



Loneliness moderates the relationship between Dark Tetrad personality traits and internet trolling

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ABSTRACT

The present study investigated the influence of Dark Tetrad (DT) personality traits and loneliness on internet trolling behavior. Five hundred and thirteen participants (51.1% females) completed questionnaires to assess their level of DT personality traits, loneliness, and internet trolling behavior. Results revealed that each of the DT personality traits and loneliness were positive predictors of internet trolling. Hierarchical regression analyses indicated that higher levels of loneliness were positively associated with internet trolling in high Machiavellianism individuals. Additionally, higher levels of loneliness were positively associated with internet trolling in high psychopathy individuals. These results provide new evidence of the moderating role of loneliness on the relationship between DT personality traits and internet trolling behavior and may provide useful insights into the development and mitigation of this antisocial online response.

1. Introduction

Internet trolling refers to antisocial online behavior, such as deliberately making others feel unpleasant or frustrated, or disrupting the community by directing aggressive, inflammatory, and destructive comments toward victims (Buckels, Trapnell, & Paulhus, 2014; March, 2019). In a previous study, 5.6% of participants reported enjoying internet trolling (Buckels et al., 2014). Similar to antisocial behavior in face-to-face situations, internet trolling can cause serious problems for victims. Kurokawa (2010) argued that being pestered on the internet facilitated depression and anxiety in victims. Fuji and Endo (2016) found that experiences of defamation on the internet increased negative emotions such as sadness or despair in victims and inhibited the creation of interpersonal relationships, with these negative effects lasting for more than three years. Although it is important to clarify the predictors of trolling in order to prevent this behavior (March, 2019), relatively few studies have examined the personality traits and environmental factors that promote or inhibit aggressive behavior associated with internet trolling.

Buckels et al. (2014) investigated the relationship between internet trolling and Dark Tetrad (DT) personality traits. The DT personality traits are a constellation of four socially undesirable and aversive personality traits: Machiavellianism, psychopathy, narcissism, and everyday sadism (Buckels, Jones, & Paulhus, 2013; Furnham, Richards, &

Paulhus, 2013). Machiavellianism is characterized by the manipulation and exploitation of others; cold affect, callousness, and a lack of sincerity or ethical concern (Christie & Geis, 1970). Psychopathy is a hostile and aversive personality trait that includes affective, emotional, interpersonal, and behavioral characteristics such as egocentricity; irresponsibility; shallow emotions; deficits in empathy, guilt, remorse, or morality; social deviance; manipulation of others; and high impulsivity (Hare, 2003). Narcissism is characterized by an exaggerated sense of grandiosity, superiority, entitlement, and self-worth, as well as despising of others and an excessive need for admiration (Raskin & Terry, 1988). Everyday sadism is the tendency to enjoy other people's suffering and pain (Paulhus & Dutton, 2016). DT personality traits are commonly associated with cyber-aggression in adolescents (Pabian, De Backer, & Vandebosch, 2015). On the other hand, Jones and Neria (2015) indicated that DT personality traits separately predicted different facets of aggression, with Machiavellianism positively predicting hostility, psychopathy positively predicting physical aggression, and narcissism negatively predicting hostility.

Buckels et al. (2014) found positive correlations between each of the DT personality traits and engagement in internet trolling, with psychopathy and everyday sadism in particular as positive predictors of trolling behavior. Other research has found similar results. Cracker and March (2016) investigated the relationship between DT personality traits and trolling behavior on social networking services. Results

Abbreviations: DT, Dark Tetrad; DTDD, Dark Triad Dirty Dozen

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showed a positive correlation between each of the DT personality traits and use of trolling behavior, with psychopathy and everyday sadism facilitating such behavior. Kircaburun, Jonason, and Griffiths (2018) reported that Machiavellianism, psychopathy, and everyday sadism exerted predictive influences on internet trolling behavior. A positive relationship between DT personality traits and internet trolling has been found in Asian as well as Western countries (Masui, Tamura, & March, 2018).

A variety of previous research has indicated that loneliness promotes aggressive responses. Loneliness refers to a situation in which there is a lack of interpersonal relationships or specific relational provision (Weiss, 1973). Loneliness is a frustrated condition because the need for belongingness is not fulfilled (Williams, 1997), and frustration evokes an aggressive response (i.e., Frustration-aggression hypothesis; Berkowitz, 1989). Most perpetrators of school shootings in the United States have experienced chronic or acute social rejection, such as teasing, ostracism, bullying, and romantic rejection (Leary, Kowalski, Smith, & Phillips, 2003). Among adolescents, there is a positive association between degree of loneliness and both overt and relational aggression (Povedano, Cava, Monreal, Varela, & Musitu, 2015), and experiences of being the target of offline bullying increase aggressive responses on the internet (Ybarra & Mitchell, 2004).

Loneliness and level of social support not only have direct effects on aggression but also moderate the relationship between DT personality traits and aggression. In individuals with high narcissism, experiences of social rejection facilitate aggressive responses to innocent others (Twenge & Campbell, 2003). Moreover, the degree of aggressive behavior in individuals with high psychopathy and higher levels of social support from family members equaled those with low psychopathy (Masui, Iriguchi, Terada, Nomura, & Ura, 2012). However, it remains unclear if loneliness promotes aggressive responses on the internet in individuals with high DT.

The present study investigated the influences of loneliness, each of the DT personality traits, and their interactive effects on internet trolling behavior. Given the earlier work reviewed above, the presence of each DT personality trait and loneliness should increase engagement in internet trolling. Furthermore, the influence of each DT personality trait on internet trolling behavior should be more pronounced in those who are high in loneliness compared with those who are low in loneliness.

2. Method

2.1. Participants

Participants were randomly selected from 15,831 candidates, aged from 20 to 69 years, throughout Japan who were registered with an internet research company (Rakuten Research, Inc., Tokyo, Japan). These individuals were sent an e-mail containing the URL of the survey website. Data were analyzed from a total of 513 individuals (51.1% female; M age = 46.8 years old, $Range$ = 20–69, SD = 13.4) who completed survey questions online. Participants received an internet shopping discount as a financial incentive for participation.

The first screen of the survey informed participants that no personal information would be released to third parties and that only a summary of the survey would be presented at a conference and published in a journal. All participants gave their consent. The survey was conducted from 19 to 21 February 2018, and only complete responses were analyzed.

2.2. Materials

The Global Assessment of Internet Trolling-Revised (GAIT-R; Sest & March, 2017) was used to measure internet trolling. The GAIT-R consists of eight items that assess trolling frequency, trolling enjoyment, and troll identity (5-point Likert scale; 1 = *Strongly Disagree*, 5 = *Strongly Agree*; e.g., I enjoy upsetting people I do not personally

know on the Internet). The Japanese version of the GAIT-R (J-GAIT-R) was developed by Masui et al. (2018) and was confirmed to have excellent test-retest reliability and criterion-related validity. In the present study, J-GAIT-R had good internal consistency (α = 0.80).

DT personality traits were measured using the Japanese version of the Dark Triad Dirty Dozen scale (DTDD-J; Tamura, Oshio, Tanaka, Masui, & Jonason, 2015) and the Japanese version of the Varieties of Sadistic Tendencies (VAST-J; Shimotsukasa & Oshio, 2016). The original Dirty Dozen scale was developed by Jonason and Webster (2010) and consists of 12 items (5-point Likert scale; 1 = *Strongly Disagree*, 5 = *Strongly Agree*) that assess individual levels of Machiavellianism (e.g., I tend to exploit others toward my own end), psychopathy (e.g., I have used deceit or lied to get my way), and narcissism (e.g., I tend to want others to admire me). A Japanese version of the DTDD scale was developed through back translation of the items and demonstrated the same factor structure as the original, as well as adequate internal reliability and construct validity (Tamura et al., 2015). In the present study, the internal consistencies for the combined index (α = 0.85) and each sub-factor were all moderate and adequate in magnitude (Machiavellianism = 0.85, psychopathy = 0.60, narcissism = 0.82).

The VAST-J is based on the English version of the same scale (Paulhus & Jones, 2015) and consists of 16 items and 11 filler items rated on a 5-point Likert-type scale ranging from *Strongly Disagree* to *Strongly Agree*. The VAST-J includes two sub-factors, direct sadism (9 items; e.g., I enjoy physically hurting people) and vicarious sadism (7 items; e.g., I sometimes replay my favorite scenes from gory slasher films), and has excellent internal reliability. The present research captured broader sadistic tendencies by summing the two sub-factor scores; Cronbach's alpha was 0.79.

Loneliness was measured using the University of California, Los Angeles (UCLA) Loneliness Scale (Version 3; Russell, 1996), comprising 20 items (4-point Likert scale; 0 = *never*, 3 = *often*) that assess subjective feelings of loneliness (e.g., I am unhappy doing so many things alone). The Japanese version of this scale was developed by Masuda, Tadaka, and Dai (2012) and has shown good internal consistency and criterion-related validity. Cronbach's alpha in the present study was 0.94.

2.3. Data analysis

As a preliminary step, means, standard deviations, and correlation coefficients for all variables were calculated. Then two-sample *t*-tests on scores of each scale were conducted to assess gender differences.

Because the main goal of the present study was to examine whether DT personality traits influence engagement in internet trolling through the moderating impact of loneliness, moderated hierarchical regression analyses (Jaccard, Wan, & Turrisi, 1990) were performed to examine interactions between each DT personality trait and loneliness as predictors of internet trolling. In the hierarchical regression analysis, the dependent variable was the score for internet trolling. In previous research, sex and age affected engagement in internet trolling (Buckels et al., 2014; Cracker & March, 2016; Masui et al., 2018); thus, sex and age were entered at the first step. Successive steps (2–4) entered scores for DT personality traits, loneliness, and their interaction. The sign of the regression coefficient (β) was assessed at each step. Furthermore, all continuous independent variables were standardized (with a mean of 0 and SD of 1) before any product terms were computed, and the unstandardized solution was then examined. A simple slope analysis was conducted to interpret significant interactions (see Aiken & West, 1991).

3. Results

3.1. Descriptive statistics

Table 1 shows means, standard deviations, and correlation

Table 1

Means, SDs, and correlation coefficients for internet trolling, Dark Tetrad personality traits, and loneliness.

	Means	SDs	1	2	3	4	5	6
1. Internet trolling	1.42	0.49	–	.37***	.30***	.20***	.39***	.17***
2. Machiavellianism	2.12	0.84		–	.53***	.51***	.49***	.04
3. Psychopathy	2.39	0.66			–	.26***	.39***	.41***
4. Narcissism	2.54	0.86				–	.34***	-.15*
5. Sadism	1.70	0.41					–	.16**
6. Loneliness	2.71	0.51						–

* $p < .05$.

** $p < .01$.

*** $p < .001$.

coefficients for scores for internet trolling, DT personality traits, and loneliness. The two-sample t -tests revealed a gender difference for internet trolling scores, with the scores for males ($M = 1.50$, $SD = 0.53$) significantly higher than those for females ($M = 1.35$, $SD = 0.44$, $t(511) = 3.41$, $p < .001$, $d = 0.31$). Scores for Machiavellianism (male: $M = 2.26$, $SD = 0.83$; female: $M = 1.98$, $SD = 0.83$), psychopathy (male: $M = 2.46$, $SD = 0.63$; female: $M = 2.32$, $SD = 0.68$), narcissism (male: $M = 2.67$, $SD = 0.85$; female: $M = 2.42$, $SD = 0.86$), and everyday sadism (male: $M = 1.85$, $SD = 0.47$; female: $M = 1.55$, $SD = 0.28$) were also significantly higher for males than for females ($t(511) > 3.38$, $ps < 0.05$, $ds > 0.21$).

Internet trolling was positively associated with Machiavellianism ($r = 0.36$, $p < .001$), psychopathy ($r = 0.37$, $p < .001$), and everyday sadism ($r = 0.49$, $p < .001$). There was a positive relationship between psychopathy and loneliness ($r = 0.41$, $p < .001$). Although the correlation coefficients between internet trolling and both narcissism and loneliness were significant, these correlations were small.

3.2. Moderating effects of loneliness on the relationship between DT personality traits and internet trolling

To reveal the moderating effects of loneliness on the relationship between DT personality traits and internet trolling, moderated hierarchical regression analyses were conducted. Dummy codes for sex (male = 1, female = 0) and age of participants were entered at the first step. Scores for the three DT personality traits that were not used as predictors were then entered at the second step. For the third step, scores for the other DT personality trait and loneliness were entered, and at the fourth step, the interaction of DT personality trait and loneliness was entered. The dependent variable was the score for internet trolling. Moderated hierarchical regression analyses revealed a significant Machiavellianism \times loneliness interaction (Table 2; $B = 0.14$, $SE = 0.04$, $t(504) = 3.41$, $p < .001$; R^2 change = 0.02,

$p < .001$), a significant psychopathy \times loneliness interaction (Table 3; $B = 0.14$, $SE = 0.05$, $t(504) = 2.71$, $p < .01$; R^2 change = 0.01, $p < .01$), and a significant everyday sadism \times loneliness interaction ($B = 0.32$, $SE = 0.09$, $t(504) = 3.66$, $p < .001$; R^2 change = 0.02, $p < .001$). Main effects of Machiavellianism, psychopathy, everyday sadism, and loneliness were also significant ($B = 0.07$ – 0.42 , $SE = 0.03$ – 0.06 , $t(504) > 2.00$, $ps < 0.05$).

The interactions between Machiavellianism and loneliness on internet trolling are shown in Fig. 1(A). Fig. 1(A) demonstrates that individuals with high loneliness (at +1 SD above the mean) and higher levels of Machiavellianism reported significantly more internet trolling than those low in Machiavellianism ($B = 0.14$, $SE = 0.04$, $t(504) = 3.78$, $p < .001$), but there was no such relationship for those with low levels of loneliness (at –1 SD below the mean; $B = 0.00$, $SE = 0.01$, $t(504) = 0.09$, $p = .93$). As shown in Fig. 1(B), for participants with high levels of loneliness, higher levels of psychopathy were associated with increased internet trolling ($B = 0.15$, $SE = 0.05$, $t(504) = 3.31$, $p < .001$; the slope for stability –1 SD was non-significant ($B = 0.00$, $SE = 0.05$, $t(504) = 0.12$, $p = .90$). A simple slope analysis revealed that loneliness did not moderate the relationship between everyday sadism and internet trolling, and individuals with high everyday sadism trolled more than those with low everyday sadism, irrespective of loneliness.

The main effect of narcissism and the interactive effect of narcissism and loneliness on internet trolling behavior were not significant ($B = -0.03$ – 0.04 , $SE = 0.03$ – 0.04 , $t(504) < 1.04$, $ps > 0.29$).

4. Discussion

The present research explored the effects of DT personality traits and loneliness on engagement in internet trolling. In particular, it examined whether loneliness would moderate the relationship between each of the DT personality traits and internet trolling behavior.

First, the predicted effects of Machiavellianism, psychopathy, and everyday sadism on engagement in internet trolling were revealed. Buckels et al. (2014) argued that psychopathy and everyday sadism were positive predictors of internet trolling behavior. Furthermore, Kircaburun et al. (2018) reported predictive influences of Machiavellianism, psychopathy, and everyday sadism on engagement in internet trolling. The present results are consistent with these findings. Loneliness was also found to have positively predictive effects on internet trolling. Povedano et al. (2015) showed a positive relationship between degree of loneliness and aggressive response, while Ybarra and Mitchell (2004) demonstrated an association between experiences of being targets of offline bullying and online aggressive responses. The present findings suggest that DT personality traits and loneliness are factors that play a role in increasing aggressive behavior on the

Table 2

Hierarchical regression analysis of internet trolling on Machiavellianism and loneliness ($N = 513$).

Variables	Model 1			Model 2			Model 3			Model 4		
	B	$SE\ B$	β	B	$SE\ B$	β	B	$SE\ B$	β	B	$SE\ B$	β
Sex	0.14	0.04	0.15**	–0.03	0.04	–0.03	–0.02	0.04	–0.02	–0.02	0.04	–0.02
Age	–0.01	0.00	–0.16**	0.00	0.00	–0.04	0.00	0.00	–0.03	0.00	0.00	–0.02
Other DT personality traits												
Psychopathy				0.14	0.03	0.19**	0.09	0.04	0.11*	0.08	0.04	0.11*
Narcissism				–0.02	0.02	–0.03	–0.03	0.03	–0.05	–0.02	0.03	–0.04
Sadism				0.51	0.06	0.43**	0.47	0.06	0.39**	0.45	0.06	0.37**
Machiavellianism							0.07	0.03	0.12*	0.07	0.03	0.12*
Loneliness							0.08	0.04	–0.08	0.10	0.04	0.10*
Machiavellianism \times loneliness										0.14	0.04	0.13**
R^2	0.05			0.28			0.29			0.30		
F for change in R^2	12.50**			53.28**			3.75**			11.66**		

* $p < .05$.

** $p < .01$.

Table 3
Hierarchical regression analysis summary for internet trolling on psychopathy and loneliness ($N = 513$).

Variables	Model 1			Model 2			Model 3			Model 4		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Sex	0.14	0.04	0.15**	−0.03	0.04	−0.03	−0.02	0.04	−0.02	−0.02	0.04	−0.02
Age	−0.01	0.00	−0.16**	0.00	0.00	−0.05	0.00	0.00	−0.03	0.00	0.00	−0.02
Other DT personality traits												
Machiavellianism				0.10	0.03	0.17**	0.07	0.03	0.12*	0.07	0.03	0.12*
Narcissism				−0.04	0.03	−0.07	−0.03	0.03	−0.05	−0.02	0.03	−0.04
Sadism				0.52	0.06	0.43**	0.47	0.06	0.39**	0.45	0.06	0.38**
Psychopathy							0.09	0.04	0.11*	0.08	0.04	0.10*
Loneliness							0.08	0.04	−0.08	0.08	0.04	0.09*
Psychopathy \times loneliness										0.14	0.05	0.10**
R^2	0.05			0.27			0.29			0.30		
F for change in R^2	12.50**			50.33**			7.19**			7.34**		

* $p < .05$.

** $p < .01$.

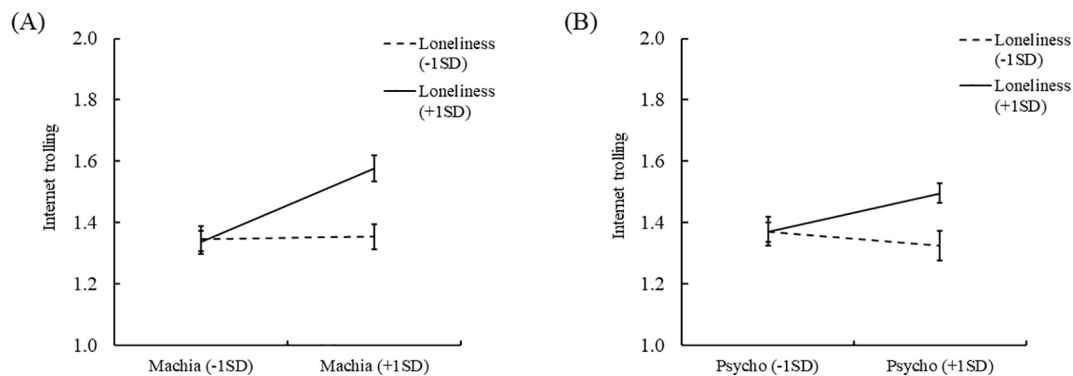


Fig. 1. Effects of loneliness on (A) the relationship between Machiavellianism and internet trolling and (B) the relationship between psychopathy and internet trolling.

Note: Machia = Machiavellianism; Psycho = psychopathy.

internet.

Second, the hierarchical regression analysis conducted here showed a moderating effects of loneliness on the relationship between each DT personality trait and engagement in internet trolling. The facilitating effects of Machiavellianism or psychopathy on internet trolling behavior presented only in participants experiencing high levels of loneliness. On the other hand, the degree of internet trolling behavior did not differ in participants with high levels of Machiavellianism or psychopathy and low loneliness and those with low DT personality traits. These results suggest that the subjective feeling of a lack of interpersonal relationships increases the likelihood of an aggressive response in individuals with high DT personality traits who are engaged in online situations. Previous research revealed that a lack of social support increased aggressive response in individuals with high psychopathy (Masui et al., 2012), with degree of social support from family members moderating the association between psychopathy and an aggressive response to innocent others. The present study may play a role in expanding knowledge about the moderating effects of loneliness on the relationship between DT personality traits and aggressive behavior.

Previous studies have demonstrated that enrichment of psychosocial resources inhibits aggressive responses in individuals with high DT personality traits (Masui et al., 2012; Masui & Ura, 2016). Masui and Ura (2016) found that high levels of subjective childhood socioeconomic status inhibited aggressive responses in individuals with high psychopathy. In the present research, the degree of internet trolling behavior was the same in individuals with high DT personality traits and low loneliness and in those with low DT personality traits. This finding supports the view that enrichment of psychosocial resources inhibits aggressive behavior in individuals with high DT personality

traits.

Previous research has found that experiences of social rejection facilitate aggressive behavior toward other people in individuals with high narcissism (Twenge & Campbell, 2003). However, the present analyses produced no significant interaction between narcissism and loneliness. This inconsistency may be explained by differences in aggressive behaviors. The aggressive behavior studied by Twenge and Campbell was direct and its target was specified, but internet trolling is indirect aggression with an indefinite target. It is possible that these differences may have produced different effects of loneliness on the relationship between narcissism and internet trolling behavior.

The current study revealed that each DT personality trait had a different influence on engagement in internet trolling. Although Machiavellianism, psychopathy, and sadism positively predicted internet trolling behavior, narcissism did not. In addition, a moderating effect of loneliness was found for Machiavellianism and psychopathy. These results support the conclusion that DT personality traits cannot be combined into a meaningful composite (e.g., Furnham et al., 2013).

Several limitations of the present study should be noted. First, this study was conducted by self-reports and used a cross-sectional design, methods which may limit the external validity of the findings (Jones & Neria, 2015). A longitudinal study would be required to identify a causal relationship between DT personality traits, loneliness, and internet trolling. In addition, loneliness was evaluated subjectively. Further examinations of loneliness by means of experimental manipulation should be useful in clarifying detailed effects of loneliness on the relationship between DT personality traits and internet trolling. Second, participants in the present research were all Japanese individuals who registered with an internet research company, and the sample was thus

limited. Assessment of additional types of samples, including student samples, and would generalize the results of the present study. Finally, the internal consistency of psychopathy in the DTDD-J was low. A similar problem occurred in several previous studies in Japan (e.g., Masui et al., 2018; Tamura et al., 2015). In future studies, it may be necessary to correct the wording of the items to improve the reliability of the scale.

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