ASSESSING THE ROLE OF BEHAVIORAL ACTIVATION SYSTEM (BAS)/BEHAVIORAL INHIBITION SYSTEM (BIS) AND SELF-ESTEEM IN ONLINE TROLLING BEHAVIOR

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ABSTRACT

Background: Online trolling is a provocative and obnoxious conduct that takes place online and is associated with participating in anonymous actions making other people feel unpleasant. The two fundamental motivational systems accountable for regulating human behavior, Behavioral Inhibition System (BIS)/Behavioral Activation System (BAS), might contribute to the understanding of this kind of behavior. **Objectives:** In this cross-sectional study, we examined the links between the BIS/ BAS, internet trolling, and self-esteem among adult online multiplayer gamers in Bangladesh. **Methods:** Global Assessment of Internet Trolling (GAIT) scale, the BIS/BAS scales, and Rosenberg self-esteem scale were used to measure study variables. These scales were administered to 131 adult online multiplayer gamers (107 male and 24 female) using snowball sampling approach. Their age range was 18- 31 years (*M* = 21.96*, SD* = 3.20). **Results:** After age, gender and socio-economic status were controlled for, BIS, and BAS (reward responsivity, drive, and fun seeking) were examined for their predictive utility of online trolling behavior. Results revealed that self-esteem is not substantially connected with internet trolling behavior, and that it is predicted by low BIS and high fun-seeking tendency – one of the BAS subscales. **Conclusion:** These results imply that inherent temperamental tendencies may make people more likely to annoy others online for personal gain and enjoyment.

KEYWORDS: Behavioral Activation System, Behavioral Inhibition System, Self-esteem, Online Trolling Behavior, Online Multiplayer Games.

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Introduction

With an ongoing advancement of technology, targeted violence and harassment have increased drastically. Different undesirable phenomena, such as cybercrime and trolling make the online environment hostile to many of its users. Online trolling is receiving increasing research attention and exploration; however, disagreement and confusion surround definitions of the behavior. When trolling behavior is used in an online context, it can be broadly defined as hiding online and using hot-button issues to make other users of the Internet act irrationally or emotionally, or as a way to purposefully enrage others in order to elicit emotional responses, or as a way to oppose other users of the Internet with predictable or unpredictable behaviors; if someone falls into the trick, the troll(s) become even more extreme (Buckles et al., 2014; Morrissey, 2010).

According to Thacker and Griffith (2012), online trolling encompasses a variety of behaviors, such as offensive conduct, racism and gender discrimination, deliberate fabrication, and deceptive statements. In the world of online gaming, this kind of undesirable behavior is commonplace. Research indicates that toxic behaviors, specifically trolling which includes spamming, flaming, trash-talking, misdirection, verbal aggression and cyber-victimization, are prevalent among gamers, particularly in competitive environments (Zsila et al., 2022; Komac and Cagiltay, 2021). Violence in video games has been shown to increase hostile behavior and decrease supportive behavior (Anderson et al., 2010; Hasan et al., 2013). A correlation analysis also showed that violent video games were significantly and positively associated with online aggressive behaviors (Zheng et al., 2021). However, despite its prevalence in cyberspace, trolling as a subject of academic study is a confusing space as limited research has been conducted into the motivations and goals behind those actions – why and who people choose to troll and what gratifies them.

The literature has shown several determinants of trolling behavior. Men are, for instance, reportedly more prone than women to troll others, according to research (Buckles et al., 2014; Sest and March, 2017), yet not all studies have shown this gender difference (March et al., 2017). Yang (2012), found an association between male adolescent online gamers and a preference for violent games, increased hostility, and aggressive behavior. Self-esteem is one factor that has been proven to predict other antisocial behaviors (like cyberbullying) that occur online. According to Rosenberg (1965), self-esteem

is an attitude toward oneself that is either positive or negative and is influenced by one's own ideas and beliefs (Baranik et al., 2008). According to Tracy and Robins (2003), there is evidence to suggest that individuals with poor self-esteem use anger and aggressiveness to project blame onto others in an attempt to protect themselves from feelings of inadequacy.

Numerous studies have been conducted on self-esteem and general Internet use. For example, studies reveal that people with poor self-esteem would rather correspond with others via email or the Internet than in person (Joinson, 2004). Additionally, it has been discovered that using the Internet generally boosts one's self-esteem, but playing video games may have the opposite effect (Jackson et al., 2009). This shows that for those who have relatively low self-esteem, using the Internet as a means of social connection can boost their self-esteem. The impact of self-esteem when playing online video games where social interaction (including trolling) might happen is comparatively unexplored, nonetheless, considering the expansion of online gaming in recent years.

According to Grigsby and Stevens (2000), a theoretical framework for analyzing bullying behavior, bullies may be unable to regulate their aggressive and inappropriate verbal and physical acts. Gray's reinforcement sensitivity theory (Gray, 1982; Gray, 1987), which is widely regarded as an effective approach to understanding and explaining basic human behaviors, proposes that there are individual differences in sensitivity to stimuli from two basic brain systems that regulate and control human motivation and behavior: the behavioral inhibition system (BIS) and the behavioral activation system (BAS). The earlier type controls avoidance behavior to avoid dangers and consequences and is linked to stimuli conditioned for punishment or the cessation of rewards. As a result, those with high BIS are more likely to display behavioral inhibition and feel negative feelings like dread and worry (Hewig et al., 2006). The latter controls the acquisition of rewards and the accomplishment of objectives and is linked to stimuli related to rewards or the cessation of punishment. Thus, those with high BAS sensitivity are more likely to experience positive emotions (such as optimism and wellbeing) and act in ways that provide them an advantage over others (Nam et al., 2018).

This study aimed at exploring the utility of behavioral inhibition/behavioral activation system and self-esteem as predictors of engaging in trolling behaviors among online gamers; additionally, because BIS/BAS are regarded as relatively stable traits that may be tough to alter directly (Franken, et al., 2006), it is important to investigate the mechanisms by which BIS/BAS contribute to online trolling, as this helps to provide a theoretical framework for the prevention and intervention of online trolling. Drawing on earlier results pertaining to behavioral inhibition/behavioral activation system, self-esteem, and malevolent online behavior we assumed that gender, the self-esteem and behavioral inhibition/behavioral activation system —in combination— account for the inter-individual variance in online trolling behavior of online gamers.

Objectives

1. To investigate whether there is any gender difference in online trolling behavior, behavioral inhibition system, behavioral activation system, and self-esteem.
2. To investigate whether there is any relationship between online trolling behavior, behavioral activation system, behavioral inhibition system and self-esteem.
3. To investigate whether behavioral activation system, behavioral inhibition system and self-esteem predict online trolling behavior.

We hypothesized (H_1) that there would be significant gender differences in online trolling behavior, behavioral inhibition system, behavioral activation system, and self-esteem. Likewise, we hypothesized (H_2) that online trolling behavior would be negatively correlated with self- esteem and all of the subscales of behavioral activation system (i.e., reward responsiveness, drive & fun-seeking) and would have significant positive correlation with behavioral inhibition system. Finally, we hypothesized (H_3) that self-esteem, low BIS and high BAS will predict levels of trolling behavior. Participants' age and gender would be entered as control variables while assessing the impact of primary predictors (self-esteem, low BIS and high BAS).

Methodology

Participants

The study was a cross-sectional survey conducted in May 2023 with a sample of Bangladeshi young adults who play online multi-player games. They aged from 18 to 31 (M = 21.96, SD = 3.20). The sampling method was non-probability, namely snowball sampling method where participants were asked to share the survey link with their contacts on Facebook or other media. Among the 131 participants, 72.3% were males and 16.2% were females. In case of educational level of the participants, 23.6% had attended S.S.C, 25.7% had attended H.S.C, and 33.1 % and 6.1% were in honors and masters. Most of the participants (72.3%) were from middle-class families, followed by lower-class families (14.2%) and only 2% from higher class families. Most of the participants (76.4%) were students, followed by job holders (8.8%), unemployed (2%), and businessmen (1.4%). According to their place of residence, most of the participants (64.9%) were from urban areas, and 23.4% were from rural areas. Given the amount of time spent online, a substantial number of participants (29.7%) stated that they spent 3 to 4 hours per day.

Data Collection

Data were collected through a Google survey form which was distributed via email and social media platforms (i.,e. Facebook, messenger & WhatsApp). We made use of this platform's pertinent feature when creating the online survey to make sure all of the questions were correctly completed and submitted. We made sure that one IP matched one response by enabling 'one response per user' from Google forms settings in order to further guarantee the standard of our survey. Respondents were unable to review and change their answers after submission. Furthermore, surveys with blatantly unsuitable response patterns—like ones that had the same answer for every question—were rejected. Participants received monetary compensation (20 BDT) for their time as stated in the explanatory statement in the beginning of the survey form.

Ethics

Current research was guided by APA ethical principles and code of conduct. The Helsinki Declaration, its subsequent amendments, and comparable moral precepts were adhered to during the investigation. This study was approved by the Ethical Review Committee of the Department of Psychology,

University of Dhaka (number of approval: PSY 23/3/025). For everyone who clicked on the link, the survey was "open". Every participant gave electronic informed permission before responding. Participants were informed of their rights as research participants. They were made aware of the purpose and nature of the study, and were given the assurance that their information would be kept private and confidential.

Measures

The following measures were used in the study:

The Personal Information Form (PIF)

The PIF included demographic, personal, and social information about respondent's gender, age, occupation, socio-economic status etc.

Online Trolling Behavior

Bangla translated version of The Global Assessment of Internet Trolling (GAIT) scale (Buckles et al., 2014) was administered to evaluate trolling behavior (i.e., trolling experience, enjoyment, and identification). This short scale consists of 4 items (e.g., "I have sent people to shock websites for the lulz"), with a 5-point Likert-type response format (1 = strongly disagree; 5 = strongly agree). It demonstrates satisfactory internal consistency reliability (e.g., $\alpha \geq 0.82$) and construct validity (Buckles et al., 2014). This 4-item measure was translated from English into Bangla by an independent and bilingual translator. That translation was then discussed by the research team. In a subsequent step, another independent and bilingual translator undertook the back-translation. Finally, the Bangla version was administered to 25 psychology students in a pilot sample. Cronbach's α was .71 and .86 for this pilot sample and the entire sample respectively. The internal structure of the translated GAIT was scrutinized by submitting the items to confirmatory factor analysis (CFA). Model fit was assessed by relative or normed Chi square (chi-square/degrees of freedom; χ^2/df), the Comparable Fit Index (CFI), Root Mean Squared Error of Approximation (RMSEA), Goodness of Fit Index (GFI), and Tucker-Lewis coefficient (TLI). CFA provided support for the one-factor solution, with high loadings on the latent factor (i.e., from 0.65 to 0.93) and most indices reflecting an excellent model fit, namely χ^2 (2) = .59 (p = .742), χ^2/df = .29; CFI =0.99, GFI = .99, TLI =0.99, RMSEA =0.001 (Kline, 2015; DiStefano et al., 2018).

The Behavioral Inhibition/Behavioral Activation Scales

Bangla-translated version of the BIS/BAS scales that have been originally developed by Carver and White in 1994 was used in the present study. It is a 20-item instrument designed to measure behavioral inhibition (i.e., concern over and reactivity to aversive events) and behavioral activation (i.e., responsiveness to incentives, drive, and fun seeking). A standard translation procedure has been used for this scale also. Bangla version was administered to 25 psychology students and Cronbach's α was .72 and .87 for BIS and BAS respectively. The scale is divided into the behavior inhibition subscale (items 1, 6, 10, 13, 15, 18, 20) and the behavior activation subscale. BAS comprises three subscales: The fun-seeking subscale (items 4, 8, 12, 16), the reward responsiveness subscale (items 3, 5, 11, 14, 19), and the drive subscale (items 2, 7, 9, 17). The scale is to be scored on a four-point Likert scale (1 indicating strongly disagree and 4 indicating strongly agree). Item 1 and item 18 are reverse scoring. In general, higher scores on the BIS scale indicate a greater disposition toward avoidance behaviors, whereas higher scores on the three BAS scales indicate a greater disposition toward approach behaviors. Studies have shown that the BIS/BAS scales have good reliability and validity. The internal consistency coefficient of the original BIS scale and the three subscales of BAS scale ranged from 0.66 to 0.76[25]. Model fit for the translated BIS/BAS scales was assessed by confirmatory factor analysis (CFA). Results of CFA showed adequate loadings on the latent factor (i.e., from 0.37 to 0.91). Indices reflected an acceptable model fit, that is χ^2 (242) = 524.23, $p < .001$; χ^2/df = 2.16; CFI =0.82, GFI = .80, TLI =0.82, RMSEA =0.08 (Kline, 2015; DiStefano et al., 2018).

Rosenberg's Self-Esteem Scale

An adapted Bangla version of Rosenberg self-esteem scale (Rosenberg, 1965) was used in the present study. The scale was originally developed to measure adolescent's feeling of self-worth or self-acceptance. It is a 10-item 4-point Likert-type scale. The scale contains 5 positive and 5 negative items. A score of 0 is assigned to 'strongly disagree', 1 to 'disagree', 2 to 'agree', and 3 to 'strongly agree'. Negative items (2, 5, 6, 8, and 9) are reversely scored. The sum of the scores across all items is the total scale score for an individual. The higher the score the higher is the individual's self-esteem. The test-retest correlations are typically in the range of 0.82 to 0.88, and Cronbach alpha for various samples were in the range of 0.77 to 0.88.

Results

Gender variations in self-esteem, BAS, BIS, and online trolling behavior are shown in Table 1. An independent sample t-test was performed and verified that no assumption was violated including the assumption of equal variances between the groups. We have conducted Levene's test and found the significance value greater than .05 (0.52, 0.40, 0.26, 0.55 and .04 respectively for online trolling behavior, BIS, BAS drive, BAS fun-seeking, and BAS reward responsiveness).

The results in Table 1 indicated a statistically significant difference in self-esteem between male and female participants. In contrast, there was no significant difference between the genders for BAS, BIS, or online trolling activity. The mean self-esteem of females (M=15.26, SD=3.79) was substantially lower than that of males (M=17.22, SD=3.84), according to t-test (t=2.23, p<.05, two-tailed).

Table 1. Descriptive Statistics and Test of Gender Difference in Online Trolling Behavior, BAS, BIS, and Self-esteem

Variables	Male (n=107)		Female (n=23)		*t*	*p*
	Mean	*SD*	*Mean*	*SD*		
Online Trolling Behavior	10.43	4.91	8.78	5.56	1.42	.157
Behavior Activation System	24.33	5.92	23.91	5.81	.305	.960
Reward responsiveness	8.79	2.48	8.43	1.75	.659	.511
Drive	7.66	2.27	7.52	2.64	.264	.792
Fun-seeking	7.87	2.06	7.96	2.03	-.185	.854
Behavior Inhibition System	12.79	3.70	12.83	3.00	-0.05	.73
Self-Esteem	17.22	3.84	15.26	3.79	2.23	.03

Table 2 shows that online trolling behavior has a significant negative correlation with all of the subscales of behavioral activation system (i.e., reward responsiveness, drive & fun-seeking) and significant positive correlation with behavioral inhibition system (r = .583, p < 0.01). That is, a greater amount of online trolling behavior is associated with enhanced responsiveness to rewards, a higher degree of determination in pursuing goals and a stronger longing for new rewards with a readiness to seek potentially rewarding situations.

Table 2. Correlation among Online Trolling Behavior, subscales of BAS, BIS and Self-esteem

Variables	1	2	3	4	5	6
1. Online Trolling Behavior	-					
2. Reward responsiveness	-.345**	-				
3. Drive	-.520**	.659**	-			
4. Fun-seeking	-.593**	.576**	.695**	-		
5. Behavior Inhibition System	.583**	-.008	-.233**	-.141	-	
6. Self-Esteem	-.169	-.026	-.090	.087	-.124	-

**p < 0.01

On the contrary, the nature of association between online trolling and behavioral inhibition system points out that lower avoidance tendency in individuals is linked to greater amount of involvement with online trolling. Nevertheless, there was no significant association found between online trolling and self-esteem in this study.

Table 3. Hierarchical Regression Predicting Online Trolling with Age, Gender, BIS and BAS

Predictors	B	β	*p*	R^2	ΔR^2	*p*
Model 1				.017	.017	.339
(Constant)	14.936					
Age	-.187	-.118	.184			
Gender	-.529	-.043	.626			
Model 2				.346	.329	< .001
(Constant)	1.316					
Age	-.031	-.019	.793			
Gender	-.902	-.073	.312			
BIS	.830	.582	< .001			
Model 3				.628	.282	< .001
(Constant)	10.046					
Age	.153	.096	.095			
Gender	-1.309	-.106	.057			
BIS	.740	.520	< .001			
Reward Responsiveness	-.088	-.041	.594			
Drive	-.144	-.066	.454			
Fun-seeking	-1.178	-.476	< .001			

Note: effect size, Cohen's $f^2 = 0.7567$. VIFs ≤ 2.57.

We performed a hierarchical regression analysis aimed at ascertaining the contribution of BIS/BAS to online trolling behavior beyond the influence of age and gender. Regression analysis requires some assumptions to be true. First, we verified that collinearity statistics had adequate values (Akinwande et al., 2015) (Variance Inflation Factors [VIFs] <5.0). Then, normality of residuals has been checked with the Shapiro–Wilk test and found the significance = .092. Such a result is a requirement for normality. Table 3 presents the model summary of the R-square, and R-square changes associated with each step in the hierarchical regression. In Step 1, age and gender were entered as covariates. Model 1 was not significant (p = .339) meaning that age and gender of individual might not predict online trolling. Then in step 2, we entered BIS and found the model significant (p < .001), thereby found lower levels of BIS (β = .582, p < .001) to be predicting online trolling. In particular, BIS accounted for 32.9% of the variance in online trolling behavior. Finally, in step 3, after introducing the subscales of BAS into the regression model we found it significant (p < .001). Specifically, we found that higher levels fun-seeking tendency (β = -.476, p < .001) predicted online trolling explaining 28.2% of its variance, but drive and reward responsiveness were unrelated to the outcome variable. These findings partially support our hypothesis (H_3). The model has been found to have a larger effect size ($f^2 = 0.7567$) representing a greater amount of variance explained by this model.

Discussion

The present study aimed to explore gender differences in self-esteem, BIS/BAS sensitivity, and online trolling behavior, as well as to examine how motivational systems (BIS/BAS) contribute to online trolling beyond demographic factors. The results provide partial support for the proposed hypotheses and offer meaningful insights into the psychological mechanisms underlying online antisocial behavior.

Consistent with previous literature, the present study found a significant gender difference in self-esteem, with males reporting higher self-esteem than females. Males had made up the majority of gamers. The fact that videogames were typically created by men for men is one of the causes for this disparity (Kuss and Griffiths, 2011). In the online gaming community, the majority of female gamers are being harassed and mocked by male players (Salter and Blodgett, 2012). Female gamers reported experiencing significant anxiety and loneliness and they have attributed these negative experiences primarily to other male gamers (McLean and Griffiths, 2018). Because of this, women who have played online games have much lower self-esteem than men (Sharma et al., 2019).

In the present study, gender did not affect the outcomes in online trolling behavior, which contradicts our hypothesis (H_1) and many other previous studies on trolling and other similar behavior. Research suggests that males are more likely to engage in trolling behavior than females (Craker and March, 2016) which has been attributed to males having higher levels of trait aggression and sensation-seeking behavior (Cross et al., 2013; Archer, 2019). On the contrary, Gylfason et al. (2021), indicate that the gender difference in trolling is not significant, and both male and female can exhibit trolling behavior on the internet depending on the cultural context and individual personality traits.

Investigation on BIS/BAS has also produced conflicting results when it comes to gender differences. According to earlier research, women are more motivated to avoid unpleasant outcomes than men, as evidenced by the fact that they have significantly lower BIS scores than men (Lewis et al., 2023; Carver and White, 1994)). According to Lewis et al. (2023), females had a greater BAS drive while there was no significant difference in the overall BAS score between males and females. Other studies using adults (Balconi et al., 2019) and adolescents (Kubikova et al., 2018) samples did not find a statistically significant gender difference in BIS/BAS scores. The current findings may therefore reflect changing online behavior patterns, where both males and females participate in digital interactions with similar motivations and levels of disinhibition.

Correlation analyses revealed that online trolling behavior was positively correlated with BIS and negatively correlated with BAS subscales (Drive, Reward Responsiveness, and Fun-Seeking). These results indicate that individuals with lower avoidance tendencies (i.e., lower BIS) and higher approach motivation (i.e., higher BAS) tend to engage more in trolling behavior. This pattern supports our hypothesis (H_2) and is consistent with the idea that trolling represents a form of impulsive, reward-driven behavior that offers immediate psychological gratification, such as amusement or dominance over others (Molenda et al., 2022).

Interestingly, no significant correlation was found between online trolling and self-esteem. This finding supports earlier research (Soares et al., 2023) suggesting that trolling may not be directly linked to self-evaluative constructs but rather to motivational and affective systems related to behavioral regulation.

Hierarchical regression analysis further demonstrated that BIS and BAS significantly predicted online trolling behavior after controlling for age and gender. Specifically, lower BIS levels and higher BAS Fun-Seeking tendencies were strong predictors of trolling behavior, explaining a substantial proportion of variance. These results partially support our hypothesis (H_3). The Fun-Seeking component of BAS—associated with impulsivity and novelty-seeking—appears to play a key role in predicting trolling tendencies, while Drive and Reward Responsiveness did not emerge as significant predictors.

Dawe et al. (2004), review of the literature suggest a two-component model of BAS consisting of reward sensitivity and impulsivity. This reward sensitivity factor can be tapped by Carver and White's (1994), BAS-reward responsiveness and BAS-drive subscales (Franken and Muris, 2006). In contrast, the impulsivity factor that reflects the extent to which one acts without any appreciation of consequences corresponds with novelty seeking and the BAS-fun seeking subscale (Franken and Muris, 2006). Taken together with the present study, these findings may suggest that online trolling seems to be an opportunity to satisfy thoughtless impulsive goals and an expression of disinhibition among individuals.

Molenda and colleagues (2022), demonstrated how BIS works to prevent online aggression like online trolling that can have adverse consequences. By preventing online trolling, BIS functions as a protective system, reducing the likelihood of unpleasant and painful events. They also reported that online trolling behavior is predicted by BAS. Although individuals with highly activated BAS and lower BIS are more likely to take chances and look for rewards, trolling behavior can also be caused by other variables. According to one study, trolling in the gaming is not just motivated by thrill-seeking and personal delight, but also by personality traits and other related factors (Cook et al., 2017; Cook et al., 2023)

The current research tried to find the factors associated with the perpetration of online trolling behavior. Understanding these dynamics is crucial for fostering healthier gaming communities. Findings of this study have practical application in that future intervention for online trolling should consider factors like BAS and BIS. For instance, those with high levels of impulsivity and lack of inhibition (low BIS, high BAS) could be suggested as more beneficial pursuits than trolling. Furthermore, our findings serve as a knock for launching anti-trolling campaigns and creating anti-trolling laws.

The possible limitations of the current study must be taken into account when interpreting the results. The primary limitation of our study is that participants were chosen by the use of a non-probabilistic sampling technique which takes down the generalizability of our findings. Future research could broaden the scope by utilizing larger samples, such as nationally representative samples from the adult population. The tools used in this investigation have been translated and administered by us. Consequently, by employing larger and/or more varied samples in subsequent research, several of these scales can be revalidated. To gain greater comprehension of these phenomena, future research should concentrate on contextual and personality characteristics that might moderate the relationship between internet trolling and BIS/BAS.

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