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An examination of psychosocial factors associated with malicious online trolling behaviors

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ABSTRACT

Objective: Trolling, that is, triggering disruption and conflict for one's own amusement, is a malicious online behavior that causes substantial, negative consequences for its victims. Research is needed to better understand, and ultimately to prevent, trolling behavior. To this end, the current study examined potential demographic and psychosocial predictors of social media trolling behavior in a collegiate population.

Methods: College students ($N = 504$; 82% female) completed an online survey in which they provided demographics, information about their social media habits, and responses to validated personality and psychosocial assessment instruments. Participants were categorized as positive or negative for trolling behavior based on their self-reported social media habits.

Results: Based on the final regression model, significant predictors of trolling included male gender, greater need for participation in social media, and greater likelihood to make downward social comparisons on social media.

Conclusions: Taken together, these results provide new information that may help to identify those at risk of engaging in trolling behavior. These findings contribute to a developing literature that may lead to prevention and intervention strategies to reduce negative outcomes and to improve online experiences for everyone.

1. Introduction

Within the last decade, social networking sites have grown to be the most popular online activity worldwide, representing over 1.2 billion global users and occupying one out of every 5 min spent online (Comscore, 2011). Along with this increase in social media use, bullying and other malicious online behaviors have made an appearance in cyberspace. This type of behavior has been termed cyberbullying, and has been defined by Smith et al. (2008, p. 376) as “an aggressive, intentional act carried out by a group or individual using electronic forms of contact, repeatedly and over time against a victim who cannot defend himself or herself.” During the past 10 years, reports of the prevalence rates of cyberbullying have ranged from 10% to 40% depending on study methodology (Lenhart, 2012; O'Brennan, Bradshaw, & Sawyer, 2009).

2. Literature review

More recently, a phenomenon referred to as trolling has emerged in the literature. In many ways trolling is similar to cyberbullying and cyberstalking in that technology is used to cause harm and distress (Caplan, 2018; Nichol, 2012). Unlike cyberbullies and cyberstalkers,

trolls often do not know the group or person they are attacking (Caplan, 2018; Nichol, 2012). Trolls tend to be deceptive, taking on false identities while targeting their victims (Hardaker, 2010). Further, while trolls may initially convey pseudo-sincere intentions, their underlying motivation is to cause meaningless disruption and/or trigger conflict for their own amusement (Hardaker, 2010; Lenhart, 2012). Trolls may be motivated by circumstantial factors such as boredom, attention-seeking, and revenge (Hardaker, 2010; Shachaf & Hara, 2010). In addition to these characteristics of deception and disruption, trolls may also be aggressive, escalating their efforts until they successfully provoke retaliation from their victims (Hardaker, 2010). More specific definitions of trolling have been offered by researchers to account for observed differences in trolls' behaviors. For example, Shachaf and Hara (2010) define trolling as repetitive, harmful actions that go against some websites' terms of use, while both Bishop's (2012) and Binns' (2012) view of trolling focuses on the posting of offensive or unconstructive messages to create arguments or start debates.

To date, research on the phenomenon of trolling has focused primarily on characterizing this new category of malicious online behavior, and the literature remains relatively sparse with regard to psychosocial factors that may predict trolling behaviors. Several theoretical perspectives drive this research area. First, the five factor

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model (FFM) of personality (McCrae & Costa, 1996) has been studied in the context of antisocial behaviors that characterize trolling. Meta-analytic findings regarding personality traits of antisocial individuals (low in agreeableness and conscientiousness) can inform the current work. The aggression involved with general bullying behaviors was described in a recent meta-analysis by Mitsopoulou and Giovazolias (2015). This study demonstrated an association between lower conscientiousness and agreeableness and higher neuroticism and extraversion and bullying, further supporting the use of the FFM as a theoretical basis for understanding trolling behaviors. In terms of personality factors specifically in trolls, Buckels, Trapnell, and Paulhus (2014) found that participants with a greater enjoyment of trolling tended to be more extroverted and less agreeable compared to those who did not enjoy trolling (Buckels et al., 2014).

Another theoretical perspective that drives the current study is the link between empathy and prosocial behavior, whereas low levels of empathy are associated with antisocial behavior and aggression (Eisenberg, Eggum, & Di Giunta, 2010; Jolliffe & Farrington, 2006; Miller & Eisenberg, 1988). Studies examining online bullying have considered both affective empathy (i.e., the ability to experience, internalize, and share others' emotions; Mehrabian & Epstein, 1972), and cognitive empathy (i.e., the ability to recognize and understand others' emotions; Hogan, 1969). Low levels of affective and cognitive empathy tend to be associated with a greater number of cyberbullying behaviors (Ang & Goh, 2010). Sest and March (2017) found that high levels of affective empathy decreased trolling behaviors.

When considering the link between social support and trolling behavior, the direct effects model of social support may be a relevant theoretical model in understanding the beneficial effects of social support and social integration on individual's behavior and well-being (whereas a lack of social support may be tied to antisocial behaviors such as trolling) (Cohen & Wills, 1985). To our knowledge no research has investigated the role of perceived social support (or lack thereof) in trolling behaviors; however, several studies have examined this factor in relation to cyberbullying. Perceived social support is subjectively determined by past experiences and it assesses the degree to which an individual believes he or she could receive social support if needed (Kim, Na, & Park, 2010). Park, Na, and Kim (2014), as well as Cho and Yoo (2017), found negative associations between perceived social support from *offline* relationships commission of cyberbullying. In other words, those who had more social support were less likely to become cyberbullies. Cho and Yoo (2017) also found that participants who had an *online* social support were less likely to exhibit cyberbullying behaviors.

A final theoretical perspective that guides this research is the social media engagement theory which suggests that social media users' experience predicts how involved and engaged they are with social media, which affects how much they use social media (DiGangi & Wasko, 2016). The intensity or frequency of social media use for individuals who engage in trolling has not been examined and is deserving of further study.

While much of the literature has focused on cyberbullying, there is limited research on trolling behaviors. The present study addressed these gaps in the literature with a focus on psychosocial factors that may be related to trolling behaviors. We hypothesized that participants who engaged in trolling behavior would have lower levels of conscientiousness and agreeableness, lower levels of empathy, and less perceived social support. Remaining hypotheses explored the influence of specific social media experiences and were inspired by studies suggesting that antisocial uses of the internet are positively correlated with frequency of activity (Juvonen & Gross, 2008). We hypothesized that participants who engaged in trolling behaviors would have a greater need for social media, greater endorsement of downward comparisons on social media, and higher levels of social media addiction.

3. Methods

3.1. Participants

Undergraduate students aged 18 or older were recruited from a large public university using a research subject pool and received either course credit or extra credit for their participation. While this sample is a convenience sample, it does represent a portion of the population who have essentially grown up on social media. Use of at least one of the following social media applications: Facebook, Twitter, Snapchat, or Instagram was required for participation.

3.2. Procedure

This study was approved by the participating university's Institutional Review Board. The online survey was administered using the Qualtrics software and participants provided informed consent and completed the anonymous online survey via computer or smartphone. Participants were advised to skip any questions that they did not feel comfortable answering.

3.3. Measures

In addition to providing demographic information such as their age, gender, and race/ethnicity, participants responded to items concerning their own trolling behaviors, as well as potential predictors of trolling such as psychosocial factors and social media experiences.

3.3.1. Trolling behaviors

The outcome variable, trolling behaviors, was developed specifically for this study. This variable was based on three questions created by a focus group. The 3-item scale measured the extent to which the participant debated with others online and had intentions to aggravate/irritate others online. The items asking, "To what extent do you enjoy the following: Debating various topics with the intention to irritate/upset others" and "To what extent do you enjoy the following: 'Trolling' on public forums" were measured on a 5-point Likert scale ranging from *Not at all* to *Very much*. The item asking, "Please indicate how much you agree with the following statement: I like to post memes and comments with the intent to aggravate or annoy others" was measured on a 5-point Likert scale ranging from *Strongly disagree* to *Strongly agree*.

3.3.2. Categorization of trolling behaviors

For purposes of analysis, participants were categorized as positive or negative for trolling behaviors based on their responses to this 3-item trolling behavior scale. Individuals who selected *Somewhat* or *Very much* for debating and trolling, and/or those who selected *Agree* or *Strongly agree* for posting content to aggravate or annoy, were categorized as *positive* for trolling behaviors. Those participants who selected all other responses were categorized as *negative* for trolling behaviors.

3.4. Psychosocial predictors

3.4.1. Personality

Conscientiousness and agreeableness were assessed with the Big Five Personality Inventory (John & Srivastava, 1999). The assessment contained 44 statements (e.g., "I see myself as someone who has an assertive personality"). For this sample, the conscientiousness scale ($M = 3.50$, $SD = 0.71$) achieved an alpha reliability of 0.73 and the agreeableness scale ($M = 3.82$, $SD = 0.43$) achieved an alpha reliability of 0.75.

3.4.2. Empathy

Three subscales of the Interpersonal Reactivity Index (IRI) (Davis, 1983) were used to evaluate empathy: Perspective-Taking, Empathic Concern, and Personal Distress. The assessment contained 21

statements (e.g., “Sometimes I don’t feel very sorry for other people when they are having problems”). For this sample, the perspective-taking scale ($M = 2.68$, $SD = 0.34$) achieved an alpha reliability of 0.76, the empathic concern scale ($M = 2.89$, $SD = 0.23$) achieved an alpha reliability of 0.75, and the personal distress scale ($M = 1.72$, $SD = 0.48$) achieved an alpha reliability of 0.71.

3.4.3. Social support

The Interpersonal Support Evaluation List (ISEL) (Cohen & Hoberman, 1983; Cohen, Memelstein, Kamarck, & Hoberman, 1985) was used to measure social support. The assessment contained 12 items (e.g., “When I need suggestions on how to deal with a personal problem, I know someone I can turn to”). For this sample, the ISEL-12 scale ($M = 3.21$, $SD = 0.19$) achieved an alpha reliability of 0.88.

3.5. Social media experiences

3.5.1. Intensity

Intensity of social media use was measured with the Social Media Intensity Scale (Ellison, Steinfeld, & Lampe, 2007). Participants completed the 13-item intensity scale for each of the four social media outlets used. Example items include, “Facebook has become part of daily routine” and “I feel out of touch when I haven’t logged onto Instagram for a while.” For this sample, the Facebook scale ($M = 2.49$, $SD = 0.31$) achieved an alpha reliability of 0.88, the Snapchat scale ($M = 3.76$, $SD = 0.35$) achieved an alpha reliability of 0.91, the Instagram’s scale ($M = 3.38$, $SD = 0.25$) was 0.92, and the Twitter scale ($M = 3.44$, $SD = 0.21$) achieved an alpha reliability of 0.94.

3.5.2. Need for participation

To assess the need for social media, the 16-item Need for Participating in Social Media Scale was used (Park, Kee, & Valenzuela, 2009). An example statement from this scale is, “I use social media (Facebook, Twitter, Instagram, and Snapchat) to feel like I belong to a community.” For this sample, the scale’s ($M = 3.69$, $SD = 0.93$) alpha reliability was 0.85.

3.5.3. Social comparison

To measure participants’ upward and downward comparisons, the 2-item Social Comparison on Social Media measure was used (Vogel, Rose, Roberts, & Eckles, 2014). The statements used were, “When comparing yourself to others on social media, to what extent do you focus on people better off/worse off than you?” For this sample, participants’ upward comparison scores averaged 2.81 ($SD = 1.23$) and downward comparison scores averaged 2.18 ($SD = 1.06$).

3.5.4. Social media addiction

To measure social media addiction, the Bergen Social Media Addiction Scale (Andreassen, Torsheim, Brunborg, & Pallesen, 2012) was used. An example item includes: “How often during the last year have you: Become restless or troubled if you have been prohibited from using social media”. The overall scale ($M = 2.63$, $SD = 0.45$) achieved an alpha reliability of 0.85.

3.6. Statistical analyses

Data were screened for outliers and missing values. Pairwise deletion was used for missing values for univariate analyses. Univariate comparisons were conducted to assess differences in demographics, psychosocial predictors (personality, empathy, and social support), and social media experiences (intensity, need for participation, social comparison, and social media addiction) between the comparison groups. For comparisons of categorical variables, chi-square tests of independence were used. For comparisons of continuous variables, independent *t*-tests were used. A simultaneous logistic regression model was developed to determine the key demographic, psychosocial

Table 1
Demographics.

	Trolling behaviors N = 74	No trolling behaviors N = 430	Statistical significance
Gender (%)			
Males	29.7%	14.9%	p = .015
Females	68.9%	84.4%	
Age			
Mean (Std. Dev)	20.14 (2.75)	20.43 (3.78)	p = .518
Race/ethnicity (%)			
Caucasian	47.1%	60.6%	p = .100
African American	15.7%	10.6%	
Latino/Hispanic	37.1%	28.8%	

predictors, and social media experiences associated with trolling. Only variables significant at the univariate level were included in the model. To determine significance, two-tailed tests with an alpha level = 0.05 were used. All analyses were conducted using SPSS version 24.0 (Armonk, NY: IBM Corp).

4. Results

4.1. Demographics (see Table 1)

Of the 504 participants who completed the survey, 414 were female (82.1%), 86 were male (17.1%), and the remaining 4 participants (0.8%) identified as “other” or preferred not to answer. Participants’ mean age was 20.39 ($SD = 3.65$). Of the participants who reported their race/ethnicity, 285 (58.6%) were Caucasian, 55 (11.3%) were African American, and 146 (30.0%) were Latino/Hispanic. Trolling behaviors differed by gender. A higher percentage of males were categorized as T-pos (29.7%) compared to the T-neg (14.9%). However, differences in age and race/ethnicity between the T-pos and T-neg groups were not significant.

4.2. Psychosocial predictors (see Table 2)

Two personality subscales differed between the T-pos and T-neg groups. Agreeableness was significantly lower in the T-pos group compared to the T-neg group. Conscientiousness was also lower in the T-pos group compared to the T-neg group. No significant between-group differences were noted for the other personality subscales (i.e., extraversion, neuroticism, and openness). There was a significant difference in perspective taking, such that trolls were less likely to understand others’ perspectives. There was also a significant difference in empathic concern, such that trolls were less likely to express empathy

Table 2
Relationship between trolling behaviors and specific psychosocial factors.

	Trolling behaviors N = 74	No Trolling behaviors N = 430	Statistical significance
Empathy			
Mean (Std. Dev)			
Perspective Taking	17.01 (4.9)	19.1 (4.7)	p = .001
Empathic Concern	18.2 (5.1)	20.6 (4.5)	p < .001
Personal Distress	10.0 (3.9)	9.8 (4.1)	p = .755
Big Five Personality			
Mean (Std. Dev)			
Extraversion	26.1 (6.3)	25.4 (6.4)	p = .401
Agreeableness	32.3 (5.3)	34.7 (5.2)	p < .001
Conscientiousness	30.2 (4.3)	31.7 (5.3)	p = .029
Neuroticism	24.7 (5.1)	25.3 (5.2)	p = .401
Openness	35.3 (6.0)	35.0 (6.0)	p = .686
Interpersonal Support			
Mean (Std. Dev)	36.6 (6.7)	38.8 (6.8)	p = .012

Table 3
Relationship between trolling behaviors and general social media measures.

	Trolling behaviors N = 74	No Trolling behaviors N = 430	Statistical significance
Social Media Intensity			
Mean (Std. Dev)			
Facebook	14.1 (7.1)	15.1 (6.0)	p = .323
Instagram	20.9 (6.7)	20.2 (6.7)	p = .449
Snapchat	23.5 (6.9)	22.4 (6.2)	p = .181
Twitter	23.1 (7.6)	20.2 (7.9)	p = .011
Need for Social Media			
Mean (Std. Dev)	47.5 (10.9)	43.7 (10.9)	p = .005
Comparisons of others...			
Mean (Std. Dev)			
Better than me	2.89 (1.4)	2.79 (1.2)	p = .514
Worse than me	2.59 (1.3)	2.10 (1.0)	p = .002
Social Media Addiction			
Mean (Std. Dev)	17.03 (6.1)	15.6 (5.4)	p = .038

towards others. T-pos and T-neg groups did not differ significantly on personal distress. Interpersonal support differed significantly, such that trolls reported significantly lower perceived social support.

4.3. Social media experiences (see Table 3)

Participants in the T-pos group used Twitter more intensely than those in the T-neg group. No significant between-group differences were noted for intensity of use for Facebook, Instagram, or Snapchat. The T-pos group had a greater need for participation in social media, as compared to the T-neg group. Members of the T-pos group were more likely to make downward social comparisons online, as compared to the T-neg group. There were no between-group differences for upward social comparisons online. The groups differed significantly on social media addiction, such that trolls reported higher levels of addiction to social media.

4.4. Multivariate analyses (see Table 4)

The variables showing significant differences in means or proportions in comparison of the two trolling behavior groups at the univariate level were included in the multivariate analysis. A simultaneous binary logistic regression analysis was conducted to determine which variables were most associated with exhibiting trolling behaviors. The overall model was significant ($X^2(10) = 32.134, p < .001$) with a Nagelkerke R Square = 0.160. Gender was a significant predictor of trolling status, in that males were 2.429 times more likely to be classified in the T-pos group ($B = 0.888, X^2 = 4.24, p = .040$). The need for participation in social media also produced a significant association,

Table 4
Binary logistic regression analysis assessing demographic, personality, and social media behaviors most associated with trolling behaviors.

	B	SE	Wald	Sig	Exp (B)	95%CI Lower	95% CI Upper
Male Gender	0.888	0.431	4.238	0.040	2.429	1.044	5.656
Empathy-Perspective Taking	-0.044	0.042	1.070	0.301	0.957	0.881	1.040
Empathy-Empathic Concern	-0.032	0.043	0.539	0.463	0.969	0.890	1.055
Big-5-Agreeableness	-0.031	0.038	0.648	0.421	0.970	0.900	1.045
Big-5-Conscientiousness	-0.017	0.038	0.199	0.656	0.983	0.912	1.060
Interpersonal Support	0.007	0.027	0.074	0.786	1.007	0.956	1.062
Twitter Intensity	0.037	0.027	1.882	0.170	1.037	0.984	1.093
The Need for Social Media	0.039	0.020	3.907	0.048	1.040	1.000	1.081
Downward Social Comparisons	0.435	0.165	6.973	0.008	1.545	1.119	2.133
Social Media Addiction	-0.037	0.038	0.945	0.331	0.964	0.894	1.038
Constant	-2.386	2.037	1.371	0.242	0.092		

such that those with higher need for social media were more likely to exhibit trolling behaviors ($B = 0.039, X^2 = 3.91, p = .048$). Lastly, participants with a stronger endorsement of downward comparisons on social media were more likely to be in the T-pos group ($B = 0.435, X^2 = 6.97, p = .008$).

5. Discussion

In recent years, a number of studies have examined the associations between malicious online behaviors (such as cyberbullying) and psychosocial factors or social media usage characteristics (Ang & Goh, 2010; Cho & Yoo, 2017; Juvonen & Gross, 2008; Park et al., 2014). However, fewer studies have focused on the specific behavior of trolling, which is distinct from cyberbullying (Nichol, 2012). With a few exceptions (e.g., Buckels et al., 2014; Sest & March, 2017), existing studies have largely sought to define trolling or to describe the characteristics of trolls, rather than to identify the most significant set of factors that might predict trolling behavior. In the current study, we sought to address these gaps in the literature by identifying the key demographics, psychosocial factors, and social media behaviors that might be associated with trolling behaviors on social media sites.

The theoretical underpinning for the factors examined in this study came from the five factor model of personality (McCrae & Costa, 1996), the theory of empathy and prosocial (antisocial) behavior (Miller & Eisenberg, 1988), the direct effects model of social support (Cohen & Wills, 1985), and the social media engagement theory (DiGangi & Wasko, 2016). The variables hypothesized from these four models were found to be independently associated with trolling behaviors at the univariate level of analysis. When considered altogether at the multivariate level of analysis, three factors (male gender, need for participation in social media, and downward comparisons on social media) emerged as being the key factors associated with membership in the participant group that exhibited trolling behaviors.

Males were more than twice as likely to engage in trolling. This finding is consistent with previous research showing that males are more likely to use social networking sites for antisocial purposes (Ferenczi, Marshall, & Benjanyan, 2017). Further, Sun, Fan, and Du. (2016) conducted a meta-analysis on gender differences in cyberbullying evaluating 39 empirical studies and found that males were more likely to exhibit cyberbullying behaviors. The reasons for these differences included males being more likely to bully others in face-to-face situations and males having a higher tendency of playing more violent online games.

The Need for Participating in Social Media scale assessed participants' motivations related to social media use, and a high need to participate predicted membership in the T-pos group. This supports our hypothesis that high levels of trolling behaviors would be associated with a greater need for social media, and to the authors' knowledge, ours is the first study showing this association. One possible explanation for this finding is that people who exhibit trolling behavior need to be

entertained and exert power in some way. This parallels findings of an association between psychopathy and trolling behavior, in which trolls are more likely to endorse harming others for their own fun and pleasure (Lopes & Yu, 2017). This need may also be related to the attention-seeking characteristics of trolls that were revealed in Hardaker's (2010) qualitative study. Social media sites are an outlet in which these needs can be met with anonymity and ease. Further, it is possible that the anonymity of social media may also encourage deindividuation, which may foster the escalation of aggressive behavior among trolls (Lowry, Zhang, Wang, & Siponen, 2016).

Downward comparisons on social media also predicted membership in the T-pos group. To the authors' knowledge, ours is the first study showing this association. In their online interactions, trolls were more likely to compare themselves to others worse off than themselves, an activity that may have allowed trolls to feel better about themselves by comparison. Although downward comparisons can produce negative feelings as they reveal how things could be worse, they have actually been shown to lead to improvements in affect and self-evaluation (Wills, 1981). This may help explain why those who are identified as trolls are more likely to compare themselves to others worse off and may be perhaps use their trolling behaviors as a means of elevating their self-esteem.

5.1. Limitations

While the results of the current study advance our understanding of trolling behaviors, several limitations remain to be addressed in future studies. For example, the participant pool for this study was college students, which can limit the generalizability to those of other education levels and age groups. Additionally, a more proportional representation of male social media users would provide greater opportunity to explore gender differences in trolling behaviors. Further, though our data were collected anonymously online, it is important to note that our results remain subject to disadvantages, such as social desirability bias, which are inherent to self-report studies. Lastly, there are limited validated scales that have been developed to assess trolling behaviors. The trolling scale used for this study was developed by the research team and should be validated in other studies.

6. Conclusion

The overarching goal of this study was to gain a better understanding of which psychosocial factors and social media experiences might best predict trolling behaviors on social media sites. Participants who were more likely to be categorized as trolls tended to be male, to have a greater need for participation in social media, and to exhibit higher levels of downward comparison in their online activities. A better understanding of trolls may help to identify those at risk of engaging in trolling behaviors and could lead to more prevention and intervention opportunities focused on reducing negative outcomes. Ultimately, the development of strategies to reduce trolling may improve online experiences for everyone, and most importantly, could decrease the number of individuals who are psychologically harmed by others' malicious online behavior.

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