Investigating the Role of Gratitude and Self-Reflection in Online Gaming Toxicity

Lucas Jose Zagal
University of Utah

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School of Computing
University of Utah
Salt Lake City, UT 84112 USA

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Abstract

This project aims to investigate the role of gratitude and self-reflection in addressing online gaming toxicity. Online toxicity is a serious issue that negatively affects many people. It is quite challenging to address because the design of these online competitive games reinforces toxic behaviors. Additionally, much of the research and solutions that have been implemented focus purely on punishment. Because punitive measures fail to address this category of mostly well-behaved players, there is a need to investigate other methods of addressing online toxicity. One such method is gratitude, which has been shown to have numerous benefits to mental health. In this study, we investigated whether a brief gratitude intervention could reduce toxic behavior and improve well-being among League of Legends players. We recruited 20 self-identified toxic players from League of Legends communities and randomly assigned them to either a gratitude or control condition. Over two weeks of normal gameplay, participants completed post-session surveys measuring self-reported toxic behaviors and psychological well-being via the Flourishing Scale. In the second week, participants in the gratitude condition were prompted to express gratitude about their game experience, while those in the control condition reflected on things they noticed. Our findings suggest that while standalone gratitude interventions may not reduce in-game toxicity, they can meaningfully shape how players interpret their experiences. Future work should explore real-time, in-game interventions during natural breaks in gameplay, such as after character death, and examine the situational triggers of toxicity to develop more context-sensitive solutions.

ABSTRACT

This project aims to investigate the role of gratitude and self-reflection in addressing online gaming toxicity. Online toxicity is a serious issue that negatively affects many people. It is quite challenging to address because the design of these online competitive games reinforces toxic behaviors. Additionally, much of the research and solutions that have been implemented focus purely on punishment. Because punitive measures fail to address this category of mostly well-behaved players, there is a need to investigate other methods of addressing online toxicity. One such method is gratitude, which has been shown to have numerous benefits to mental health. In this study, we investigated whether a brief gratitude intervention could reduce toxic behavior and improve well-being among League of Legends players. We recruited 20 self-identified toxic players from League of Legends communities and randomly assigned them to either a gratitude or control condition. Over two weeks of normal gameplay, participants completed post-session surveys measuring self-reported toxic behaviors and psychological well-being via the Flourishing Scale. In the second week, participants in the gratitude condition were prompted to express gratitude about their game experience, while those in the control condition reflected on things they noticed. Our findings suggest that while standalone gratitude interventions may not reduce in-game toxicity, they can meaningfully shape how players interpret their experiences. Future work should explore real-time, in-game interventions during natural breaks in gameplay, such as after character death, and examine the situational triggers of toxicity to develop more context-sensitive solutions.

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INTRODUCTION

League of Legends is an online game that is notorious for its toxic community (Maher, 2016). Toxic behavior is behavior that is harsh, malicious, or harmful, and online it often takes the form of verbal abuse and harassment. This toxicity is deeply ingrained within the game's culture. It is not simply a matter of a few bad apples spoiling the bunch. In League of Legends, almost all reports for toxicity are on the average player who usually behaves well (Dinh, 2022). This indicates a systemic issue rather than one-off bad actors.

From the moment players enter the game, they are thrust into a competitive environment where winning is paramount. The game's mechanics and structure encourage a meritocratic mentality. Success is equated with individual skill and prowess. However, League of Legends is a team game, and victory isn’t dependent on just one person’s skill. The individualistic meritocratic ethos being misapplied to a team environment results in players belittling and demeaning those who do not meet their standards of excellence (Adachi & Willoughby, 2011). The prevalence of harassment, abuse, and discrimination within gaming communities has far-reaching consequences, not only for the mental health and well-being of individual players but also for the overall integrity of the gaming ecosystem. Toxic behavior drives away new players, alienates marginalized groups, and perpetuates a cycle of negativity and hostility that undermines the fundamental purpose of gaming — to provide a space for enjoyment, camaraderie, and self-expression (Zsila et al., 2022). While punitive measures such as bans and

suspensions may temporarily alleviate the effects of toxicity, they fail to address the underlying factors that contribute to its prevalence.

Encouraging empathy and gratitude in online games like League of Legends is necessary because the game is designed to reinforce meritocracy, resulting in toxicity from competitiveness and hyper-individualism via meritocracy. It is also necessary because this toxicity is a serious problem that cannot be ignored, and because simply punishing toxicity treats only the symptoms and not the root causes. To combat toxicity in online games, we must adopt a proactive approach that promotes empathy, understanding, and respect among players. By fostering a culture of inclusivity and kindness, we can create a gaming environment where all players feel valued, supported, and empowered to be their authentic selves. We believe this culture can come about through the power of gratitude.

Our work investigated the role that gratitude can play in addressing online gaming toxicity. Using a between-subjects experimental design, we recruited participants to play League of Legends for two weeks while engaging in either a gratitude exercise or a self-reflection exercise. Thus, we make unique research contributions by 1) presenting the results of a gratitude intervention on the toxicity and well-being of League of Legends players, and 2) offering a discussion of what future behavioral interventions could look like. Through this endeavor, we hope to contribute to a future where online gaming can

be a source of fun and healthy competition rather than a source of frustration and harassment.

BACKGROUND AND RELATED WORK

To effectively confront the pervasive issue of online toxicity in games such as League of Legends, it is necessary to first examine the underlying psychological and systemic mechanisms that contribute to such behavior. We begin this section by exploring relevant literature on psychological factors that contribute to online toxicity, followed by a critical analysis of how systemic choices exacerbate this toxicity. We then further consider the measurable impacts of toxic behavior on player well-being and community dynamics, as well as the limitations of the punitive approaches that have been historically employed by game developers. Finally, this section outlines potential alternative interventions drawing on research on gratitude.

THE TOXIC MERITOCRACY OF GAMES

In order to try and address online toxicity in games like League of Legends, it is important to understand the underlying causes of this behavior.

PSYCHOLOGICAL FACTORS

A research paper by Suler (2004) outlines a phenomenon known as the online disinhibition effect which describes how people say and do things online that they wouldn't do when face-to-face with others. The author describes how "in the case of expressed hostilities or other deviant actions, the person can avert responsibility for those behaviors, almost as if superego restrictions and moral cognitive processes have been temporarily suspended from the online psyche" (Suler, 2004, p. 322). This disinhibition effect is possible because players form a separate online identity by playing the game.

The formation of a compartmentalized identity as a "league player" is reinforced by League of Legends' roles and characters. Each of the 5 players on a team fills a specific role, coined Top, Mid, ADC, Support, and Jungle. These are essentially analogous to sports positions like a quarterback or center lineman in American football, for example. A player might enjoy a particular role and come to see themselves as a "support player." Similarly, players can identify strongly with one of League of Legends' hundreds of unique and imaginative characters. If they play a character like Tristana enough, they can come to see themselves as a "Tristana main." These elements all help to reinforce a personal identity that is unique to the game League of Legends, and compartmentalizing this identity away from one's day-to-day life can lead to players acting with unusual anger or hatred towards teammates when they otherwise might not.

Suler also describes factors that can make people more likely to dissociate in this way. One such factor is known as solipsistic introjection. According to Suler (2004), "online text communication can evolve into an introjected psychological tapestry in which a person's mind weaves these fantasy role plays, usually unconsciously and with considerable disinhibition. Cyberspace may become a stage, and we are merely players" (p. 323). Solipsistic introjection describes how reading other people's messages can be experienced as having a little version of them inside your mind. You hear them speaking to you but you don't know what they sound like, so you come up with a voice to give

them. This mental character is formed in large part by one's assumptions, expectations, and biases. League of Legends players might similarly introject the other players and experience interactions with them inside their own minds, a place where there is very little inhibition. From there, they can form unfounded opinions about their teammates and more easily self-rationalize their toxic behavior towards them.

SYSTEMIC FACTORS

In addition to psychological factors that result in toxic behavior, competitive games are fundamentally designed in such a way that toxicity is an inevitability. This is due to how games perpetuate meritocratic norms, which results in competitiveness and hyper-individuality. Meritocracy refers to a system in which people's success is determined by their own abilities and merit. This is typically understood to be the most desirable system for organizing a society as compared to other alternatives (Woolridge, 2021). In his book *The Aristocracy of Talent,* Woolridge (2021) writes that combines several admirable qualities, one of which is that meritocracy needs to secure equality of opportunity, which society does by providing education for everyone. However, League of Legends, despite emphasizing meritocratic values, doesn't provide this equality of opportunity for success. There are numerous vital skills such as map awareness, ward placement, and wave management, that the game does not provide any tutorials for. Additionally, In his book, *The Toxic Meritocracy of Games*, Paul (2018) also critiques the notion that meritocracy is a good and fair system. He writes that "the myth of meritocracy is stultifying, as people throughout the spectrum are led to believe that they deserve where they end up and ignore structural explanations for the inequality inherent to a

meritocratic ideology" (pp. 50-51). This critique illustrates why perpetuating meritocratic norms in games is such an issue.

When it comes to League of Legends, the game perpetuates these norms by ranking players according to their skill. As such, the game creates a hierarchy where players are constantly striving to climb the ranks and prove their worth. This ranking system not only reinforces the idea that success is determined solely by individual skill but also creates a competitive environment where players feel pressure to perform at their best at all times. Consequently, any perceived shortcomings or mistakes can be met with harsh criticism and judgment from peers, further fueling the toxic cycle.

Recent research by Shen et al. (2020) analyzed the behavior of players throughout millions of online battles to determine the different factors that lead to online toxicity in gaming. They found that "reducing players' stress and frustration could mitigate toxic behavior induced by negative affect" (Shen et al., 2020, p. 8). While there are things that could be done to reduce stress and frustration, much of it is inherent to the game. League of Legends is fundamentally a competitive game. There must always be a winner and a loser. If you're emotionally invested in being good at the game, then you're going to put a lot of time and effort into winning. However, League of Legends is also a fundamentally team-based game. This means that whether or not you win isn't 100% in your control. As such, feeling that you're playing well and losing as a result of your teammates is an inevitability that will lead to frustration. This is especially true when you

consider that the game is designed to have you win 50% of the time to try and find your "true skill" (Leung-Harrison, 2024). The more you win, the more likely you are to be matched against harder and harder opponents which will inevitably lead to losses and frustration. In turn, this will likely result in toxic behavior.

THE IMPACTS OF TOXIC BEHAVIOR

Toxicity in games is often depicted as something that's simply "par for the course." It is brushed off as harmless banter or trash talk. A research paper by Fox & Tang (2017) examined the relatively unknown outcomes of women's frequent encounters with general and sexual harassment in online games. From the survey responses collected, the researchers found that "sexual harassment led to rumination, which is troubling given its association with negative affect, depressive symptoms, and other detrimental outcomes" (Fox & Tang, 2017). The link between toxic behavior and significant mental health concerns presents a clear argument for integrating more robust educational and supportive measures within the game itself.

Being subjected to harassment and toxicity in League of Legends has clear detrimental effects if taken to heart. Not only can it lead to negative mental health outcomes for players, but those players will also be less inclined to play the game. If you're brand new to the game and in your first match, you're called a slur, there's a good chance you're going to uninstall the game. This means it is also a serious problem for game developers to try and address. If they want their game to be successful and attract players who will spend money, they need to make sure that their players are having as

good of an experience as possible by addressing this issue. It is especially important if they want to foster a diverse player base, as women experience more of this kind of targeted harassment and at a much higher degree. Fox & Tang (2017) state that "sexist players maintain stereotypes regarding women's motives and participation in video games, and those who try to draw attention to gender inequalities are targeted for harassment or labeled 'feminist killjoys'." This analysis critiques the lack of empathy that is exhibited by many players of games like League of Legends.

These kinds of attitudes are a serious problem and are a reflection of larger societal issues. The prevalence of the ideology of meritocracy in the United States means that people's experiences are stripped of all context. Undergoing a negative experience like harassment is individualized, and allowing yourself to be affected by it is seen as a personal failure. There is very little room for empathy when everyone is expected to fend for themselves and thrive based purely on their skills and abilities. In such an environment, the dismissal of harassment as a minor issue or even as a test of resilience further entrenches toxic behaviors. It underscores a fundamental misunderstanding of the nature of harassment, not as a challenge to overcome, but as a systemic issue that undermines the basic principles of respect and equality in gaming communities.

THE NEED FOR SOLUTIONS BEYOND PUNISHMENT

Online toxicity is very clearly a well-established problem. In an article published in *Nature*, Maher (2016) recounts how League of Legends developer, Riot Games,

attempts to tame toxic behavior. In documenting Riot Games's efforts to punish toxic players, he writes that "players who were banned from the game were often unsure why they had been punished, and continued to act negatively when the bans were lifted." This finding reinforces the notion that simply punishing players is not an adequate solution to the problem of online toxicity in League of Legends.

Almost all online games acknowledge the issue of toxicity and are motivated to try and address it. It is extremely common for games to have systems for reporting players for bad behavior, and those reports are used to dole out punitive measures like chat mutes, account suspensions, and even full bans. However, this problem persists despite developers using these strategies for many years. League of Legends was released in 2009, and 16 years later, toxicity is still an issue despite the best attempts of the developers. The use of punitive measures alone has been insufficient in dealing with toxicity, and it is quite clear that a different approach is necessary. In 2017, the developers of League of Legends introduced a new "Honor System" designed to specifically incentivize good behavior (Lee, 2017). However, in the 8 years the system has existed, it still hasn't managed to be fully succesful, something even the developers have acknowledged and are working on (Dinh, 2022). This is because, despite all the effort put into punishing toxicity, and even rewarding good behavior, toxicity remains an aspect of the game's culture that is deeply normalized.

Recent research by Berest et al. (2021) highlights a study that tested the degree to which toxic behavior is normalized in gaming culture. The normalization of toxicity is a crucial factor because, according to the researchers, “those who engage in toxic behaviors will normalize their beliefs about toxicity, and those with normalized beliefs will be more approving of toxic behaviors in games” (Beres et al., 2021, p. 2). League of Legends is a game where toxicity is very much normalized. Tyler Steinkamp, better known as Tyler1, is an extremely popular League of Legends player and online streamer. He currently has over 7 million followers across the websites YouTube and Twitch and is specifically known for his extremely toxic behavior (Friedman, 2018). In his livestreams, he would constantly abuse his teammates and would intentionally lose games after perceived slights from his teammates. His continued popularity as a streamer despite this behavior demonstrates how many players in the League of Legends community don’t view toxicity as a serious problem. To his 7 million followers, it is simply a part of the game. This kind of culture makes addressing toxicity quite challenging as any attempts to curb toxic behavior that don’t also try to break the cycle of normalization will be ineffective. This raises the important challenge of finding strategies that do work to address the underlying issues.

In a study of World of Tanks players, Shen et al. (2020) investigated the team-level factors that predict the occurrence of online toxicity. They found that “gamers

exhibited toxicity significantly more when the battles were convened randomly. When there is little anticipation of future interactions, a self-interested individual may defect because doing so incurs minimal social cost" (Shen et al., 2020, p. 2). These findings highlight potential strategies for curbing online toxicity in games like League of Legends that could be more effective than simple punitive measures.

League of Legends uses a random matchmaking system to pair up players. As a result, players know that they likely aren't ever going to see or interact with any of the other users in the game ever again. This means that even if they receive in-game punishments like bans or suspensions due to toxic behavior, they don't receive any sort of social consequences. One potential strategy for dealing with toxicity may be to group up players into very small matchmaking "cohorts" so that they're always playing with and talking to the same group of players. This would allow for social consequences to become a factor in people's behavior, which is supported by the previously mentioned paper's findings that in-game player "clans" are less likely to exhibit toxic behavior. However, those kinds of organizations are opt-in and can still be quite large. A smaller, more focused group might be more effective for developing empathy.

Another example of a potential strategy that encourages empathy in players was published by Beres et al. (2021). The researchers presented a study that asked players of the game Overwatch to judge levels of toxicity and give their reasoning as to why they

would or wouldn't report it. The researchers found that "the same behaviors that are perceived as inappropriate, intolerable, and harmful by some can be interpreted as appropriate, tolerable, and enjoyable by others" (Beres et al., 2021, p. 12). These findings clarify the need to demonstrate to players of games like League of Legends why such behaviors can be considered harmful rather than simply punishing them. This is especially true considering that many players don't know for what reason they are punished, as mentioned earlier.

One way to demonstrate this viewpoint to players could be to expand game tutorials to include appropriate behavior. The vast majority of game tutorials and other onboarding experiences focus entirely on teaching the mechanics of the game, guiding you through what buttons to press and what the objectives are. In some cases, they even recommend strategies to employ. However, there is never any sort of education on what kind of social behavior is appropriate. This is a huge oversight because League of Legends is fundamentally a team-based game. It requires coordinating with four other individuals, and this social cooperation is just as much a part of the game as which buttons you're pressing.

As developers like Riot Games strive to enhance the gaming experience and address issues of toxicity, integrating empathy-building exercises into gameplay tutorials could serve as a proactive step toward cultivating a more positive and inclusive gaming

culture. In an article published in the scientific journal *Nature*, Maher (2016) describes the lofty ambitions that Riot Games has in trying to improve both their game and online society. He writes that in general, "much of the attention on violence [in video games] has missed the biggest impact that games have. Researchers are slowly starting to wise up to the idea that it may not be as important to think of what it means for someone to pretend to be a soldier than whether they're spending their time spewing racial or homophobic slurs." Maher's writing explores how online toxicity in games like League of Legends influences our society at large. It is more relevant to explore why players act in this anti-social way rather than the specifics of what the game is.

Even though it is certainly important to address toxicity for the sake of the enjoyment of the people playing the game, the implications go far beyond the gaming experience itself. Toxicity in online environments like League of Legends can seep into everyday interactions, reinforcing negative behaviors and normalizing discrimination. This perpetuation of harmful attitudes can affect individuals' perceptions and actions in the real world, contributing to broader societal issues such as inequality and intolerance. Therefore, efforts to tackle these kinds of behaviors are not only crucial for creating a more inclusive gaming environment but also as a stepping stone for fostering a culture of respect and empathy in society at large.

GRATITUDE

One promising strategy for encouraging empathy and reducing toxicity is practicing gratitude. In Classical Rome, Cicero spoke about the importance of gratitude and that it was not only the greatest virtue but also the parent of all other virtues (Cicero, 54/1891). If we want to encourage empathy and cultivate more "virtuous" players, gratitude seems to be a good place to start.

In more modern times, psychologists have found that there are numerous benefits to practicing gratitude. In a chapter from *Designing Positive Psychology*, the Emmons & Mishra (2011) review research on gratitude and positive human functioning. They write that "there has been an accumulation of scientific evidence showing the contribution of gratitude to psychological and social well-being" (Emmons & Mishra, 2011). One such finding is that those who are more grateful exhibit higher subjective well-being (McCullough, Emmons, & Tang, 2002). Subjective well-being is defined as consisting of "frequent positive affect, infrequent negative affect, and cognitive evaluations such as life satisfaction" (Busseri & Sadava, 2011). If players perceive themselves as having higher well-being, they might be less likely to engage in toxic behavior.

Similarly, if you could get players to act more altruistically, they would certainly be less likely to engage in toxic behavior. Gratitude has also been shown to directly increase altruistic behavior towards both known individuals and strangers. Since League of Legends often requires playing on a team with strangers and always requires playing

against a team of strangers, gratitude might be capable of making players treat all other players better.

Many different psychological interventions have been created to try and increase gratitude. A study that analyzed six different interventions found that reflective writing in "gratitude journals" was quite effective and also had the longest-lasting benefits (Seligman et al., 2005). This type of exercise might be very useful in addressing in-game toxicity. This is because this kind of reflection leads to more awareness of positive experiences and doesn't directly aim to "fix" those kinds of behaviors.

METHODS

Based on this prior work, we designed an experimental study that measures the role that practicing gratitude plays in reducing in-game toxicity and improving player well-being.

RECRUITMENT AND PARTICIPANTS

For this study, we recruited a total of 20 League of Legends players (see Appendix A) from various online communities focused on the game, including the official League of Legends subreddit (https://www.reddit.com/r/leagueoflegends/), the subreddit's Discord server (http://discord.gg/lol), and the official League of Legends Facebook group (https://www.facebook.com/groups/237416026286854/). All participants were 18 or older, spoke English, lived in the US, and played the game at least three times per week. They also all played the "Ranked" mode primarily, played mostly with strangers rather than friends, and had all been toxic in-game at least once before. These

inclusion criteria were chosen so that participants would be more likely to behave toxically from the outset. IRB approval was obtained before recruiting participants. Participants were self-selected, and monetary compensation was not provided.

STUDY DESIGN

To investigate the potential effects that practicing gratitude might have on online toxicity, we had participants play League of Legends on their own time for two weeks. We utilized a combined within-subjects design and between-subjects design. Participants were randomly assigned to either the control condition or the gratitude condition. We chose to have a neutral control condition rather than attempting to measure the effects of a punishment condition because of the difficulty in finding a suitably impactful punishment that we could both administer and enforce asynchronously.

During the first week, all participants, regardless of condition, were instructed to complete a survey after each session of play. For the first week, the survey was identical across both conditions. The survey measured the level of toxicity of the participants by asking them to indicate which of five different categories of toxic behavior they performed during that session. Since gratitude has been shown to improve well-being (Emmons & Mishra, 2011), the survey also measured the participants' psychological well-being under the assumption that people with higher well-being will be less toxic than people with lower well-being. We utilized the Flourishing scale questionnaire (Diener et al., 2009) to measure participant well-being. The scale consists of 8 Likert scale questions that assess “self-perceived success in important areas such as relationships, self-esteem, purpose, and optimism” (Diener et al., 2009; see Appendix B).

The participants indicated their level of agreement with statements on a 7-point scale ranging from “strongly disagree” to “strongly agree.” An example item is “I am engaged and interested in my daily activities.” The Flourishing scale is widely used in research practice and has been found to be reliable and valid (Schotanus-Dijkstra et al., 2016). In addition to measuring player wellbeing via the Flourishing scale, we also measured the in-game toxicity of players by asking them to indicate which of 5 types of toxic behaviors they had performed during their time playing. Participants could mark multiple types if they had performed multiple distinct types of toxic behavior.

After having all participants complete the survey repeatedly over the course of the first week, the survey was modified before beginning the second week to include a short writing exercise. For participants in the gratitude condition, the survey was changed to include a question asking them to express gratitude about three things or three people from their time playing, and they were given the prompt “After playing, I am grateful for…”. For participants in the control condition, the survey was changed to include a question asking them to write freely about three things or people they noticed from their time playing, and they were given the prompt “After playing, I noticed…”. This control condition was chosen to isolate the potential effects of gratitude rather than just self-reflection.

ANALYSIS

For our quantitative analysis of the flourishing scale results and the count of toxic events, we performed both a within-subjects analysis comparing the results of the first week to the results of the second week for each condition and a between-subjects analysis comparing the second week of the control condition with the second week of the gratitude condition. For the within-subjects analysis, we compared the change in the mean Flourishing score and the change in the average number of reported types of toxic behaviors performed between the first and second weeks using a Mann-Whitney U test. For the between-subjects analysis, we compared those same scores between the control and gratitude conditions using a Wilcoxon signed-rank test.

We followed a thematic analysis approach to analyze the written responses of the participants that were collected during the second week. We conducted qualitative coding of the responses, making sure to remain receptive and look for as many codes as possible. From there, we iteratively combined these codes into emergent themes. Our qualitative coding resulted in 5 different themes for the gratitude condition and 6 different themes for the control condition.

RESULTS

We present here both the quantitative and qualitative findings from our study, examining the impact of a gratitude intervention on players' well-being and in-game toxicity in League of Legends.

QUANTITATIVE

Our between-subjects analysis of the median Flourishing scores after the second week between the gratitude condition and the control condition showed a significant difference between the two groups ($p = 0.02$). However, this significant difference was also present during the first week of the study when both groups were following the same procedure ($p = 0.0001$; see Figure 1) As a result, this significant difference is almost certainly due to sampling variability rather than the result of the intervention. Furthermore, an analysis of the mean number of reported types of toxic behaviors showed no significant difference between the two conditions ($p = 0.14$; see Figure 2).

Figure 1

Distributions of Median Flourishing Scores

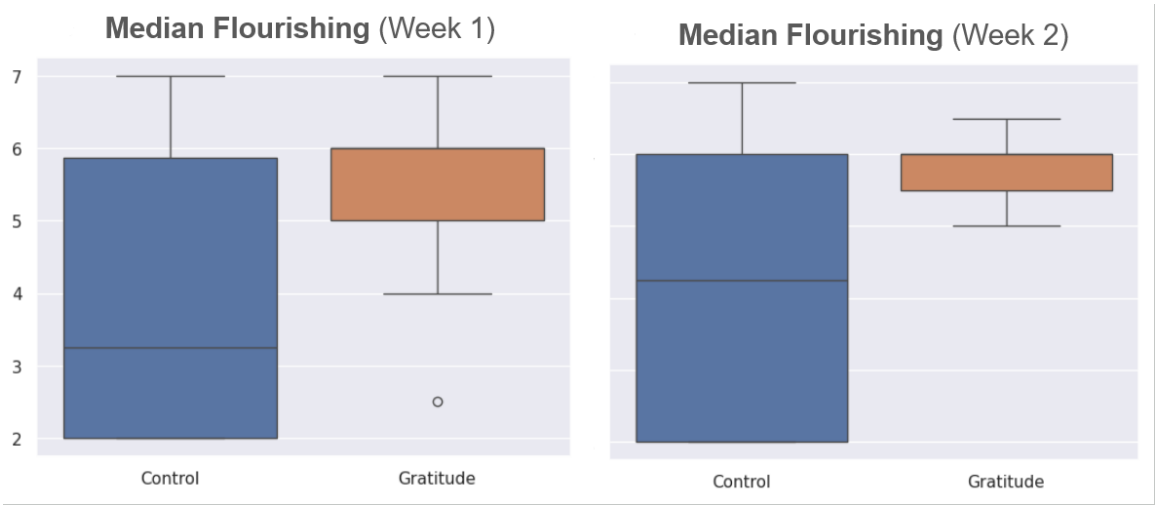


Figure 2

Distributions of Median Number of Toxic Events After Week 2

Our within-subjects analysis of the change between the first and second weeks did not show a statistically significant change. The Wilcoxon signed-rank test found no change in the median Flourishing scores for control participants ($p = 0.67$) and no change for gratitude participants ($p = 0.39$; see Figure 3). Similarly, we found no statistically significant change in the mean number of reported types of toxic behaviors for the control group ($p = 0.43$) or the gratitude group ($p = 0.43$; see Figure 4).

Figure 3

Distribution of Changes in Median Flourishing Score from Week 1 to Week 2

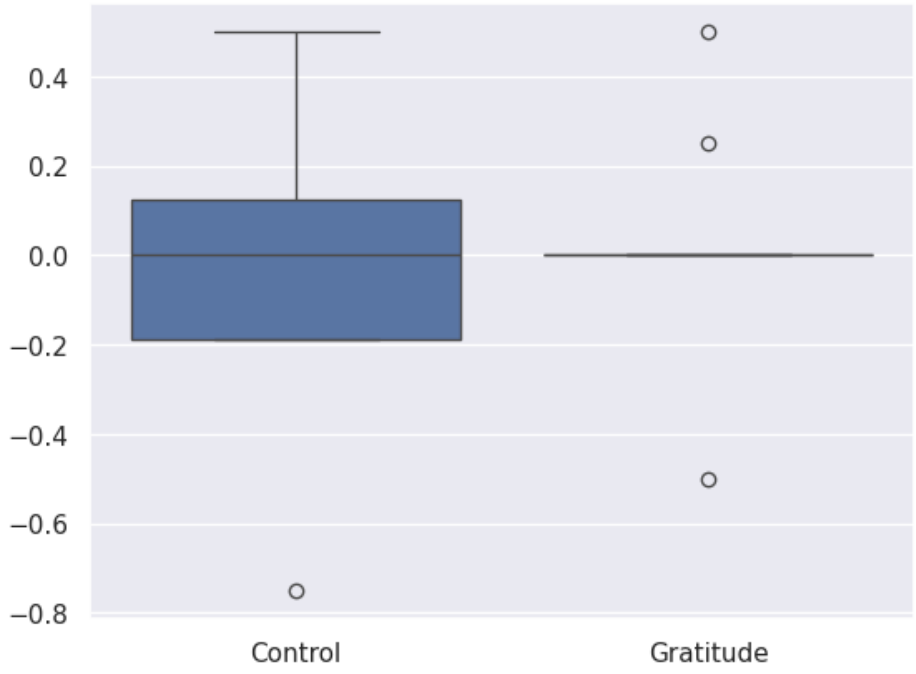
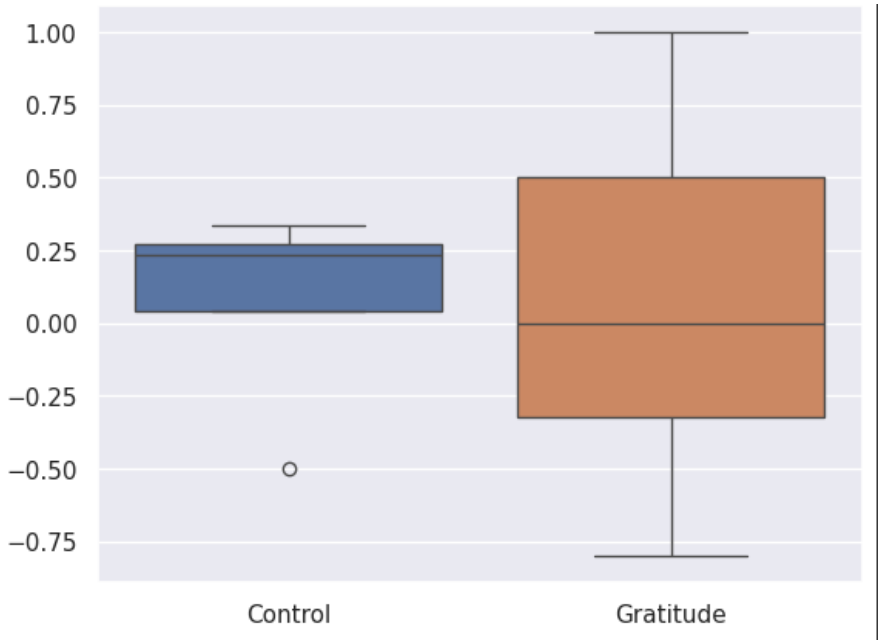


Figure 4

Distribution of Change in Median Number of Toxic Events from Week 1 to Week 2



QUALITATIVE

Participants in the gratitude condition expressed gratitude for a variety of different things, but by far the most common was gratitude for other players. They gave thanks to teammates who were patient and kind, who helped support their own weaknesses, and who were otherwise good, skillful teammates. Surprisingly, many of the participants also expressed gratitude for their opponents as well. They gave thanks to their opponents for being good sports, both in victory and defeat, with one participant writing that they were *"thankful for the enemy team, as they put up a fight and didnt ff [surrender early] even when they were getting beat."* Another participant wrote that they were *"thankful for the enemy team ending the match quickly so i could be free"*. This focus on the other people

that the participants played with is quite encouraging, as positive awareness might produce a moment of hesitation before engaging in toxic behavior towards them.

Participants also expressed gratitude for elements of the game, such as the infrastructure required to be able to play it. Some players gave thanks to the developers for their work. This was sometimes in a backhanded way, as seen when a participant wrote they were grateful for "*Riot's design team even though they don't know how to balance."* Another player also expressed that they were grateful for having access to an internet connection to play the game. Other game elements that participants were grateful for were evidence of their progress through in-game levels or ranks. One participant was grateful for having ranked up to Platinum, the sixth highest rank in the game. Additionally, many players indicated that they were grateful for having had fun during their time playing.

The final and second-most prevalent theme was participants expressing gratitude for things completely separate from the game, such as friends, family, partners, and the ability to be physically active. This is notable because these responses didn't follow the instructions that participants were given (to express gratitude about people or things from their time playing). While it is possible that participants didn't read the directions carefully enough, one participant's response was directly about this and was quite illuminating:

"I'm grateful for all the other things in life that I have. Real people, family, good food, a roof. I am not grateful for League nor the people. I don't come here to be grateful, and when I tried to fake that feeling I got more conscious about how shitty is the people that play this game (at least a percentage big enough to make it silly to try to salvage the few good interactions here and there). If I try to be conscious about the game to try to feel gratitude, the only thing I want to do is uninstall the game."

It seems that at least one participant in the gratitude condition, when asked to be thankful for people or things in the game, found that there wasn't anything to be grateful for, and subsequently quit the study.

In the control condition where participants were asked to simply write down things they noticed, there were two major categories that the themes fell into. Participants largely noticed either things about themselves, or about their teammates.

The primary way in which participants were aware of themselves was through their performance in the game. Some responses were self-critical, with one participant writing about a character that they really liked and "*did really well with last season, but I've been struggling on him recently, and it definitely made me feel super crummy."* However, most responses were fairly non-judgmental, and responses stayed focused on just noticing. For example, one participant wrote that *"I noticed that I have been playing poorly too. I think it has to do with mental fatigue from staying up late to play games*

after difficult classes." Another participant wrote that they'd noticed that "*my 2nd game with Smolder did not go very well. I played against Darius mid and did not have the correct runes and summoner spells to 1v1 him."* Just as participants would notice these lowlights, they would also notice highlights, such as when one participant "*dominated with a final [Kill/Death/Assist ratio] of 15/3/10 and 7 cs per minute which was great."* These kinds of observations are in line with some of the affordances that League of Legends provides. During the game, players can view a "scoreboard" showing the number of kills and deaths each player has, as well as how much gold they've earned and which items they've bought. After the game, each player can also view a more detailed minute-by-minute breakdown of their performance as compared to the 9 other players in the game. The game places these kinds of performance metrics right at your fingertips, so, unsurprisingly, these metrics would also be at the surface of the players' thoughts when it comes time to write about noticings.

In addition to being aware of their performance, participants noticed their own emotional experience. A few participants noted that they had played for a shorter amount of time than typical. One participant noted a lack of desire to keep playing, while another attributed the shorter play session to feeling tired. In addition, many participants noted that they weren't having fun and would continue to play despite not having fun. One participant wrote that "*I noticed that I wanted to continue playing regardless if I was having fun,"* and another wrote that "*I should've hopped off then to save my mental*

health but I did not, and I stay upset about it." In contrast to the participants' balanced noticing of both good and bad performances, these negative emotions and lack of fun were over represented in participant responses. Not a single response from a participant mentioned that they had noticed that they'd had fun.

League of Legends players do still aim to try and have fun (or at least aren't intentionally trying not to have fun), so many participants noticed different factors or techniques they could use to help themselves be more emotionally stable or reduce their toxicity. One participant noticed that taking a break for a few days helped them to play better as well as made them "*more stable emotionally."* Several other participants noticed that muting some or all other players was also effective in making sure they didn't get upset and behave toxically. One participant wrote that "*I mostly avoid flaming in text chat if I use [voice chat] to communicate with friends,"* and another wrote that "*muting at the first sign of trouble, it's been quite helpful."*

The final theme under awareness of self was participants noticing and questioning their own motivation for playing League of Legends in the first place. For the participants who noticed their reasoning for playing, their goal is ultimately to have fun. As one participant put it, "*I don't care about winning or losing, as long as I'm having a good time (and perhaps another person deserves to lose)."* As described above, participants in the control condition tended to notice when things went poorly or when they weren't enjoying themselves. For a few participants, this prompted a deeper level of self-

reflection, where they noticed the effects of playing didn't seem to line up with their initial motivation of wanting to have fun, and in turn, questioned what was making them keep playing. One participant wrote that "*I couldn't stop myself from continuing to play after a win, almost as if I was a drug addict looking for their next fix* 😲💨 *but also I can't not play before bed or I won't get good sleep* 😭*."* Another participant said the following in a similar vein:

"Even tho I hate this game, I can't stop playing it, and I think I realized today that I continue to play it 1: bc im addicted, and 2: bc it's something I can do with all my friends, I like the sense of community. I think that is the major reason why I continue to play, friends far outweigh the bad for me.

When participants weren't noticing things about themselves or their experience, they were noticing things about others. These noticings were directed at their teammates, their opponents, or other players more generally. These noticings were also primarily about the performance of others in the game, and they tended to notice when their teammates played poorly or worse than the enemy team. For example, one participant wrote that "*I felt very frustrated at my tahm kench support who kept going in to fight [when they shouldn't have],"* another wrote that "*Someone forgot items and I couldn't get them to notice,"* and another wrote that "*I noticed that my katarina mid built ludens echo for some reason instead of something like a shadowflame which was troll."* All of these share an implied expectation that had been violated. The participants' teammates behaved in a way that the participants believed they shouldn't have. This implied

expectation was also present when participants noticed moments when their teammates would leave the match mid-way through, resulting in an imbalanced 4v5 game. One participant wrote, "*I don't understand how there are so many throwers in the game. Like, players who just don't play the game. How can that be fun?"* League of Legends players expect that their teammates will act competently, and so moments when they didn't meet this expectation stood out and were noticed by the participants.

DISCUSSION

In this study, we examined the role that self-reflection and gratitude play in addressing online gaming toxicity. Our quantitative analysis showed no statistically significant difference between the first and second weeks and between control and gratitude conditions, for both flourishing and toxicity. Our qualitative analysis showed that those in the gratitude condition were able to express an appreciation towards other players (both teammates and opponents), towards game-related elements, as well as towards things unrelated to the game (such as family or friends). Those in the control condition noticed aspects about themselves, such as their performance, emotional state, coping strategies, and motivations. They also noticed the behavior of teammates and opponents, particularly when their teammates underperformed or otherwise generally frustrated participants.

Overall, participants in the gratitude condition were asked to show appreciation for things in the game, and this resulted in more positive responses. However, they also frequently disregarded the directions and wrote about things outside of the game, to the

point of one participant expressing negative sentiments about League of Legends and quitting both the game and the study. Participants in the control condition were given a neutral prompt (simply to notice), but their responses were more self-focused as well as more critical and negative than the responses of those in the gratitude condition.

From these results, it seems that neither the gratitude nor the self-reflection exercise helped participants to behave less toxically while playing, nor did our intervention have any meaningful effect on their overall well-being as assessed by the flourishing scale. This suggests that this use of reflection exercises alone isn't enough to meaningfully reduce toxic behaviors in online environments. However, these exercises did influence how participants framed and interpreted their experiences, which could be useful as part of a larger intervention strategy. Notably, the gratitude exercise did result in one participant choosing to quit playing, which shows the potential for gratitude to meaningfully affect user behavior positively.

LIMITATIONS AND FUTURE WORK

While the control condition was designed to serve as a neutral comparison, many participants engaged in deep self-reflection even without the gratitude prompt. Participants in the control group often explored their motivations, emotional states, and even their contributions to toxicity. This suggests that the control prompt may not have provided a strong enough contrast to the gratitude condition. Participants in the control

condition may have experienced a placebo effect, where they still expected the self-reflection to help them. Additionally, we chose not to measure the effects of any kind of punishment to compare gratitude to. This is something future research could attempt to do, for example by offering some kind of bonus compensation that is reduced every time a participant behaves toxically. However, that wouldn't be pure punishment as offering a bonus also incentivises good behavior. Additionally, you wouldn't be able to utilize self-reporting, as bonus compensation for providing a certain kind of data introduces a conflict of interest for the participant.

The inconsistency in survey completion times is another notable limitation. Some participants failed to complete surveys immediately after gameplay and later filled them out retrospectively, potentially introducing recall bias and reducing the accuracy of the data. Another limitation involves assumptions regarding the flourishing scale. While this study used flourishing as a proxy for well-being, it is unclear whether those with higher well-being or higher life satisfaction are less likely to behave toxically. Future research should further explore the relationship between mental well-being and toxic behavior.

Due to methodological constraints, participants self-reported the types of toxic behaviors they engaged in rather than the number of separate instances of toxic behaviors. This means that, for example, someone who was verbally abusive 15 different times in a session and someone who was verbally abusive once in a session both report just one type of toxic behavior. Future work should therefore include more sensitive

measurements for toxic behavior to better understand the effects of interventions for toxicity.

We have found that interventions that influence attitudes outside of gameplay may not be sufficient to reduce toxicity within gameplay itself. Toxic behaviors often emerge in real-time, suggesting that interventions need to be embedded into the game experience, ideally during moments where players are most susceptible to frustration. As such, interventions could be designed to occur in-game, particularly during natural moments of downtime, such as when a player's character is killed and they are temporarily inactive. These moments could provide opportunities for short, targeted interventions to help players regulate emotions before returning to gameplay.

Future research should also aim to develop a better understanding of the underlying factors that drive frustration and toxicity, including unmet expectations of competence and violations of the perceived "social contract" between teammates. Finally, future work should also explore the temporal dynamics of toxicity: when, during a game, is toxicity most likely to occur, and what in-game events precede or predict these behaviors? A more detailed, time-sensitive understanding of these patterns could inform the creation of real-time interventions that are contextually relevant and more effective at reducing toxic behavior as it arises.

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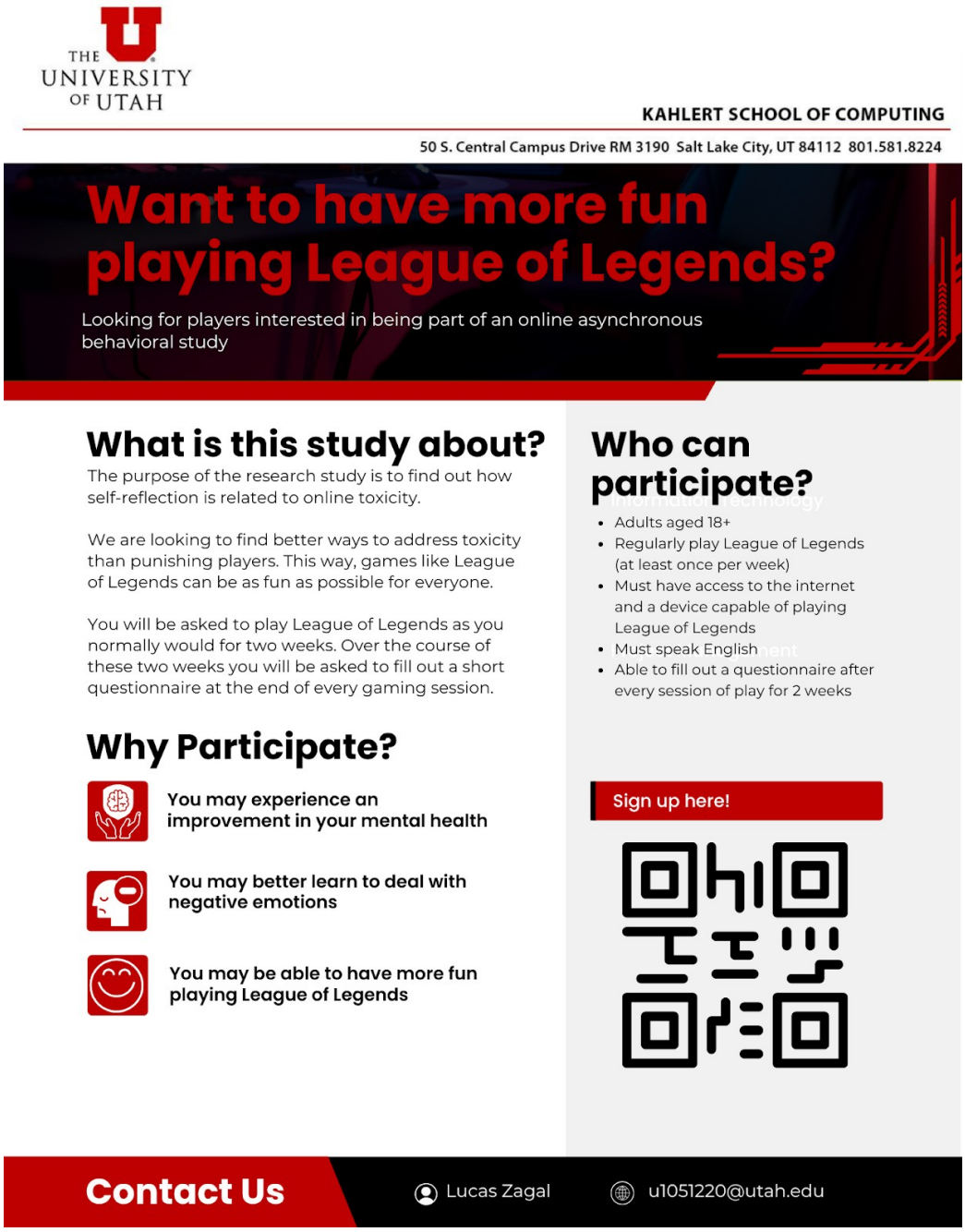
APPENDIX A

RECRUITMENT FLYER



APPENDIX B

STUDY QUESTIONNAIRE

The reflection prompt for the control condition is “Please write about 3 events or things you noticed from your time playing League of Legends today: (e.g ‘After playing, I noticed…’)”

Game Questions

Once you've finished playing for the time being, please answer these questions to record how your session playing League of Legends went:

What is your Riot ID? (e.g EarlGreyTeemo#sip)

How many matches did you play during this session?

Of the matches you played, how many did you WIN?

Of the matches you played, how many did you LOSE?

Were there any moments where you felt frustrated/upset at your teammates?

- ○ Yes
- ○ No

Reflection

Please express gratitude about 3 things or towards 3 people from your time playing League of Legends today:

(e.g "After playing, I am grateful for...")

Effort

How much effort did you put into answering the previous question?

- ○ Very little effort
- ○ Quite a bit of effort
- ○ A lot of effort

Flourishing Questions

Below are 8 statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement or disagreement with each statement:

	1. Strongly disagree	2. Disagree	3. Slightly disagree	4. Mixed or neither agree nor disagree	5. Slightly agree	6. Agree	7. Strongly agree
I lead a purposeful and meaningful life.	○	○	○	○	○	○	○
My social relationships are supportive and rewarding.	○	○	○	○	○	○	○
I am engaged and interested in my daily activities	○	○	○	○	○	○	○
I actively contribute to the happiness and well-being of others	○	○	○	○	○	○	○
I am competent and capable in the activities that are important to me	○	○	○	○	○	○	○
I am a good person and live	○	○	○	○	○	○	○

a good life							
I am optimistic about my future	○	○	○	○	○	○	○
People respect me	○	○	○	○	○	○	○

Name of Candidate: Lucas Zagal

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