A toxic triad: Aggression, anger, and authoritarianism - A study with multiplayer online battle arena game players

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Abstract

Previous research on players' toxic behaviors in multiplayer online battle arena games (MOBAs) has suggested that individual beliefs about how other players "ought to behave" are major contributors to how they perceive and experience toxicity. In this study, we operationalized a psychometric measure of authoritarianism as a proxy for capturing players' beliefs about the rigidity of roles and behavioral expectations in the MOBAs League of Legends and Dota 2. Using reasoning from frustration-aggression theory, we formulated hypotheses which we tested with a cross-sectional sample (N=216). The results offered support for our hypothesis that those scoring higher on authoritarianism also reported experiencing higher levels of anger and aggression in MOBAs. This study is among the first to offer empirical support that strong beliefs about rigid roles and behavioral patterns may lead to increased frustration and, consequently, toxic behavior.

Keywords

Toxicity, toxic behavior, aggression, anger, authoritarianism

1. Introduction

Not only since the pandemic, multiplayer online battle arena games (MOBAs) have enjoyed steadily increasing popularity across the world. For example, one of the most popular MOBAs currently, League of Legends, is played monthly by over 150 million players and is one of the highest-grossing video games in the world, bringing in billions of dollars each year [36, 37]. The great success of MOBAs also can be attributed to the now standard, but back in-the day innovative, freeto-play business model (i.e., in which players get access to the game without having to pay for it), which significantly increased the appeal of the corresponding games and lowers setup costs for players. On the revenue side, MOBAs earn much of their revenue from selling so-called purely hedonic quadruple items (such as ward or champion skins) [8, 28]. Moreover, MOBAs can be understood as a unique digital playground that is highly dynamic, competitive, and frustrating, but also offers less autonomy for individual players than older game concepts [18, 44]. As a result, new forms of digital user behavior and collaboration can be observed.

A related phenomenon that can be observed in the MOBA context, and also other competitive online games, is so-called toxic behavior, which represents an umbrella term for different forms of deviant behaviors such as insulting, criticizing, or stealing resources (mostly) directed towards teammates [30]. Toxic behavior leads to a bad mood during highly competitive games and is considered the primary driver of player churn [2]. Therefore, toxic behavior is a major challenge in MOBAs and beyond. During the last couple of years, academia has started to focus much more heavily on toxic behavior and contributed to the current understanding of toxicity. For example, Neto et al. (2017) studied communication patterns that lead to toxic behavior among players and found that once it has begun, toxicity propagates and manifests throughout a battle [42]. Moreover, Adinolf and Turkay found that most reported instances of toxicity originate from players' need attributing failure to others [2] and Beres et al looked at the normalization of toxic behaviors [12]. Furthermore, Kordyaka et al. derived a unified theory of toxic behavior, showing that attitude, past victimization experiences, behavioral control, and disinhibition were the most relevant antecedents of toxic behavior [29]. Despite some isolated indications, relationships between the player's personality and toxic behavior are still scarce, which is surprising because they would offer an efficient opportunity to address clusters of players based on different characteristics. More specifically, there is a lack of knowledge on to what degree players' tendencies for

GamiFIN Conference 2024 (GamiFIN 2024), April 2-5, 2024, Ruka, Finland.

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negative emotions (e.g., anger and aggression) and individual orientations correlate with toxicity.

With the present study, we seek to contribute to these research gaps by exploring the relationship between individual dispositions and orientations and toxic behavior in a theory guided manner. For this, we refer to previous work that already dealt with the relationship between individual dispositions and orientations and deviant behaviors in the neighboring contexts of social psychology, political science, and sociology [1, 15, 22]. Specifically, we want to test the explanatory potential of the political orientation authoritarianism (e.g., describing the advocacy of strict obedience to authority at the expense of personal freedom) and the two individual emotional dispositions: anger (e.g., describing an intense emotional state of displeasure and hostility) and aggression (e.g., refers to a behavior intended harming oneself or others) as antecedent variables of toxic behavior [5, 38]. To this end, we use a cross-sectional survey design, covariance-based statistics, and structural equation modeling collecting data from players of the two successful MOBAs League of Legends and Defense of the Ancients 2. In summary, our study is guided by the research question listed helow:

Research question: How do authoritarianism, anger, and aggression influence toxic behavior in MOBAs?

By answering the RQ we contribute to the research on toxicity in the fields of IS and beyond. The rest of this study is structured in the following order. First, in the related work section, we introduce toxic behavior and the relevant antecedent variables (i.e., authoritarianism, anger, aggression). Next, we describe the methodology including research design, data collection, and measurements used. Following this, we present the results comprising preliminary analysis, hypotheses testing, and additional analysis. Afterwards, we discuss our main findings, their implications and limitations, and future work. The paper closes with a short conclusion section.

2. Related work

In the following, we provide introspection about relevant knowledge related to the context and constructs of our study.

2.1. MOBA games

MOBA games, or Multiplayer Online Battle Arena games, are a genre of video games that can be understood of a contemporary form of strategy video games, where two teams of players, typically consisting of five members each, compete on a strategic battlefield to destroy the opposing team's main structure (oftentimes called the Nexus) [18]. Played on maps with distinct lanes, players control unique champions (sometimes called heroes as well) with specific abilities, gaining experience and gold throughout the match to level up and purchase items [41]. The objective in a variety of MOBAs is to push through enemy defenses, defeat opponent heroes, and

ultimately destroy the enemy team's core or nexus [3]. A notable feature of MOBAS is the combination of the design elements of real-time interaction in a highly competitive environment [33]. With a focus on teamwork, strategy, and individual skill, popular examples include League of Legends and Defense of the Ancients 2, offering a highly competitive and engaging gaming experience.

2.2. Toxicity in MOBAs

The occurrence of toxic behavior is one of the most crucial challenges for the contemporary industry of the MOBA market because corresponding behaviors substantially limit the player experience leading to negative (economic) consequences such as reduced revenue and lowering the number of players [27, 41]. Furthermore, some scholars even derived indicators that toxicity not only makes the game less enjoyable but can also negatively impact the mental health and well-being of players [17, 32]. To combat toxicity, game developers, such as Riot Games (in case of the most successful MOBA League of Legends) often implement systems such as reporting and banning systems, which show manageable levels of success [31]. To better understand toxicity, it's important to know the unique characteristics of toxic behavior and how it differs from other negative behaviors online. Opposed to well researched constructs of the dark side of technology use, such as cyberbullying [7, 9], toxic behavior is much more temporary and not always intentional (it can be rather understood as a spontaneous strategy of coping as an answer to a situation of stress), and a rather normalized part of the ordinary culture of play [2, 12, 35]. As explanations the specifics of the online environment (e.g., anonymity and online disinhibition) as well as characteristics of the game (e.g., competition, need for collaboration) were often listed [29, 31]. Summarizing, existing research has already derived a substantial body of knowledge related to toxic behavior but its relationship with player dispositions and orientations is still scarce.

2.3. Authoritarianism

As briefly introduced earlier, authoritarianism can be conceptualized as a political orientation that combines elements of politics and authoritarianism [5, 17]. Authoritarianism classically impacts individuals' attitudes and behaviors by suppressing dissent, scapegoating marginalized groups, and reinforcing social hierarchies. The orientation has already been explored in contexts such as social psychology, political science, and sociology trying to understand better the underlying psychological and sociopolitical factors associated with authoritarian attitudes and its implications [4, 46]. To the best of our knowledge, no study has yet attempted to better understand the relationship between authoritarianism and toxic behavior in MOBAs, which is surprising because individuals with authoritarian tendencies may exhibit a desire for control and dominance, leading to aggressive and toxic behavior toward teammates or

opponents. Corresponding insights promise to offer possibilities for a more inclusive and respectful gaming culture by raising awareness, implementing clear guidelines and reporting systems. Based on the characteristics of authoritarianism (e.g., suppression of dissent, reinforcement of social hierarchies), it should have an impact on how players deal with stressful and potentially frustrating situations during a game. Following this line of thought, player authoritarianism should contribute to manifestation of toxic behaviors and manifest itself through more toxic behaviors during a game, such as resource theft, harassment, and unsportsmanlike conduct. Accordingly, we specify our Hypotheses 1:

Hypothesis 1: the individual orientation authoritarianism is positively correlated with toxic behavior.

2.4. Frustration-aggression theory

Frustration-aggression theory is a psychological theory that proposes a direct relationship between frustration and the likelihood of resulting aggressive behavior. The theory posits that when an individual experiences frustration or an obstacle in achieving a goal, it triggers a state of emotional arousal, specifically anger and aggression [13, 14]. The individual dispositions anger (e.g., can be considered an emotional response of an individual) and aggression (e.g., can be considered a behavioral response of an individual) have a long history in psychological research and the context of deviant behaviors since both constructs are relevant in many aspects of human cohabitation, as they are natural responses to stress, conflict, and frustration [22, 38, 40]. Previous research, has already made use of anger and aggression in the context of video games deriving insights such as exploring the link between violent video games exposure and aggression or how design features can be used to reduce aggression [47, 48]. However, to the best of our knowledge, no study up to now has attempted exploring relationships between anger and aggression and toxic behavior, which is surprising because both concepts offer particularly suitable opportunities to explain toxicity because of resulting conflicts during gameplay of highly competitive and disinhibited MOBAs. Based on this, we specify two hypotheses we seek to test within our study.

First, because anger is a natural emotional response to frustrating situations that occur multiple times in almost every MOBA ranked game, we hypothesize that players in a disinhibited environment act more impulsively without considering the consequences of their actions and that they are more likely to behave in a toxic manner. Accordingly, we postulate a reinforcing effect of anger on toxic behavior and formulate our Hypothesis 2:

Hypothesis 2: the individual disposition anger is positively correlated with toxic behavior.

Second, we seek to test whether behavioral aggression is also a relevant predictor of toxic behavior in MOBAs. Specifically, we postulate a positive relationship between aggression and toxicity, as aggression is defined as a hostile attitude that should increase the likelihood of the occurrence of negative (toxic) behaviors. Accordingly, we assume a reinforcing effect of aggression on toxic behavior and formulate our Hypothesis 3:

Hypothesis 3: the individual disposition aggression is positively correlated with toxic behavior.

3. Methodology

To comprehend the methodology in our study, we subsequently illustrate information related to the

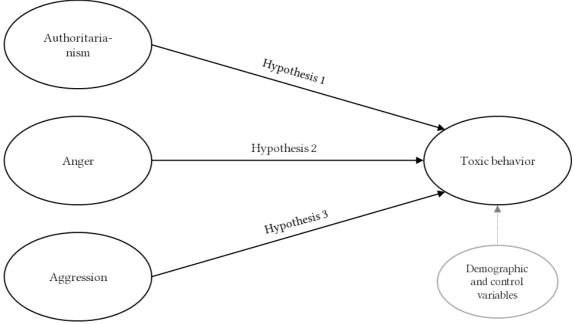


Figure 1. Research model.

research design and the procedure, the data collection and participants, and the measurements used.

3.1. Research design and procedure

To answer our RQ and the corresponding hypotheses, we used a cross-sectional approach collecting self-reported data from players of the two MOBAs League of Legends and Defense of the Ancients 2 with the aid of an online survey. After data collection, we analyzed the data with covariance-based statistics (i.e., regression analysis and structural equation modelling) using SPSS 28 and AMOS 28. The subsequent Figure 1 illustrates the research model of our study.

To ensure a structured procedure, we divided our questionnaire into a total of five parts, each of which was presented separately, with the items in the individual parts being randomized. In the first part of the questionnaire, we first listed the aim of our study and the necessary characteristics of the research subjects as well as information on data protection and contact options. Subsequently, in the second part of the questionnaire, we asked all items related to our independent variables (authoritarianism, anger, aggression). This was followed in part three of the questionnaire by our dependent variable toxic behavior and in part four by relevant demographic characteristics of the participants. Finally, in part five, we thanked the participants and presented the necessary code to prove their participation.

3.2. Data collection and participants

First, we collected data from 254 participants via the crowdsourcing marketplace Mechanical Turk (MTurk). All participants received \$2.15 as a reward for participating in our study. To ensure that the questions were answered seriously and that participants were attentive while participating in our questionnaire, we included a total of three attention

check items in our questionnaire (e.g., "Please choose a number greater than 4"). Using these measures, we excluded a total of 18 participants, leaving a sample of 236 MOBA players. To further ensure the quality and fit of the participants to the objectives of our study, we also asked participants to indicate their three favorite game characters (either in League of Legends or Defense of the Ancients 2) in an open response field and excluded participants with ambiguous answers (10 cases). We also excluded 10 additional cases with implausible answers (e.g., single or triple digit age) and missing data. Consequently, our final sample comprised 216 participants.

Regarding the demographic characteristics of our sample, most participants were male (n = 119), roughly around 34 years (M = 34.19; SD = 6.92), holding a bachelor's degree (69%), and coming from North America (n = 189). Additionally, regarding the control variables, the majority of participants played League of Legends (n=152), their playing experience was a little more than 3 years as an average (M = 3.17; SD = 1.11), they reported playing video games several times a week (M = 2.26; SD = 1.03) for approximately 10 hours per week (M = 10.08; SD = 2.08).

3.2. Measurements

To measure the reflection constructs in our study, we used validated scales and items from previous studies and adapted these to the context of our MOBA games study wherever necessary. To measure the items, we used a seven-point Likert scale ranging from 1 ("strongly disagree") to 7 ("strongly agree") to avoid comparability and unnecessary bias. A complete list of the measurement instruments used in our study can be found in the subsequent Table 1. To ensure an adequate understanding of the items, we distributed the questionnaire to two student assistants (both of whom have extensive experience with MOBAs) from one of our research groups prior to our data with acquisition, the task of ensuring comprehensibility. Based on the feedback from both assistants, the items seemed easy to understand.

Table 1
Measurements and wording of items

Construct	ID	Wording	Source
Toxic behavior		If I get mad during a game, I	[30]
	TB_1	intentionally interrupt others while they are writing.	
	TB_2	hold others responsible making own mistakes.	
	TB_3	take away resources belonging to others.	
	TB_4	insult others.	
	TB_5	criticize others.	
Authoritarianism	AT_1	Troublemakers should clearly feel the effects of the fact that they are unwanted in the game.	[24]
	AT_2	Players should leave important decisions to those in charge.	
	AT_3	Established conducts should not be questioned in the game.	
Anger	AN_1	I become irritable if I am disadvantaged during a match	[40]
	AN_2	I get mad when I lose points.	
	AN_3	I show my irritation when frustrated during a game.	
	AN_4	I find it difficult to control my temper during a match.	
	AN_5	Game bugs make me angry.	
	AN_6	I feel bitter towards my opponent if I lose.	

Aggression	AG_1	Violent behaviour, directed towards an opponent, is acceptable.	[40]
	AG 2	It is acceptable to use illegal force to gain an advantage	

It is acceptable to use illegal force to gain an advantage.

AG_3 I taunt my opponents to make them lose concentration.

AG 4 I use excessive force to gain an advantage.

I insult opponents to distract them. AG 5

AG 6 Opponents accept a certain degree of abuse.

Dependent variable

Toxic behavior. To measure toxic behavior, we used an empirically validated scale consisting of five items [29]. The scale (M = 4.21; SD = 1.63; Cronbach's Alpha = .91) comprised statements such as "If I get mad during a game, I hold others responsible for making own mistakes".

Independent variables

Authoritarianism. To measure authoritarianism, we used an empirically validated scale consisting of three items [24]. The scale (M = 4.60; SD = 1.44; Cronbach's Alpha = .84) comprised statements such as "troublemakers should clearly feel the effects of the fact that they are unwanted in the game".

Anger. To measure anger, we used an empirically validated scale consisting of six items [40]. The scale (M = 4.42; SD = 1.33; Cronbach's Alpha = .89)comprised statements such as "I become irritable if I am disadvantaged during a match".

Aggression. To measure anger, we used an empirically validated scale consisting of six items [40]. The scale (M = 4.11; SD = 1.64; Cronbach's Alpha = .94)comprised statements such as "I taunt my opponents to make them lose concentration".

4. Results

4.1. Preliminary analysis

To control for any unwanted effects of the demographic and control variables on the dependent variable toxic behavior, we conducted a multiple linear regression analysis. Therefore, we inserted the demographic (age, sex, education, country) and control (game, started to play, frequency, hours a week) variables as predictors of the dependent variable toxic behavior. The regression showed a significant result (F (8,204) = 3.75, p < .001) and explained 9% of the variance of the dependent variable toxic behavior. After controlling for the false discovery rate using the Bonferroni correction [11], only the variable education (β = .21, p < .05) had significant effects on toxic behavior (all others $p \ge .53$).

4.2. Hypotheses testing

To test the hypotheses of our study, we inserted authoritarianism as well as anger and aggression as independent variables to explain the dependent variable toxic behavior, while controlling for the influence of the identified confound education. The regression equation showed a significant result (F (4,211) = 117.20, p < .001) and explained 68% of the variance of the dependent variable toxic behavior. After applying the Bonferroni correction, anger (β = .21, p < .01) and aggression (β = .59, p < .01) had significant effects (others $p \ge .22$). Accordingly, we found empirical support for Hypotheses 2 and 3 (opposed to Hypothesis 1).

4.3. Additional analysis

To derive a more holistic picture related to the relationships between the variables in our research model, we decided to carry out some additional analysis. For this, we relied on the previously identified results of the hypothesis testing section and specified the non-significant variable authoritarianism as an antecedent of anger and aggression. Despite the empirical indicator of the hypotheses testing, we justified this specification because authoritarianism is related to an emphasis on strict adherence to traditional values, hierarchical structures, and the suppression of dissent [24]. These beliefs can create a sense of threat when their worldview or authority is challenged, which should result in heightened anger and aggressive behaviors.

Before testing the structural equation (path) model, we derived relevant validity indicators allowing us to carry out a structural equation path model based on existing recommendations in relation to discriminant and convergent validity [20, 21]. Specifically, we carried out a maximum-likelihood factor analysis with oblimin rotation specifying the extraction of four factors (i.e., toxic behavior, authoritarianism, anger, aggression) to test the composite reliability (CR), the average variance extracted (AVE), and the Fornell-Larcker criterion. Based on the results depicted in Table 2 and Table 3 in the Appendix, all composite reliabilities exceeded the recommended threshold of 0.7 (≥ 0.77), the AVE of each construct was greater than $0.5 (\ge 0.51)$, and all items loaded on the intended factors ($j \ge .62$). Accordingly, convergent validity of the four constructs seemed satisfied. Additionally, the square root of the AVE of each construct (≥ 0.71) was greater than the correlations between each construct and the other constructs (≤ 0.70), and no meaningful cross-loadings were detected, satisfying the conditions required for discriminant validity.

Table 2
Descriptive statistics and construct correlations

Construct	CR	AVE	Mean	SD	1	2	3	4
Toxic behavior	.84	.51	4.21	1.63	.71	.65***	.66***	.61***
Authoritarianism	.79	.56	4.60	1.44		.75	.58***	.70***
Anger	.86	.55	4.42	1.33			.74	.65***
Aggression	.77	.56	4.11	1.64				.75

Note(s): (a) CR: Composite reliability; (b) Diagonal elements are the square root of the shared variance between the constructs and their measures; (c) Off-diagonal elements are correlations between constructs. ***p < 0.001

To test the specified model, we inserted the data into a structural equation (path) model [25]. The results of the path model showed little room for improvement ($\chi 2$ (1,216) = 4.15, p = .04), which is no longer relied upon as a basis for acceptance or rejection of a model [43, 45]. Therefore, we assessed additional fit indices, which consistently indicated an excellent fit between the postulated theoretical model and the empirical model (CFI = .99, GFI = .99, SRMR =

.02). The subsequent Figure 2 summarizes the results. Based on the results of our model, all predictors accounted for 68% of the variance of toxic behavior. Whereby, anger (β = .24, p < .001) and aggression (β = .65, p < 0.001) predicted toxic behavior and authoritarianism predicted anger (β = .70, p < .001) and aggression (β = .58, p < .001). Furthermore, anger and aggression showed a significant correlation (r = .42, p < .001).

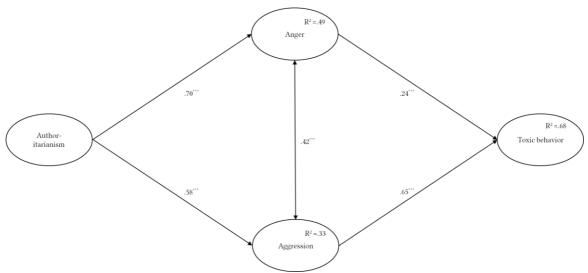


Figure 2: Aggregated model

5. Discussion

Subsequently, we summarize our main findings, illustrate the significance of them, and highlight possible implications for theory and practice, and limitations, we subsequently list them below.

5.1. Main findings

Based on the results of our study, we are now able to answer our research question – How do authoritarianism, anger, and aggression influence toxic behavior in MOBAs? Taken together, we summarize our key findings with the following points:

 First, the individual orientation authoritarianism was (opposed to our Hypothesis 1) not a relevant predictor of toxic behavior

- Second, the individual dispositions anger as well as aggression were highly relevant positive predictors of toxic behavior confirming Hypotheses 2 and 3.
- Third, as part of our additional analysis, we found empirical indicators that authoritarianism was a meaningful predictor variable of both individual dispositions anger and aggression.

5.2. Implications for theory

The results of our study allow for several implications that are relevant on the level of theory. Below, we elaborate on some of them.

First, contrary to our hypotheses', authoritarianism was (to our own surprise) not a direct predictor of toxic behavior. One possible explanation for this could be the semantic distance of the operationalization of authoritarianism we picked for our study, which rather describes more general

orientations towards society (e.g., "people should leave important decisions to those who are in charge") [31]. This possible explanation is corroborated by the results of the additional analysis of our study, which showed that the influence of authoritarianism on toxic behavior was fully mediated by anger and aggression, whereby both constructs semantically showed much greater proximity to the MOBA context of our study (e.g., "I become irritable if I am disadvantaged during a match"). Based on this, we argue that the influence of authoritarianism was overshadowed by the influences of anger and aggression in a regression analysis we simultaneously tested the influences of all three predictor variables. As a potential workaround, we recommend future research to consider more holistic measurements of authoritarianism comprising multiple dimensions to test more granular influences of authoritarianism. This could be achieved by making use of the authoritarianism scale and the dimensions authoritarian submission, authoritarian aggression, and conventionalism [16, 39].

Second, both anger and aggression were relevant direct predictors of the commission of toxic behaviors. At the theoretical level, we interpret the positive influence of anger based on the assumptions of cognitive appraisal theory and frustration-aggression theory [10, 19]. Thus, anger is often triggered by the perception of an unfair or frustrating situation when individuals see their goals threatened. This empirical pattern also fits the context of toxic behavior in MOBAs, as toxicity is often triggered by the perceived "guilt" of other teammates (the external attribution theme), leading to anger as a player's emotional response. In the case of the positive influence of aggression, we rely on the General Aggression Model [6, 26] as an additional theoretical explanation. The General Aggression Model assumes that aggression is triggered by a combination of cognitive and emotional processes, physiological arousal, and individual characteristics. The emergence of toxic behavior is also associated with physiological arousal, which causes an overload of available resources and situational stress in a player. As a consequence, we understand this finding as a confirmation of previous research related to toxicity understanding toxic behavior as a form of coping within a specific situation [29].

5.3. Implications for practice

We also derived important implications from our findings that relate to untapped opportunities for reducing toxic behavior through game design.

First, our results showed that authoritarianism exerted a fully mediated effect on toxic behavior via anger and aggression. This finding can be used to target players who have a higher dispositional expression of authoritarianism and are more likely to engage in toxic behavior. To this end, for example, educational programs could be developed as part of a game's communication strategy to promote awareness of a more inclusive and diverse gaming community. To disseminate such programs, game developers could use a variety of tools, such as a) partnering with organizations working to address toxicity to share resources, b) community events and tournaments to

encourage participation of players from diverse backgrounds and promote teamwork, respect, and fair play, and to open their doors to player-driven initiatives that embrace the promotion of a positive gaming culture.

Second, both anger and aggression were highly relevant direct predictors of toxic behavior. Given the significant influences of our study, we suggest that strategies to reduce toxicity should also take these findings into account. For example, game developers could use market segmentation and user-centered technology design techniques to target specific groups of players with homogeneous personality traits that are more or less likely to play a role in the development of toxicity. Specifically, this could involve the use of a) stress management or b) cognitive restructuring techniques from the field of sports psychology.

5.4. Limitations and outlook

As is the case with all empirical research, our work is not without limitations. First, our research was conducted in the context of MOBAs (i.e., League of Legends and Dota 2). This fact may have introduced some context-specific elements into our work, and we suggest that our findings not to be generalized for all game environments without future research. Second, we collected data from Amazon MTurk, which is a popular means by which researchers can obtain samples quickly [23]. MTurk has received criticism related to participants who have claimed false eligibility and provided low-quality responses. In our research, we addressed these limitations to the best of our ability by introducing several attention-check questions and removing both outlier and inconclusive responses from the data. Nevertheless, we encourage future research to repeat the study that we have conducted with samples sourced from other locations to test reliability. Third, as opposed to previous work related to toxicity [34], we did not find any influences of demographic variables in relation to toxic behavior. We explain this inconsistency with the differences between the samples of the two studies, whereby participants of our study were a little older, and the gender distribution was more equal. Nonetheless, we recommend exploring influences of demographic variables within the context of MOBAs in greater detail in the future. Additionally, we would also like to mention the social desirability bias, which describes a type of response bias in which respondents tend to answer questions in such a way that they are rated positively by others. This can pose a challenge in the context of self-reported toxicity and complicate the interpretation of the data. In addition to pointing to future research that could specifically address this aspect, we refer in this context to a study that triangulated self-reported and behavioral toxicity and was able to show that both variables correlate highly positively with each other [29].

6. Conclusion

Within our study, we examined the innovative phenomenon toxic behavior in the context of MOBA video games investigating the role of individual orientations (i.e., authoritarianism) and dispositions (i.e., anger and aggression) in predicting such behaviors. The findings of the study revealed that both anger and aggression significantly predicted toxic behavior among MOBA players, which can be understood as a confirmation of the assumptions of the frustration-aggression theory. Moreover, additional analysis showed that the influence of the individual orientation authoritarianism was a relevant antecedent of anger and aggression. These results contribute to a better understanding of the complexities surrounding toxic behavior and highlight the importance of considering individual orientations and dispositions in addressing this ongoing challenge in the digital transformation era.

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DOI:https://doi.org/10.1089/cyber.2019.0762

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Appendix

Table 3
Loadings and cross-loadings of items

Item	Toxic behavior	Authoritarianism	Anger	Aggression
TB_1	0,74			
TB_2	0,75			
TB_3	0,62			
TB_4	0,68			
TB_5	0,77			
AT_1		0,79		
AT_2		0,70		
AT_3		0,76		
AN_1			0,82	
AN_2			0,73	
AN_3			0,72	
AN_4			0,73	
AN_5			0,71	
AN_6			0,82	
AG_1				0,74
AG_2				0,75
AG_3				0,74
AG_4				0,76
AG_5				0,76
AG_6				0,75

Note: loadings smaller than .4 are hidden for reasons of clarity.