Digital Shadows

Jie Sheng, Yanqing Gu, Ziqi Wang, Lan Ou and RAY LC
School of Creative Media, City University of Hong Kong
Hong Kong, SAR
cattgun666@gmail.com, guyanqing0205@gmail.com, LC@raylc.org

Abstract

Cyberbullying has become an increasingly prevalent issue in today's digital landscape, yet its psychological impact is often underestimated. Existing studies primarily focus on quantitative data, lacking the immersive qualities needed to foster empathy and self-reflection. To address this gap, we developed "Digital Shadows," an interactive installation designed to simulate the emotional journey of a cyberbullying victim through contrasting digital environments. The installation employs a shift from serene visuals to hostile imagery, aiming to evoke participant awareness and prompt self-reflection regarding their online behaviors. Results indicate that participants experienced shock and a newfound understanding of cyberbullying's subtleties. This work contributes to digital empathy-building practices, underscoring the value of sensory-driven installations in enhancing social awareness within digital communities.

Keywords

Cyberbullying, interactive installation, digital empathy, immersive experience, online behavior, psychological impact, social awareness, sensory engagement, digital interactions

Introduction

The rapid expansion of internet access has seamlessly integrated digital spaces into daily life, offering unprecedented opportunities for connection, information sharing, and creativity. [20] However, these platforms also enable harmful behaviors, with cyberbullying standing out as a prevalent issue that operates without physical constraints and often under the cover of anonymity. [22] This anonymity allows perpetrators to act without facing immediate repercussions, which intensifies the psychological impact on victims, who may feel trapped and unsupported within the vast digital space. [23] Victims frequently endure psychological trauma, including anxiety, depression, and, in severe cases, suicidal ideation. [13] Research indicates that these effects are not short-lived; the trauma from cyberbullying can linger, impacting individuals' sense of identity, self-worth, and long-term emotional health. [17]

Despite this, current approaches to studying cyberbullying are limited, often focusing on theoretical frameworks or isolated case studies. [5] While these methods are valuable, they fail to capture the profound day-to-day emotional experiences of victims. For example, surveys and retrospective interviews, though informative, lack the capacity to deeply engage audiences and foster empathy, a critical component for understanding cyberbullying's hidden impact. This gap indicates the need for more immersive methods to convey the nuanced, often hidden psychological toll that cyberbullying inflicts on victims, as traditional data presentation struggles to fully express this scope. [16]

To address this, we developed "Digital Shadows," an interactive installation simulating the emotional journey of a cyberbullying victim. The installation begins as a serene, visually engaging "digital utopia" filled with peaceful sounds and vibrant imagery, symbolizing the initial allure of online spaces. [3] However, as participants engage, this environment shifts; serene imagery gives way to hostile, abusive visuals, illustrating the hidden harms of cyberbullying and encouraging participants to reflect on their own online behaviors. [16] This transition demonstrates how an inviting digital space can quickly transform into a source of emotional distress for victims, a shift further reinforced by incorporating text and language directly sourced from cyberbullying victims' testimonies. Disturbing phrases such as *"Why are you still alive?"* and *"No one likes people like you."* deepen the emotional impact, immersing participants in the psychological toll of online harassment and fostering empathy for its victims.

This research raises questions about immersive experiences' role in understanding cyberbullying: How effectively can an installation convey the hidden harms of cyberbullying? Can sensory transitions within an installation foster empathy for victims? Addressing these questions, "Digital Shadows" contributes to the discourse on cyberbullying's impact, offering an empathy-driven method that fosters reflection and awareness in digital communities. [5]

Figure 1. Project Overview

Figure 2: Final Installation

Background

The Psychological Impact of Cyberbullying

Cyberbullying, facilitated by widespread internet access, has been increasingly recognized as a major source of psychological trauma affecting victims across various demographics. [19] Unlike traditional forms of bullying, cyberbullying transcends physical boundaries and can continue unabated, even reaching victims within their homes, contributing to a persistent feeling of vulnerability and helplessness. [16] Research has shown that victims of cyberbullying frequently suffer from anxiety, depression, and post-traumatic stress disorder (PTSD), with adolescents at higher risk of these mental health issues due to their developing emotional resilience. [21] The constant accessibility of digital platforms can exacerbate these issues, as victims find themselves unable to escape the harassment, which remains visible and accessible indefinitely. [22]

Studies highlight that cyberbullying can severely impact self-esteem and identity, as victims often feel that they are under scrutiny from both peers and strangers alike. [15] The anonymous nature of cyberbullying can further intensify its impact; victims feel isolated, as their aggressors remain unknown and unaccountable, creating an environment of fear and distrust. [7] This anonymity, coupled with the rapid dissemination of harmful content, has been shown to amplify the psychological impact, leaving victims with a sense of powerlessness. [2] For many, the long-term effects include a damaged sense of self-worth, decreased life satisfaction, and difficulties in forming interpersonal relationships due to the erosion of trust. [5] Addressing these unique psychological effects requires interventions that go beyond immediate support, helping victims rebuild their confidence and cope with the enduring impact of cyberbullying. [18]

Gender Dynamics and Toxicity

Cyberbullying in East Asian contexts is further complicated by gendered harassment, often mirroring GamerGate-inspired ideologies that perpetuate hostility toward women in digital spaces. In Chinese online communities, targeted harassment campaigns frequently weaponize accusations of 'attention-seeking' or 'moral corruption' to discredit and attack women, particularly those who challenge traditional gender roles or gain visibility in male-dominated spaces. Female gamers, streamers, and influencers are especially vulnerable to cyberbullying that extends beyond verbal abuse to include doxxing, non-consensual image manipulation, and organized smear campaigns. This pattern of online aggression reflects broader patriarchal norms, where digital platforms become battlegrounds for reinforcing societal hierarchies and gender disparities. The systematic nature of these attacks highlights how cyberbullying is not merely an individual issue but a deeply embedded social phenomenon that intersects with power dynamics, misogyny, and the evolving structure of online subcultures. Addressing these entrenched biases requires a nuanced understanding of how digital spaces both challenge and perpetuate existing inequalities, necessitating more inclusive and context-aware interventions.

Lack of Understanding and Secondary Harm

Cyberbullying is a pervasive issue that impacts individuals across all age groups, yet its emotional and psychological effects are frequently underestimated by the general public. [21] Many people tend to dismiss cyberbullying as merely "words on a screen" or trivial online interactions, failing to recognize the profound damage it can inflict on victims' mental health. [2] This lack of understanding can have serious consequences, leading to what is known as secondary harm. [23] Secondary harm occurs when victims are not only affected by the initial bullying but also by the reactions—or lack thereof—of those around them, such as friends, family members, or even mental health professionals who may minimize their experiences. [18] This invalidation can cause victims to feel isolated, misunderstood, and unsupported, further deepening their emotional suffering and reinforcing their sense of vulnerability. [9] When victims do not receive the empathy and acknowledgment they need, they may begin to internalize negative feelings, which

exacerbates their sense of hopelessness and helplessness. [13] Research has shown that dismissive or unsupportive reactions can significantly impact victims' recovery, as victims who feel unsupported are less likely to seek help and more likely to experience long-term psychological consequences, including depression, anxiety, and even post-traumatic stress disorder (PTSD). [5] Furthermore, the lack of social acknowledgment can perpetuate a harmful cycle: as victims feel increasingly isolated and misunderstood, their mental health may continue to deteriorate, leading to a greater risk of self-harm, social withdrawal, and decreased life satisfaction. [16] Secondary harm also highlights a gap in public awareness and understanding of the serious implications of cyberbullying. [3] Without proper education and awareness, society at large may continue to underestimate the issue, thereby neglecting the need for supportive interventions and perpetuating the stigma around seeking help for cyberbullying-related trauma. [8] Educational initiatives aimed at raising awareness about the real, tangible effects of cyberbullying on mental health are essential in breaking this cycle. By fostering a deeper understanding, society can work towards creating a more supportive environment for victims, encouraging empathy, and reducing the likelihood of secondary harm. [11]

Empathy-Driven Interactive Approaches to Address Cyberbullying

Empathy-driven, interactive installations have gained significant attention as innovative tools to convey the complex emotional experiences of cyberbullying victims. Projects like “Digital Shadows” aim to simulate the victim’s journey through cyberbullying, beginning with a visually appealing “digital utopia” that represents the initial allure of online interaction. [1] As participants continue to engage, the environment transitions into a hostile and abusive space, exposing them to the types of verbal harassment and hostility commonly encountered by victims. [20] This transition from tranquility to aggression mirrors the deceptive nature of online spaces, which can shift from inviting to harmful unexpectedly, and allows participants to viscerally experience the impact of cyberbullying. [25]

Research into interactive, empathy-focused installations suggests that these experiences are more likely to leave lasting impressions, encouraging viewers to reflect on the consequences of digital interactions and their potential role in fostering either positive or negative environments online. [10] By providing an immersive, sensory-driven experience of cyberbullying’s effects, empathy-driven approaches like “Digital Shadows” prompt viewers to consider the importance of accountability in digital spaces and the impact of their own online behaviors. [14] In doing so, these installations contribute to a growing body of work that advocates for the use of art and technology as tools for social change, promoting a deeper, more compassionate understanding of digital interactions. Through the integration of art and technology, empathy-driven installations offer a unique avenue for raising awareness, potentially encouraging behavioral shifts that align with a more responsible and supportive digital culture. [5]

Methodology

Pre-interview

To gather real stories and experiences of cyberbullying, we conducted preliminary interviews with five participants who had experienced cyberbullying. These participants were recruited online through a social media platform in mainland China (Xiaohongshu). Additionally, we analyzed one actual case of cyberbullying through an interview.

Case Report: Yang Feng Incident

In spring 2021, Yang Feng, a high school student, became a target of online harassment after posting a video criticizing *Genshin Impact*. A group of fans, calling themselves “Xianjia Army,” retaliated by doxxing him, releasing his personal information, and subjecting him to phone harassment, threats, and the distribution of altered images of his identity documents. The abuse escalated to impersonation on social media, harassment of his teachers, and sending corrosive chemicals to his home. His parents were also doxxed. Yang initially felt helpless, and his attempts to report the harassment were met with misunderstandings. Although some abusive content was removed, new accounts were quickly created to continue the attacks. The emotional toll was significant, leading to anger, depression, and academic decline. Yang believes the harassers were motivated by a desire for amusement and power. This experience has made him more cautious, and despite some perpetrators being caught, the ordeal left a lasting impact on his life.

Pre-interview Questions

After gaining a deeper understanding and analysis of Yang Feng's cyberbullying case, and to maintain the neutrality of the interview, we designed the following interview questions:

·When were you subjected to cyber violence?

·How old were you at that time?

·For what incident did you suffer from cyber violence?

·What was your first reaction at the time?

·What did the cyber-violent person do as time went on? Did they continue to do so?

·How did you feel at the time? (Victims can say something about the words used by the abuser when elaborating)

·What do you think they were doing it for?

·Were you able to digest these emotions? How do you feel now?

Pre-interview Result

These interviews provide a deep exploration into the multifaceted and psychologically damaging nature of cyberbullying. While each volunteer's experience reflects different triggers and personal narratives, the common threads reveal unsettling truths about how digital environments amplify hostility, and how the human psyche processes these attacks.

1. The Fragility of Identity in Digital Spaces

Across interviews, participants describe the vulnerabilities tied to identity in online spaces, where innocuous actions—such as asking a question about plush dolls or sharing a neutral article—can lead to misidentification and harsh judgment. This showcases how quickly personal identity can be targeted and misrepresented online, making digital platforms precarious places for self-expression.

2. The Emotional Toll of Relentless Criticism

Many interviewees expressed confusion, frustration, and deep distress because of relentless online attacks. Whether it was the feeling of helplessness from not being able to defend oneself or the suffocating intensity of hostile comments, the experience of cyberbullying took a lasting emotional toll. The constant flood of negative messages and insults evoked feelings of anger, fear, and vulnerability.

3. The Psychology of the Cyberbully

Analysis of the interviews reveals potential motivations behind cyberbullying. For example, Volunteer B noted that fans of a celebrity became hostile in defense of their idol. Participants suggest that anonymity and the low cost of bullying enable people to vent frustrations or defend their personal biases without consideration for the impact. These insights suggest that cyberbullies may be driven by a need for validation, social belonging, or emotional release.

4. The Failure of Self-Justification and the Power of Silence

Participants found that attempting to clarify misunderstandings often worsened the situation. Despite proving their innocence, they were not believed or acknowledged, underscoring the futility of self-justification in certain online contexts. For some, disengagement became the only viable option, revealing how silence can act as a shield, allowing individuals to protect themselves from further emotional damage.

5. The Internet as an Echo Chamber of Collective Aggression

A recurrent theme in these stories is the amplification effect of online platforms, where minor misunderstandings or differing opinions spiral into collective aggression. In cases like Volunteer A's, a single false accusation snowballed into a wave of hostility, supported by others in an echo chamber effect. This dynamic, where people collectively attack or defend a position, turns the internet into a breeding ground for impulsive, unfiltered aggression.

6. Long-Term Psychological Impact

The emotional effects of cyberbullying lingered for all participants, with some reporting residual feelings of anger, insecurity, and fear of future interactions. Yet, over time, participants also demonstrated resilience, processing their experiences and finding ways to move forward. However, for some, the trauma left an indelible mark, serving as a reminder of the potential dangers and long-term impact of cyberbullying on mental health and self-esteem.

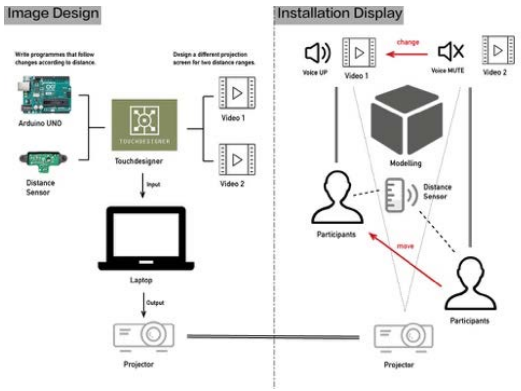

Figure 3: System Diagram, the project is mainly implemented through video projection. The two video contents are created by integrating Gen AI and text interview in-formation respectively, using PR/AE for video editing and programming language for display interaction.

Interaction Coding

This section uses Arduino as the basis and combines distance sensors/infrared sensors to write interactive codes. We will use the programming language to create the effects with Touch Designer and then export the video content to be displayed. To achieve the purpose of the interactive experiment, the distance is used as a variable factor, and the video content and audio content change with the distance of the participant from the device.

Design

Video Projection

In the video production, we built two different models in the C4D software to ensure a smooth transition and cycling of the final video. To reflect the beautiful fantasy of the internet space, we used beautiful natural scenery with birds chirping and flowers blooming as the base tone for the scene. We also added pixel blocks and glowing signs to

emphasize the cyber space's basic attributes. In the transformed scene, we used high saturation of red and green to create a creepy and eerie atmosphere. We changed the trees in the scene to withered branches and the flowers to unfriendly text with attacking intentions. These words, which were deliberately chosen, were sourced directly from our interview participants and represent the kinds of hurtful messages they have personally encountered in cyberbullying incidents. Phrases like “Why are you still alive?” “Fatass Bitch,” “Giant Baby,” and “No one likes people like you” appear in the scene, capturing the impact of the cruel words that have been directed at them. Additionally, we adjusted the sky and lighting layout to highlight an uneasy and disgusting feeling, mirroring the emotional impact these harmful words had on the victims.

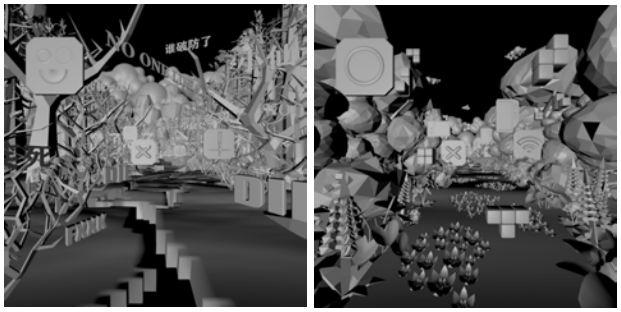

Figure 4: Modelling of video scenes

Figure 5: Final rendering of the video scene

Audio Creation

For the audio part of cyber violence, we collected cyber violence-related vocabulary based on the content of the pre-interviews, where participants shared examples of hurtful language they had encountered online. We carefully summarized and categorized these terms to capture the range of offensive language typically used in cyberbullying. The collected text was then processed through AI to generate realistic digital audio, mimicking the tone and cadence of real speech. To enhance the emotional impact, we further refined the AI-generated speech by adding matching sound effects, such as distorted voices, harsh tones, and echoes, to convey the aggression and hostility of cyberbullying. Multiple audio tracks were overlapped to create a dynamic and intense auditory experience. To ensure seamless looping and immersion, we incorporated white noise loops before and after the main audio to smooth the transitions. This audio design, combined with the visual elements, amplifies the unsettling atmosphere, allowing participants to experience the full emotional weight of cyber violence.

Interaction design

Connect the pressure sensor to the Arduino UNO and write the necessary code in the Arduino IDE. Ensure that the Arduino code can detect the pressure and send data indicating "Pressure" or "No Pressure" status.
In Touch Designer, add a Serial DAT and configure the correct serial port. The Serial DAT will continuously receive the data transmitted by the Arduino. Use a DAT to CHOP to convert the data in the Serial DAT into CHOP signals, completing the connection between the Arduino and Touch Designer.

Next, import the prepared rendered videos: the video of a beautiful world, the video of a cyberbullying world, the beautiful music, and the aggressive language audio track. Connect these media files using the Cross-TOP component. Link the DAT to CHOP output to the Cross parameter of the Cross TOP for both the video and audio. When the Cross-parameter value is set to 0, the video of the beautiful world and the beautiful music will be displayed, and when it reaches 1, the video of the cyberbullying world and the aggressive language audio track will appear. Any value between 0 and 1 will create a smooth, gradual transition between the two worlds, both visually and audibly.

To further refine the transition, add a Filter CHOP node between the DAT to CHOP output and the Cross TOP. This will smooth the data for a softer switch between the visuals and audio. You can control the speed of the transition by adjusting the Filter Width parameter of the Filter CHOP.

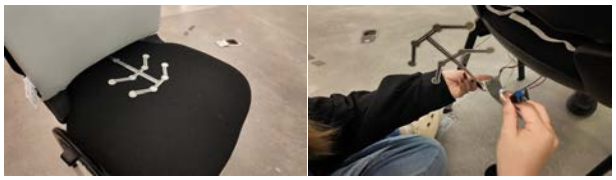

Figure 6: The installation and testing.

Art Exhibition

We present this project in the form of a combination of space and installation. We use "Utopia" video images to attract visitors to approach our installation area. When the experiencer sits at the set point, the pressure sensor is triggered, and sharp and violent online violence language will be presented to the experiencer.

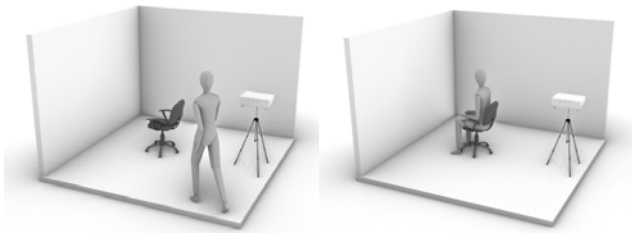

Figure 7: The design of Exhibition set up and Participant flow

Figure 8: Actual Exhibition-Before sitting down.

Figure 9: Actual Exhibition-After sitting down.

Discussion

This project's immersive approach in "Digital Shadows" contrasts with traditional research and awareness campaigns on cyberbullying, which typically utilize surveys, interviews, or case studies to gather insights. Previous studies, such as those by Hinduja and Patchin, [12] have primarily focused on quantitative data to understand cyberbullying's prevalence and psychological effects, relying on statistical analysis and retrospective accounts. While these studies provide valuable information, they lack the immediacy and personal engagement that an immersive installation like "Digital Shadows" offers. By enabling participants to experience the emotional contrast firsthand, our project diverges from these methods and instead seeks to engage viewers in an empathy-driven exploration, encouraging self-reflection on digital behavior in real-time. [26]

"Digital Shadows" utilizes immersive projection and sensory shifts to create an environment that vividly conveys the emotional journey of cyberbullying victims. By transitioning from a tranquil "digital utopia" to a hostile, abrasive space, the installation offers a layered experience that evokes self-reflection and awareness. This design, centered around contrasting atmospheres, allows participants to engage deeply with the themes of vulnerability and hostility in digital interactions. The choice of projection as the primary medium enables a collective viewing experience that invites participants to consider their roles within online spaces, fostering a shared sense of empathy and accountability that resonates across varied audiences.[26]

Limitations and Assumptions

In this project, the audience was limited to young adults, specifically individuals in their 20s, and predominantly of Asian descent (mainly Chinese). While the results provide valuable insights into cyberbullying dynamics within a Sinocentric digital context, they overlook the ethnolinguistic diversity of Southeast Asia, where infrastructural disparities and sociocultural norms intersect to create distinct cyberbullying experiences. For instance, rural Indonesian youth engaging with Facebook-centric harassment face challenges distinct from urban Han Chinese participants navigating WeChat-dominated spaces, as intermittent internet access and localized platform ecosystems mediate exposure and response patterns. Additionally, cultural and demographic factors could influence participant engagement and interpretation. For example, individuals from cultures where cyberbullying is less stigmatized may react differently from those in cultures with more widespread awareness of the issue. [6] Furthermore, if participants from other age groups, such as teenagers or older adults, were included, the experience might yield different responses, given that younger and older audiences may have varied understandings and emotional reactions to cyberbullying.

Our design assumed that the contrasting serene and hostile environments would foster reflection and awareness. While many participants responded as expected, some participants reported detachment or perceived the experience as merely informative. Furthermore, our reliance on moving imagery for immersion inadvertently caused mild discomfort in some participants, indicating that certain visual design choices can influence engagement levels.

As the study captured only immediate reactions post-exposure, claims about long-term behavioral change remain speculative. The assumption that shock-induced self-reflection naturally translates to attitudinal shifts introduces systematic bias, as participants with pre-existing empathy deficits may rationalize or dismiss the experience. Longitudinal methodologies, paired with pre/post behavioral assays, are needed to evaluate sustained impacts.

Additionally, we operated under the assumption that the initial impact of shock and surprise would translate into self-reflection, which may not uniformly apply to all individuals. This assumption introduces systematic bias, as the installation's effectiveness may vary significantly depending on personal history with digital spaces or pre-existing empathy levels. [26]

Future Design Considerations

This project highlights the potential for accessible, empathy-driven installations in addressing social issues, suggesting several design considerations for future iterations. Moving forward, refining visual effects to reduce potential discomfort and exploring modularity to tailor experiences for different age groups or cultural backgrounds may enhance engagement. [8] Future designs could incorporate interactive elements where participants can actively respond to scenarios, creating a more dynamic and personalized experience.

Overall, "Digital Shadows" contributes to both the art and research communities by offering a novel, immersive method for exploring cyberbullying's emotional toll. The project underscores the role of sensory-driven installations as a means to raise awareness, prompting reflection and fostering empathy within digital communities. By continuing to explore empathy-based installations, we may further the understanding of digital behavior and its implications, potentially influencing online culture towards greater accountability and support. [11]

References

[1] Bachen, Christine M., Pedro F. Hernández-Ramos, and Chad Raphael. 2012. "Simulating REAL LIVES." *Simulation & Gaming* 43 (4): 437–60.

[2] Betts, Lucy R., and Karin A. Spenser. 2016. "'People Think It's a Harmless Joke': Young People's Understanding of the Impact of Technology, Digital Vulnerability and Cyberbullying in the United Kingdom." *Journal of Children and Media* 11 (1): 20–35.

[3] Binns, Reuben, Max Van Kleek, Michael Veale, Ulrik Lyngs, Jun Zhao, and Nigel Shadbolt. 2018. "'It's Reducing a Human Being to a Percentage.'" *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems - CHI '18*. https://doi.acm.org/10.1145/3173574.3173951.

[4] Cheng, Lu, Ruocheng Guo, Yasin N. Silva, Deborah Hall, and Huan Liu. 2021. "Modeling Temporal Patterns of Cyberbullying Detection with Hierarchical Attention Networks." *ACM/IMS Transactions on Data Science* 2 (2): 1–23.

[5] Curtis, David J. 2009. "Creating Inspiration: The Role of the Arts in Creating Empathy for Ecological Restoration." *Ecological Management & Restoration* 10 (3): 174–84.

[6] Daniels, Jessie. 2013. "Race and Racism in Internet Studies: A Review and Critique." *New Media & Society* 15 (5): 695–719. https://academicworks.cuny.edu/cgi/viewcontent.cgi?article=1289&context=hc_pubs.

[7] Dehue, Francine, Catherine Bolman, and Trijntje Völlink. 2008. "Cyberbullying: Youngsters' Experiences and Parental Perception." *CyberPsychology & Behavior* 11 (2): 217–23.

[8] DeSmet, A., S. Bastiaensens, K. Van Cleemput, K. Poels, H. Vandebosch, G. Deboutte, L. Herrewijn, et al. 2018. "The Efficacy

of the Friendly Attac Serious Digital Game to Promote Prosocial Bystander Behavior in Cyberbullying among Young Adolescents: A Cluster-Randomized Controlled Trial." *Computers in Human Behavior* 78 (January): 336–47.
[9] Felnhofer, Anna, Oswald D. Kothgassner, Thomas Hetterle, Leon Beutl, Helmut Hlavacs, and Ilse Kryspin-Exner. 2014. "Afraid to Be There? Evaluating the Relation between Presence, Self-Reported Anxiety, and Heart Rate in a Virtual Public Speaking Task." *Cyberpsychology, Behavior, and Social Networking* 17 (5): 310–16.
[10] Hagihara, Akihito, Misato Odamaki, Koichi Nobutomo, and Kimio Tarumi. 2006. "Physician and Patient Perceptions of the Physician Explanations in Medical Encounters." *Journal of Health Psychology* 11 (1): 91–105.
[11] Herrera, Fernanda, Jeremy Bailenson, Erika Weisz, Elise Ogle, and Jamil Zaki. 2018. "Building Long-Term Empathy: A Large-Scale Comparison of Traditional and Virtual Reality Perspective-Taking." Edited by Brock Bastian. *PLOS ONE* 13 (10): e0204494.
[12] Hinduja, Sameer, W Justin, and Patchin. 2014. "Cyberbullying: Identification, Prevention, & Response." https://cyberbullying.org/Cyberbullying-Identification-Prevention-Response.pdf.
[13] Hinduja, Sameer, and Justin W. Patchin. 2010. "Bullying, Cyberbullying, and Suicide." *Archives of Suicide Research* 14 (3): 206–21.
[14] ———. 2018. "Connecting Adolescent Suicide to the Severity of Bullying and Cyberbullying." *Journal of School Violence* 18 (3): 1–14.
[15] "How Games Move Us." 2024. *MIT Press*. June 18. https://mitpress.mit.edu/9780262534451/how-games-move-us/.
[16] Kowalski, Robin M., Gary W. Giumetti, Amber N. Schroeder, and Micah R. Lattanner. 2014. "Bullying in the Digital Age: A Critical Review and Meta-Analysis of Cyberbullying Research among Youth." *Psychological Bulletin* 140 (4): 1073–1137.
[17] Macaulay, Peter J.R., Lucy R. Betts, James Stiller, and Blerina Kellezi. 2022. "Bystander Responses to Cyberbullying: The Role of Perceived Severity, Publicity, Anonymity, Type of Cyberbullying, and Victim Response." *Computers in Human Behavior* 131 (0747-5632): 107238.
[18] Patchin, Justin W, and Sameer Hinduja. 2012. *Cyberbullying Prevention and Response*. Routledge.
[19] Pater, Jessica, and Elizabeth Mynatt. 2017. "Defining Digital Self-Harm." *Proceedings of the 2017 ACM Conference on Computer Supported Cooperative Work and Social Computing*, February.
[20] Pew Research Center. 2024. "Internet/Broadband Fact Sheet." *Pew Research Center: Internet, Science & Tech*. Pew Research Center. January 31. https://www.pewresearch.org/internet/fact-sheet/internet-broadband/.
[21] Ruppel, Erin K., and Christopher J. McKinley. 2015. "Social Support and Social Anxiety in Use and Perceptions of Online Mental Health Resources: Exploring Social Compensation and Enhancement." *Cyberpsychology, Behavior, and Social Networking* 18 (8): 462–67.
[22] Sameer Hinduja, and Justin W Patchin. 2015. *Bullying beyond the Schoolyard : Preventing and Responding to Cyberbullying*. Thousand Oaks, California: Corwin.
[23] Schittenhelm, Catherine, Maxime Kops, Maeve Moosburner, Saskia M. Fischer, and Sebastian Wachs. 2024. "Cybergrooming Victimization among Young People: A Systematic Review of Prevalence Rates, Risk Factors, and Outcomes." *Adolescent Research Review*, September. Springer Science and Business Media LLC.
[24] Schultze-Krumbholz, Anja, and Herbert Scheithauer. 2009. "Social-Behavioral Correlates of Cyberbullying in a German Student Sample." *Zeitschrift Für Psychologie / Journal of Psychology* 217 (4): 224–26.
[25] Slater, Mel, and Sylvia Wilbur. 1997. "A Framework for Immersive Virtual Environments (FIVE): Speculations on the Role of Presence in Virtual Environments." *Presence: Teleoperators and Virtual Environments* 6 (6): 603–16.
[26] Williams, Kipling D, Joseph P Forgas, and William Von Hippel. 2005. *The Social Outcast*. Psychology Press.

Authors Biographies

Jie Sheng is a freelance digital illustration artist and MFA student at the School of Creative Media, City University of Hong Kong. While she continues to focus on creating digital illustrations through both commercial and private commissions, her current research explores the intersection of human experience and interactive art. Jie is delving into how interactive art can reflect human behavior and emotions, expanding her practice to include new forms of artistic expression like 3D modeling and installation art.

Yanqing GU is an MFA student at the School of Creative Media, City University of Hong Kong. Her work spans interactive art, immersive installations, and speculative storytelling, with a focus on human-computer interaction and social relationships in the digital age. Yanqing explores how technology impacts human emotions and cognitive experiences, creating projects that engage audiences in reflective and participatory ways.

Wang Ziqi is an MFA student at the School of Creative Media, City University of Hong Kong. He excels at capturing light and storytelling through photography, creating spatial and structural designs in digital modeling, and pushing the boundaries of materials in 3D printing. Currently, he is dedicated to researching the possibilities of different materials in 3D printing, exploring the fusion of technology and art to bring more diverse possibilities to physical creations.

OU Lan, an MFA student at City University of Hong Kong, with a background in animation and graphic design. Skilled in merging visual and auditory art forms, currently exploring the field of sound to create immersive experiences. Passionate about storytelling and innovation, constantly pushing the boundaries of art and design.

RAY's practice investigates how humans adapt to novel environments in creative expression with machines. His research in

neuroscience (Nature Communications) and HCI (CHI, CSCW, HRI, DIS) are reflected in his artistic practice (NYSCI, Ars Electronica, Taikwun, Science Gallery, ACC Gwangju, IEEE VISAP, SIGGRAPH). RAY founded Studio for Narrative Spaces: https://recfro.github.io/