness [33], feelings of success [18], and challenge [16] in these games. However, games can also lead to frustration because of their challenging nature and sometimes unsupportive, unfriendly, or even hostile co-players. Frustration of psychological needs (based on self-determination theory; see Section 2) in online gaming has been linked to various negative effects, including problematic gaming, daily stress, gaming-related escapism (i.e., redirecting one's full attention to a specific behavior to avoid their real life), and exit intentions (i.e., losing interest in gaming when things do not go well) [23, 29]. Experiencing excessive frustration in games can also lead to the player finding ways to vent their frustration, often into the game world. In online games, toxic behavior, i.e., "*disruptive behaviors that are perceived as harmful by others*" [19], is a

common and persistent problem [31, 32], and prior work has suggested that toxicity can be a result of negative emotions such as frustration [28, 38], highlighting the need to combat frustration earlier.

It is important for players to manage frustration to prevent negative effects on their own well-being and resulting toxicity. However, this is not always easy. Games are a demanding medium, especially because they require the players' attention and keep them engaged [11]. This demand for attention, is an integral part to an enjoyable gaming experience, but also a source of frustration [11]. Due to this, players may have a hard time breaking a loop of frustration without an external trigger, such as a distraction. However, there is no simple way of subtly distracting a player from the source of frustration.

In this interactivity, we present a first step towards better support for managing player frustration. We designed and developed *Frustration Buddy*, a smart stress ball device that briefly breaks the focus on the source of frustration and redirects it to the device in the real world. Our device distracts and soothes players using passive and active interactions and enables them to return to their gaming session with a better state of mind. This could help prevent harms to the players' well-being and escalation into toxicity.

2 Related Work

2.1 Frustration in Games

Many games are built on challenges, difficulty, and the risk of failure [18, 25]. This means that some of the sources of frustration are deeply intertwined with game design. For example, the game *DayZ* features permadeath, making a player lose their character and everything they worked for upon death. Allison et al. [3] found that, even though players do not enjoy permadeath, it gives them a sense of challenge and contributes to the experience of the game. On their own, challenge and frustration are not bad. Failure at challenges is an essential component of many games and their enjoyment [18, 25], while it is also associated with frustration when not resolved [18].

Frustration is also an important concept in self-determination theory [1, 36] that describes three basic psychological needs: autonomy, competence, and relatedness. We experience *need frustration* [4] when those basic psychological needs are undermined. Autonomy frustration involves feelings of being controlled, competence frustration refers to the feelings of failure and doubting of one's capability, and relatedness frustration refers to the feelings of loneliness and exclusion [4, 15, 29]. All of these types of need frustrations can be experienced while playing online games [4].

Another source for as well as the product of frustration is toxic behavior. Kou [30] found that some players might start to flame their teammates because of their intense frustration in the game, while they do not recognize their actions as toxic, potentially because toxicity is normalized in games [8]. Game developers often provide basic tools to manage toxic behavior (e.g., reporting) [19], however, these traditional intervention systems have not been effective at protecting players [39, 40]. Recent work by Kordyaka et al. [27] added further concern, stating that there might be a financial benefit in remaining passive for these developers. Thus, it may be valuable to explore proactive interventions to address toxicity [39, 40], for

example, by managing frustration before it escalates into toxic behavior.

2.2 Distraction, Emotion Regulation, and Self-Generated Touch

Frustration Buddy builds on the concepts of distraction, emotion regulation, and self-generated touch. Distraction significantly shapes our perception of the world. From a child captivated by a beeping toy to an adult fixated on a flashing advertisement, attention is constantly being pulled by external stimuli [10]. Light signals take advantage of the brain's selective processing of visual information, where standout features are prioritized due to cognitive limitations [17]. Consequently, sudden changes within our visual field involuntarily seize our attention [35]. This phenomenon is particularly evident with flashing objects, which effectively draw focus, especially in information-rich environments [22, 26]. Likewise, sound signals have a direct link to memory, disrupting simultaneous cognitive tasks, such as playing a game [5].

Emotion regulation is the act of applying efforts to influence one's emotional state [21]. By regulating emotions, one can, for example, be less influenced by frustrating situations or downplay annoyances to generally feel better. One model that describes emotion regulation is the "Process Model of Emotion Regulation" [20]. This model proposes multiple factors that can be modified in order to achieve changes in emotional states. One example is that one can modify the situation a person is in to influence its emotional impact. Following this model, we can also differentiate between intrinsic—when one attempts to control their own emotions—and extrinsic emotion regulation—when external factors affect one's emotions. Recently, Slovak et al. [37] proposed a comprehensive framework for designing emotion regulation interventions. The framework supports designers in making theory-informed decisions about intervention targets, strategic decisions regarding the technology-enabled intervention mechanisms to be included in the system, and practical decisions around the implementation of the selected intervention components.

Frustration Buddy builds on Gross's Process Model and Slovak's framework. Following these models, *Frustration Buddy* can be classified as external emotion regulation that helps players control their in-game frustration. *Frustration Buddy* can redirect one's attention with the goal of influencing one's emotional response through attentional deployment [20] as an experiential, on-the-spot intervention [37]. This is achieved through the distraction discussed earlier in this section. By distracting the player from negative situations that they face in games, we enable them to regain control of their emotions. Beyond the attentional deployment, *Frustration Buddy* further focuses on response modulation, i.e., influencing components of the emotional response after it has developed [20, 37], through the tangible nature of the device facilitating self-generated touch.

Self-generated touch is the act of experiencing touch initiated by oneself, e.g., the act of petting an animal [34] or squeezing a tennis racket when pressure is high [7]. Self-generated touch has been demonstrated to provide soothing when a person is anxious [9]. On a neurological level, it was found that self-generated touch engages the anxiety regulation mechanisms of the brain [14]. With

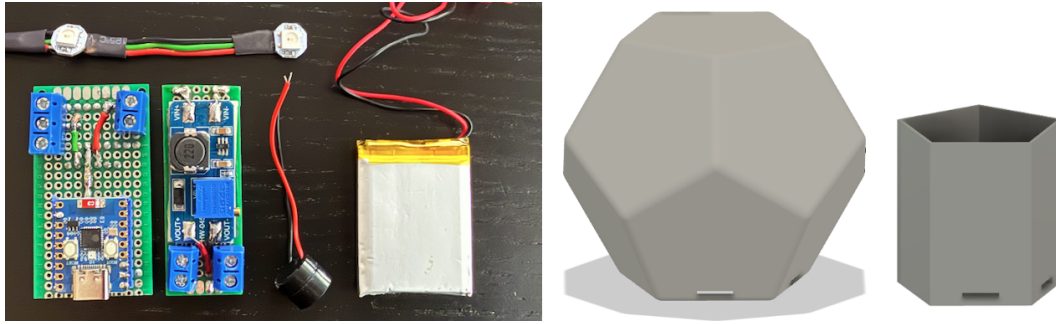


Figure 2: Left image: electrical system, from left to right: main board, power control board, speaker, battery. Up top: led string. Right image: outer shell (left) and inner shell (right)

Frustration Buddy, we support self-generated touch and leverage this anxiety regulation mechanism by allowing the player to touch, squeeze, and fidget with the device.

2.3 Prior Works

Other research has explored the beneficial effects of tangible devices and different signal modalities. For example, Blanc et al. [9] proposed a vibrating stress ball with the goal of decreasing anxiety and arousal. Their study included a self-made stress ball with force sensors and a vibration motor. Stressful images were used as a stimulus to induce arousal. The study successfully demonstrated that their device functions as a stress reliever. Buruk and Özcan [13] created a device that is physically similar to *Frustration Buddy*, sharing its shape and LEDs. Their implementation "*Luck Stone*" was used in tabletop roleplaying games and, combined with their other wearable, created immersive experiences. Recent work by Zhou et al. [41] investigated the use of a squeezable device for emotional regulation for office workers. Similar to gamers, this group may also experience stress while using a computer. Their findings demonstrate the potential of devices to soothe users in real-time and to support emotional awareness and mindfulness in emotionally challenging moments. Another study by Jung-Krenzer et al. [24] demonstrated a system that captures a person's attention in situations where compliance is low due to lack of motivation and users normally experience annoyance by frequent prompts. In their study, which compares different signal modalities (appearance, audio, light, and movement), the authors found that light has strong persuasiveness while being moderately obtrusive. Sound was found to be moderately persuasive, but very obtrusive. Building on prior work, *Frustration Buddy* is the first device aimed on managing frustration in games.

3 Frustration Buddy

3.1 Concept

Frustration Buddy is a proof-of-concept device designed to help players manage frustration while gaming. Its primary goal is to prevent frustration from ruining a player's gaming experience and subsequent escalation into more serious consequences such as toxic behavior. The device leverages the positive effect that a stress ball can have and enhances it with smart integration in games and the

capability to distract the player in game situations when frustration may happen. *Frustration Buddy* uses light and sound signals and a minigame interaction to distract players from the source of frustration.

3.2 Hardware

Frustration Buddy is a physical device closely resembling a stress ball (see Figure 1). The shape was adapted to a dodecahedron to have mounting surfaces for its lights. This shape, made up of 12 pentagon faces, can be held in a similar way as a sphere shape. To further resemble the feel of a sphere, the edges and corners of the device were rounded. Various iterations of the shell were designed and prototyped to ensure a comfortable hand feel, proper squeezability, and sufficient light transmission.

The shell was 3D printed using an enclosed Prusa MK4 printer with FilaFlex 70A filament. A gyroid infill pattern was chosen as it allowed light to pass through in a visually pleasing way. During prototyping of the outer shell, we found that 5% infill resulted in a good balance of durability, squishiness, and hand feel. One of the pentagon faces of *Frustration Buddy* was left open for the electronic system. This was housed in an inner shell that was made out of hard plastic (PLA), printed on a Bambu Lab P1S printer, and intended to safeguard the electronics from the squishing of the outer shell. The inner shell is held in place by three locking pins. Figure 2 shows the electronics system and inner and outer shell designs.

Frustration Buddy's electronics are built around an ESP32-C3 Super Mini. The ESP32 is a commonly used development board for systems that require moderate amounts of compute and low power consumption but a lot of functionality. It is commonly used in mobile, smart home, and Internet of Things (IoT) devices. The ESP32 features both Bluetooth and WiFi, making it excellent for integrating with gaming computers and consoles. It also features general-purpose input/output (GPIO) connections that manage power and signals to other devices. For *Frustration Buddy*, this enables it to control its LEDs, speakers, and gyroscope. The ESP32 is mounted to a custom circuit board which we call the main board. This board facilitates electrical connections without the need for loose wires, improving reliability.

Besides reliability, the main board also serves another purpose. Between the different components in *Frustration Buddy*, two voltages are used. Most components use 5.0 volt signals, however, the

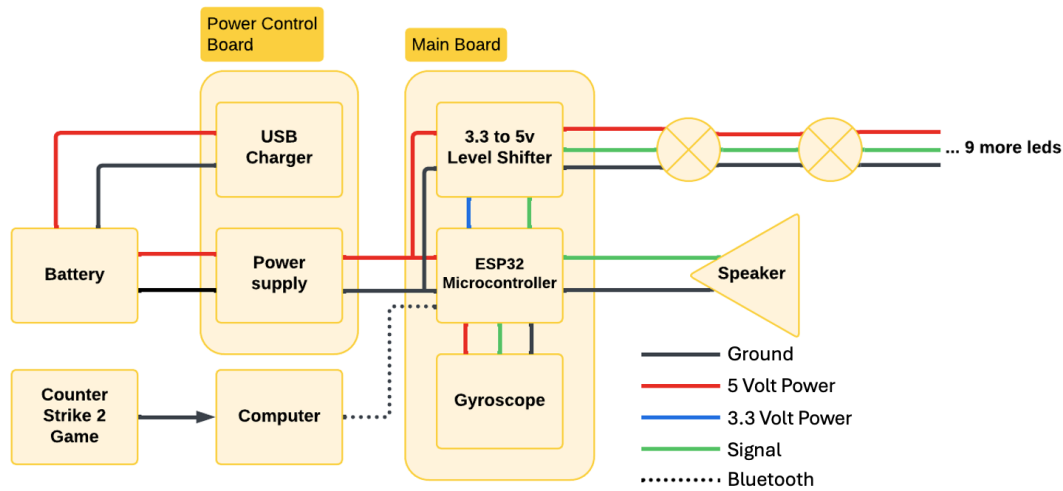


Figure 3: Diagram of *Frustration Buddy*'s electronic system

ESP32 uses 3.3 volt signals when communicating through the GPIO connections. This mismatch results in unexpected behavior of the receiving components. The main board features a level shifter that transforms 3.3 volt signals into 5 volt signals, resulting in correct behavior of all components. The main board is wired to 11 programmable LEDs, allowing the ESP32 to display millions of colors across *Frustration Buddy*'s surfaces. Lastly, the main board features a gyroscope that supplies data for the interactions.

The main board is supported by the power control board. This board, similarly to the main board, facilitates multiple circuits without the need for loose wires. The purpose of the power control board is to supply stable power to the sensitive electronics on the main board. This proved necessary, as many of these sensitive components failed during development. In order to supply stable power, the board was equipped with a step-up regulator, which is an electrical circuit that ensures a constant voltage on its output, even if the input voltage fluctuates. These fluctuations are common, e.g., due to power consumption changes when the system turns its LEDs on or off or communicates with its Bluetooth radio. The voltage of the battery is also influenced by its state of charge. A fully charged lithium polymer battery has a voltage of 4.2 volts, while that same battery has a voltage of 3.3 volts when fully discharged. The step-up regulator ensures that none of these factors interfere with the sensitive components on the main board. Lastly, the power control board features a USB charging circuit, allowing *Frustration Buddy* to be charged with a standard USB-C charger. Figure 3 shows a diagram of the electronics system.

3.3 Interaction

Frustration Buddy offers four primary interactions. Each interaction shown in Figure 4. First, *Frustration Buddy* **passively** functions as a stress ball and fidget toy, promoting self-generated touch. This interaction is initiated by the player, allowing them to channel frustration or find stress relief without prompt. This interaction can be used while the LEDs are off, or when the device uses its second interaction: the **soothing animation**. When *Frustration Buddy* is in

its soothing state, it can display a calming animation. The soothing animation cycles each LED through a gradient of colors, creating a calming effect, similar to a lava lamp. The third interaction is *Frustration Buddy*'s **distraction mode**. In this mode, it will actively try to distract the player from the game. This mode is activated after receiving a signal from the game (e.g., triggered by the game when the player dies). *Frustration Buddy* will flash its LED lights in a bright white color together with an optional beeping sound until it is picked up, which is recognized by the device's sensors. By requiring physical action to stop the distraction, we intentionally disrupt the player's engagement with the game. This disruption is supposed to disconnect the player from the source of frustration, allowing for a brief mental reset. Finally, the fourth interaction features an **interactive game** (on *Frustration Buddy*) that strengthens the distraction by demanding more sustained attention. By increasing engagement with the device, we increase the disconnect from the regular game and give the player more time away from the source of frustration. During the mini game, the player observes a pattern of lights on *Frustration Buddy* turn on. The player has to place *Frustration Buddy* on the desk with the face that lit up last facing upward. The orientation of *Frustration Buddy* is detected by the gyroscope. If this is done within 2 seconds, *Frustration Buddy* will blink green to congratulate the player. If the solution is incorrect, *Frustration Buddy* will blink red for 5 seconds, indicating a loss. After this, it will return to its soothing animation.

To activate the triggered distraction interactions, *Frustration Buddy* is connected to a computer using the ESP32's Bluetooth functionality. On the computer, we implemented software that triggers the distraction in specific moments. For the demo, we did this for the game Counter-Strike 2. We implemented the software as an add-on running on a locally hosted game server, where it records events (e.g., when the player dies) and then triggers distractions.

4 Interactive Experience

For this demonstration, we will bring a gaming computer and the *Frustration Buddy* device. The participants of the interactivity

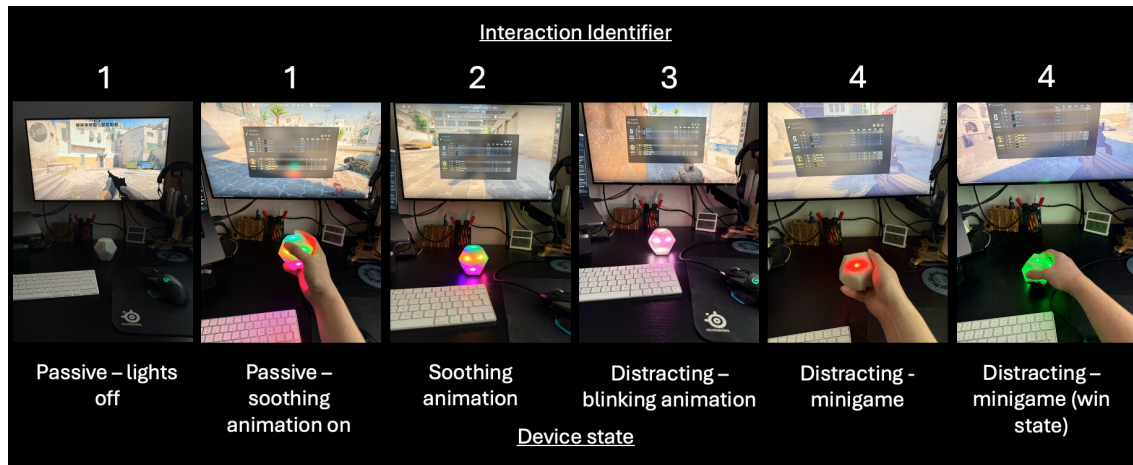


Figure 4: Different interactions enabled by *Frustration Buddy*.

demonstration will be invited to play around 5 minutes of Counter-Strike 2. The game will be played against the computer on its highest difficulty setting. This high difficulty mimics online play against competitive players, where they could experience competence frustration, due to lack of accomplishment and mastery [29]. This risk of frustration will be communicated to the participants through informed consent. During these games, the *Frustration Buddy* will activate upon player death to help soothe the frustration the participants may experience. In this interactive experience, participants will be able to experience the positive effects of distraction and self-generated touch firsthand. While mostly focused on the participant playing CS2, this interactivity is also understandable and engaging for other attendees watching the interaction.

5 Conclusion and Future Work

We present *Frustration Buddy*, a system that helps gamers manage their frustration during play. We aim to expand the design space for systems that support players when they experience frustration in games. By using distraction and a tangible device, we can remove the player from the source of frustration more than an in-game system could. In future work, we aim to thoroughly evaluate the design and effectiveness of this system and develop a design space for future development of similar devices, enabling more researchers to leverage the benefits of tangible devices for relief.

References

- [1] Richard M Ryan and Edward L. Deci (Eds.). 2017. *Self-Determination Theory: Basic Psychological Needs in Motivation, Development, and Wellness* (2017-02-14). Guilford Press. <https://doi.org/10.1521/978.14625/28806>
- [2] 2024. Gaming | Where hobbies become careers. <https://wearetechwomen.com/gaming-where-hobbies-become-careers/>. Accessed: 2025-01-23.
- [3] Fraser Allison, Marcus Carter, and Martin Gibbs. 2015. Good Frustrations: The Paradoxical Pleasure of Fearing Death in DayZ. In *Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction* (Parkville VIC Australia, 2015-12-07). ACM, 119–123. <https://doi.org/10.1145/2838739.2838810>
- [4] Nick Ballou and Sebastian Deterding. 2023. 'I Just Wanted to Get It Over and Done With': A Grounded Theory of Psychological Need Frustration in Video Games. *Proc. ACM Hum.-Comput. Interact.* 7, CHI PLAY, Article 382 (oct 2023), 20 pages. <https://doi.org/10.1145/3611028>
- [5] Simon P. Banbury, William J. Macken, Sébastien Tremblay, and Dylan M. Jones. 2001. Auditory Distraction and Short-Term Memory: Phenomena and Practical Implications. 43, 1 (2001), 12–29. <https://doi.org/10.1518/001872001775992462>
- [6] Umair Bashir. 2024. Most popular hobbies & activities in the U.S. as of September 2024. <https://www.statista.com/forecasts/997050/most-popular-hobbies-and-activities-in-the-us>. Accessed: 2025-01-23.
- [7] Jürgen Beckmann, Lukas Fimpel, and V. Vanessa Wergin. 2021. Preventing a loss of accuracy of the tennis serve under pressure. 16, 7 (2021), e0255060. <https://doi.org/10.1371/journal.pone.0255060>
- [8] Nicole A Beres, Julian Frommel, Elizabeth Reid, Regan L Mandryk, and Madison Klarkowski. 2021. Don't You Know That You're Toxic: Normalization of Toxicity in Online Gaming. In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (Yokohama, Japan) (CHI '21). Association for Computing Machinery, New York, NY, USA, Article 438, 15 pages. <https://doi.org/10.1145/3411764.3445157>
- [9] Clément Blanc, Jean-Christophe Buisson, Jeanne Kruck, and Viviane Kostrubiec. 2024. Haptic coordination: Squeezing a vibrating stress ball decreases anxiety and arousal. 96 (2024), 103220. <https://doi.org/10.1016/j.humov.2024.103220>
- [10] Jessika Boles. 2018. The Powerful Practice of Distraction. 44, 5 (2018).
- [11] Nicholas David Bowman. 2018. *Video Games: A Medium That Demands Our Attention* (1 ed.). Routledge. <https://doi.org/10.4324/9781351235266>
- [12] Elizabeth A. Boyle, Thomas M. Connolly, Thomas Hainey, and James M. Boyle. 2012. Engagement in digital entertainment games: A systematic review. 28, 3 (2012), 771–780. <https://doi.org/10.1016/j.chb.2011.11.020>
- [13] Oğuz Turan Buruk and Oğuzhan Özcan. 2018. Extracting Design Guidelines for Wearables and Movement in Tabletop Role-Playing Games via a Research Through Design Process. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Montreal QC Canada, 2018-04-21). ACM, 1–13. <https://doi.org/10.1145/3173574.3174087>
- [14] Fernando Cross-Villasana, Peter Gröpel, Michael Doppelmayr, and Jürgen Beckmann. 2015. Unilateral Left-Hand Contractions Produce Widespread Depression of Cortical Activity after Their Execution. 10, 12 (2015), e0145867. <https://doi.org/10.1371/journal.pone.0145867>
- [15] Edward L. Deci and Richard M. Ryan. 1985. The general causality orientations scale: Self-determination in personality. 19, 2 (1985), 109–134. [https://doi.org/10.1016/0092-6566\(85\)90023-6](https://doi.org/10.1016/0092-6566(85)90023-6)
- [16] Alena Denisova, Paul Cairns, Christian Guckelsberger, and David Zendle. 2020. Measuring perceived challenge in digital games: Development & validation of the challenge originating from recent gameplay interaction scale (CORGIS). 137 (2020), 102383. <https://doi.org/10.1016/j.ijhcs.2019.102383>
- [17] R Desimone and J Duncan. 1995. Neural mechanisms of selective visual attention. *Annual Review of Neuroscience* 18 (1995), 193–222. <https://doi.org/10.1146/annurev.ne.18.030195.001205>
- [18] Julian Frommel, Madison Klarkowski, and Regan L. Mandryk. 2021. The Struggle is Spiel: On Failure and Success in Games. In *The 16th International Conference on the Foundations of Digital Games (FDG) 2021* (Montreal QC Canada, 2021-08-03). ACM, 1–12. <https://doi.org/10.1145/3472538.3472565>
- [19] Julian Frommel and Regan L Mandryk. 2024. *Toxicity in Esports*. Routledge Handbook of Esports (2024).
- [20] James J. Gross. [n. d.]. Emotion Regulation: Current Status and Future Prospects. 26, 1 ([n. d.]), 1–26. <https://doi.org/10.1080/1047840X.2014.940781>

- [21] James J. Gross. 2007. *Handbook of Emotion Regulation*. Guilford Press.
- [22] Weiyin Hong, James Y. L. Thong, and Kar Yan Tam. 2004. Does Animation Attract Online Users' Attention? The Effects of Flash on Information Search Performance and Perceptions. 15, 1 (2004), 60–86. <https://doi.org/10.1287/isre.1040.0017>
- [23] Hannu Jouhki, Iina Savolainen, Heli Hagfors, Ilkka Vuorinen, and Atte Oksanen. 2024. What are escapist made of, and what does it have to do with excessive gambling and gaming? (2024). <https://doi.org/10.1007/s11469-024-01394-x>
- [24] Theresa Jung-Krenzer, Jeanine Kirchner-Krath, Celina Retz, and Maximilian Altmeyer. 2024. Leaf your Chair Behind – Calm Persuasion for Frequent Sitting Breaks Among Office-Workers. In *Proceedings of Mensch und Computer 2024* (Karlsruhe Germany, 2024-09). ACM, 111–128. <https://doi.org/10.1145/3670653.3670681>
- [25] Jesper Juul. 2013. *The Art of Failure: An Essay on the Pain of Playing Video Games*. MIT Press.
- [26] Daniel Kahneman. 1973. *Attention and effort*. Prentice-Hall.
- [27] Bastian Kordyaka, Nicole A. Beres, Rachel Kowert, Samuli Laato, and Regan Mandryk. 2024. Flame and Fortune: The Connection Between Toxic Behavior and In-game Purchasing in Multiplayer Online Games. In *Companion Proceedings of the 2024 Annual Symposium on Computer-Human Interaction in Play* (Tampere Finland, 2024-10-14). ACM, 145–150. <https://doi.org/10.1145/3665463.3678806>
- [28] Bastian Kordyaka, Michael Klesel, and Katharina Jahn. 2019. Perpetrators in league of legends: scale development and validation of toxic behavior. (2019).
- [29] Mehmet Kosa and Ahmet Uysal. 2022. Need frustration in online video games. 41, 11 (2022), 2415–2426. <https://doi.org/10.1080/0144929X.2021.1928753>
- [30] Yubo Kou. 2020. Toxic Behaviors in Team-Based Competitive Gaming: The Case of League of Legends. In *Proceedings of the Annual Symposium on Computer-Human Interaction in Play* (Virtual Event Canada, 2020-11-02). ACM, 81–92. <https://doi.org/10.1145/3410404.3414243>
- [31] Anti-Defamation League. 2022. Hate Is No Game: Hate and Harassment in Online Games 2022 | ADL. <https://www.adl.org/resources/report/hate-no-game-hate-and-harassment-online-games-2022>
- [32] Anti-Defamation League. 2024. Hate Is No Game: Hate and Harassment in Online Games 2023 | ADL. <https://www.adl.org/resources/report/hate-no-game-hate-and-harassment-online-games-2023>
- [33] Regan L. Mandryk, Julian Frommel, Ashley Armstrong, and Daniel Johnson. 2020. How Passion for Playing World of Warcraft Predicts In-Game Social Capital, Loneliness, and Wellbeing. 11 (2020), 2165. <https://doi.org/10.3389/fpsyg.2020.02165>
- [34] Patricia Pendry and Jaymie L. Vandagriff. 2019. Animal Visitation Program (AVP) Reduces Cortisol Levels of University Students: A Randomized Controlled Trial. 5, 2 (2019), 2332858419852592. <https://doi.org/10.1177/2332858419852592>
- [35] Roger W. Remington, James C. Johnston, and Steven Yantis. 1992. Involuntary attentional capture by abrupt onsets. 51, 3 (1992), 279–290. <https://doi.org/10.3758/BF03212254>
- [36] Richard M Ryan and Edward L Deci. 2020. Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being. (2020).
- [37] Petr Slovak, Alissa Antle, Nikki Theofanopoulou, Claudia Daudén Roquet, James Gross, and Katherine Isbister. 2023. Designing for emotion regulation interventions: An agenda for HCI theory and research. *ACM Trans. Comput.-Hum. Interact.* 30, 1 (March 2023). <https://doi.org/10.1145/3569898> Number of pages: 51 Place: New York, NY, USA Publisher: Association for Computing Machinery tex.articleno: 13 tex.issue_date: February 2023.
- [38] Selen Türkay, Jessica Formosa, Sonam Adinolf, Robert Cuthbert, and Roger Altizer. 2020. See no evil, hear no evil, speak no evil: How collegiate players define, experience and cope with toxicity. In *Proceedings of the 2020 CHI conference on human factors in computing systems*. 1–13.
- [39] Michel Wijkstra, Katja Rogers, Regan L. Mandryk, Remco C. Veltkamp, and Julian Frommel. 2023. Help, My Game Is Toxic! First Insights from a Systematic Literature Review on Intervention Systems for Toxic Behaviors in Online Video Games. In *Companion Proceedings of the Annual Symposium on Computer-Human Interaction in Play* (Stratford ON Canada). ACM, 3–9. <https://doi.org/10.1145/3573382.3616068>
- [40] Michel Wijkstra, Katja Rogers, Regan L. Mandryk, Remco C. Veltkamp, and Julian Frommel. 2024. How To Tame a Toxic Player? A Systematic Literature Review on Intervention Systems for Toxic Behaviors in Online Video Games. 8 (2024), 1–32. Issue CHI PLAY. <https://doi.org/10.1145/3677080>
- [41] Nianmei Zhou, Steven Devleminck, and Lucca Geurts. [n. d.]. Squeeze Away the Worries: Exploring the Potential of Squeezable Interactions for Emotion Regulation for Desk Workers. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems* (Yokohama Japan, 2025-04-26). ACM, 1–20. <https://doi.org/10.1145/3706598.3713483>