Online harassment has become a common problem with the globalization of Internet technology. Trolling is a type of online harassment and has gained the attention of scholars in recent years. The aim of trolling is deliberately deceiving and provoking others to create an environment of conflict and distress for the offenders' enjoyment and benefit on online platforms (Bishop, 2014; Buckels et al., 2014; Hardaker, 2010). These are the elements of trolling that are included in many different definitions. Moreover, starting aggressive arguments (Klempka & Stimson, 2014), posting provoking, malicious, upsetting, and shocking messages or contents, using offensive language and high agency in interactions (Cook et al., 2019), and spreading false information for attention are considered some common trolling behaviors (Hardaker, 2010).

Although there is a general lack of consensus about the definition of trolling (e.g., Cook et al., 2018), March and Marrington (2019) reported that trolling was characterized by abusive aggressive behavior in their large-sample qualitative study. It was also reported in that study that humor is another characteristic of trolling that is included in many different definitions. Moreover, starting aggressive arguments (Klempka & Stimson, 2014), posting provoking, malicious, upsetting, and shocking messages or contents, using offensive language and high agency in interactions (Cook et al., 2019), and spreading false information for attention are considered some common trolling behaviors (Hardaker, 2010).

The aim of this study is twofold. First, this study develops a new scale measuring sarcastic trolling and investigates the reliability and validity of the Turkish version of the Troll Deviancy Scale. Second, this study explores the associations among different trolling measures, dark triad, and overt and relational aggression. Eight items measuring sarcasm in trolling were written to develop a Likert type of scale. In total, 809 university students participated in the study and completed an online questionnaire. Findings suggested that both the sarcastic trolling scale and the Turkish version of the Troll Deviancy Scales are valid and reliable. Analyses showed that there were significant associations among trolling measures. Moreover, the differential predictive value of dark personality traits and overt and relational aggression in different forms of trolling were revealed. This study extends the existing literature on linking personality traits and aggression to a new form of trolling. Moreover, this study focused on a non-Western culture to examine different forms of trolling behaviors.

Literature Review
Trolling causes many problems on online platforms, such as conflict, the polarization of opinions, outraged reactions, and disruption of smooth and positive discussions (Coles & West, 2014; Buckels et al., 2014; Hardaker, 2010). These are the elements of trolling that are included in many different definitions. Moreover, starting aggressive arguments (Klempka & Stimson, 2014), posting provoking, malicious, upsetting, and shocking messages or contents, using offensive language and high agency in interactions (Cook et al., 2019), and spreading false information for attention are considered some common trolling behaviors (Hardaker, 2010).

Although there is a general lack of consensus about the definition of trolling (e.g., Cook et al., 2018), March and Marrington (2019) reported that trolling was characterized by abusive aggressive behavior in their large-sample qualitative study. It was also reported in that study that humor is another characteristic of trolling but it depends on whether one is the victim or the perpetrator of trolling. Personal enjoyment, revenge, and thrill-seeking were identified as the main motivations for trolling by self-identified trolls in another qualitative study (Cook et al., 2018). We are also in agreement with the researchers who believe that trolling is a broad term and too complex to fit in a single, narrow definition since it includes a wide variety of behaviors. However, some characteristics and motivations behind different forms of trolling can be common or similar even though the sample of behaviors varies. Thus, we aimed to develop a new tool to measure a new form of trolling, sarcasm, an aggressive form of humor, and examine its relationships with an existing trolling measure, dark triad, and aggression. In this way, we can examine whether a new form of trolling is also characterized by aggression, relates to other trolling behaviors, and the abovementioned motivations.

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Abstract
The aim of this study is twofold. First, this study develops a new scale measuring sarcastic trolling and investigates the reliability and validity of the Turkish version of the Troll Deviancy Scale. Second, this study explores the associations among different trolling measures, dark triad, and overt and relational aggression. Eight items measuring sarcasm in trolling were written to develop a Likert type of scale. In total, 809 university students participated in the study and completed an online questionnaire. Findings suggested that both the sarcastic trolling scale and the Turkish version of the Troll Deviancy Scales are valid and reliable. Analyses showed that there were significant associations among trolling measures. Moreover, the differential predictive value of dark personality traits and overt and relational aggression in different forms of trolling were revealed. This study extends the existing literature on linking personality traits and aggression to a new form of trolling. Moreover, this study focused on a non-Western culture to examine different forms of trolling behaviors.

Keywords
trolling, sarcasm, dark personality, scale development, relational aggression, overt aggression
It was shown that trolling is a multidimensional construct. For example, past research identified four behavioral types of trolling, and humorous trolling was one of them (Sanfilippo et al., 2018). Moreover, another trolling scale that was developed recently (Hamarta et al., 2021) also includes three sub-scales measuring different trolling behaviors: harm-based trolling, provocation-based trolling, and fraudulent-based trolling. Briefly, personal or social enjoyment and entertainment were the main motivations behind humorous trolling. As a component of the mean-spirited or aggressive form of humor (Martin et al., 2003), sarcasm can be closely related to trolling as it includes mocking and criticizing other events or persons (Fichman, 2020; Kreuz & Glucksberg, 1989). Besides, sarcastic comments can also lead to annoyance and disruption like regular trolling comments. Accordingly, previous research considered sarcasm as an element of trolling. For instance, Sanfilippo et al. (2018) found that sarcasm is considered one of the trolling tactics by individuals who are observers of trolling. Sarcasm was also classified as one of the trolling tactics in past research examining global trolling behaviors (Fichman, 2020; Sun & Fichman, 2018).

Sarcasm in Trolling

Sarcasm is a form of linguistic or verbal irony occurring when there is a distinction between an utterance’s intended and literal meaning (Kreuz & Glucksberg, 1989). Like other forms of verbal irony, sarcasm is characterized by indirect words intended to be interpreted non-literally by the audience (Cheang & Pell, 2011). In other words, an individual expresses something other than the actual meaning of the words (Kreuz & Glucksberg, 1989). Although it may seem that sarcasm can only be detected in oral language, past research showed that sarcasm could also be expressed online by changing the valence of the message (Derkx et al., 2008). Accordingly, using sarcastic irony includes expressing obviously false messages or the opposite of the actual answer to convey a negative comment, thus creating ambiguity and misunderstanding (Fichman, 2020). Unsurprisingly, accurately recognizing sarcasm is hard (Bouazizi & Ohtsuki, 2016), and Internet users can be misguided and even may not realize the sarcasm in comments. As a result, miscommunications occur (Oprea & Magdy, 2020). For example, Internet users can provide sincere replies to sarcastic trolling comments which are perceived as positive but serve as harmful or undesirable functions in actuality. The aim of trolls is to mock or criticize others with these inconspicuous comments. Since trolls aim to disrupt smooth and positive discussions, using sarcasm can increase their success rate. However, if others can understand the difference between sarcastic and sincere comments, trolls cannot achieve their goals.

Although humor and sarcasm are observed in trolling comments, the latter has not been investigated in trolling research as much as humor. Understanding sarcasm is more challenging as compared with understanding humor in a comment (Bouazizi & Ohtsuki, 2016). Thus, the present research aimed to develop a scale assessing sarcasm in trolling. Learning the role of sarcasm in trolling behaviors can extend our knowledge of trolling, which then helps us recognize sarcasm. Prevention of trolling behaviors is critical as trolling causes several problems on online platforms (e.g., Fichman, 2016; Sest & March, 2017). We also aimed to explore how the newly developed scale is associated with existing trolling measures, namely the Troll Deviancy Scale (Zeuzulka & Seigfried-Spellar, 2016) and the Global Assessment of Facebook Trolling (GAFT; Craker & March, 2016) to provide information about the construct validity.

The Association Between Aggression and Trolling

Various forms of aggression have been differentiated in the literature, and most of these forms overlap (Little et al., 2003). However, at least two main dimensions of aggression are distinguished: overt and relational aggression (Little et al., 2003). Overt aggression is defined as verbal and physical behaviors directed at others with the purpose of harm and includes pushing, kicking, hitting, threatening, and insulting. Relational aggression, on the contrary, refers to behaviors performed to harm friendships or a sense of inclusion in peer groups. Ostracism, spreading rumors, and gossiping are examples of relational aggression (Crick & Grotpeter, 1995).

A few recent studies examined the association between aggression and trolling. As the previous qualitative research revealed, aggression is considered as one of the main characteristics of trolling (Hardaker, 2010, 2013). New evidence from a recent study investigating the associations between trolling and humor-related traits showed that trolling was predicted by aggressive humor (e.g., katagelasticism) (Navarro-Carrillo et al., 2021). Another recent study provided more direct evidence and showed that trolling is the online version of expressed aggression and offline aggression predicts cyber trolling (online aggression behavior; Strimbu & O’Connell, 2021). Goldstein (2016) also demonstrated that cyber aggression is positively associated with both overt and relational aggression. We aimed to further support and extend these findings by examining the link between two main forms of aggression and different forms of trolling. As already mentioned, sarcasm is a component of aggressive humor (Martin et al., 2003) and includes mocking and criticizing, which are typical trolling behaviors. In light of this information, it is expected that overt and relational
aggression will positively predict sarcastic trolling in this study (H1).

The Association Between Trolling and Dark Personality Traits

Examining the role of Dark Personality traits in harmful online behavior is one of the most notable approaches in the literature. High levels of The Dark Tetrad were found to be associated with problematic Internet use in the prior literature (e.g., Bogolyubova et al., 2018; Kircaburun & Griffiths, 2018). These robust associations have caused researchers to investigate the link between dark traits and trolling. Dark Tetrad personality has been studied to reveal the dispositional characteristics of trolling (e.g., Buckels et al., 2014; Craker & March, 2016; March et al., 2017). Following the earlier work, we seek to investigate the role of narcissism, Machiavellianism, and psychopathy as the predictors of trolling behaviors in this study. We aimed to extend the prior literature by examining whether the dark traits are distinctive markers of sarcastic trolling as well.

Briefly, a combination of vanity and egocentric admiration of one’s own qualities is common in narcissism (Campbell & Miller, 2011; Paulhus, 2014). Previous research showed that narcissism did not predict trolling enjoyment when controlling for other dark personality scores (Buckels et al., 2014). Similarly, other studies also demonstrated that narcissism did not predict trolling behaviors (Lopes & Yu, 2017; March et al., 2017). It was argued that since narcissists are preoccupied with themselves more than others (Levy et al., 2011), there was no significant association between trolling and narcissism. Based on this information, we also do not expect a significant relationship between narcissism and any form of trolling.

Machiavellianism is mainly characterized by having a cynical view of human nature, lack of morality, the principle of putting benefits above others, and belief in the effectiveness of manipulative tactics in the treatment of others. Machiavellians behave strategically and deceptively (Jones & Paulhus, 2011). Surprisingly, previous research found that although Machiavellianism correlated with trolling, it did not explain the unique variance in trolling behaviors (e.g., Buckels et al., 2014; Craker & March, 2016; Lopes & Yu, 2017; March et al., 2017). As already mentioned, sarcasm refers to a discrepancy between the intended and literal meaning of an utterance. Specifically, expressing the opposite of the actual answer is a specific example of sarcastic irony (Fichman, 2020). Therefore, writing sarcastic comments involve deception and strategic manipulation of others. Based on this, it was hypothesized that Machiavellianism would positively predict sarcastic trolling (H2). The main characteristics of psychopathy are deficiencies in affect (i.e., callousness) and self-control (i.e., impulsivity). Accordingly, when their actions harm others, people with high psychopathy show a lack of concern and guilt (Jones & Paulhus, 2011). They demonstrate a blatant disregard for the psychological tension created to others (Lilienfeld et al., 2014). The predictive utility of psychopathy regarding the perpetration of trolling was shown in past research. It was not surprising that psychopathy was associated with trolling positively (e.g., Lopes & Yu, 2017; March et al., 2017; Sest & March, 2017). We also expect a significant association between sarcastic trolling and psychopathy due to the very nature of trolling. The lack of concern and empathy when their actions hurt others are common in individuals high on psychopathy (Hall & Benning, 2006). That is why they may write impulsive sarcastic comments with an overt disregard for the suffering of others. Based on this information, we expect that psychopathy would positively predict sarcastic trolling (H3).

Furthermore, the first trolling measure was developed in these studies. The Global Assessment of Internet Trolling (GAIT) Scale was developed by Buckels et al. (2014) and aimed to measure trolling experience, trolling enjoyment, and identification with trolling with four items. Another trolling measure was the GAFT, which is a modified version of GAIT (Craker & March, 2016). Since four items can be problematic in terms of content validity (Field, 2013), new items were added to GAIT and used as GAFT. Moreover, Zezulka and Seigfried-Spellar (2016) developed another scale to measure various trolling and cyberbullying behaviors named Cyberbully/Troll Deviancy Scale. Unlike GAFT and GAIT, all items in Troll Deviancy Scale measure the frequency of various behavioral indicators of trolling. The trolling section of the Cyberbully/Troll Deviancy Scale was used to examine its psychometric properties in a Turkish sample in this study. Moreover, GAFT was also used to investigate its association with sarcastic trolling.

In short, the previous research showed that noxious personality traits were helpful for the researchers who seek an investigation of the profile of individuals engaging in trolling. Psychopathy, in particular, was a consistent predictor of trolling relative to other dark personality traits (e.g., Lopes & Yu, 2017; March et al., 2017). We also aimed to demonstrate whether the dark triad has a predictive utility in explaining sarcastic trolling.

The Present Study

Although it is an aggressive form of humor (Martin et al., 2003), there is limited research examining the role of sarcasm in trolling. To address this gap, this study aims to contribute to trolling literature by developing a novel measurement tool to assess sarcasm in trolling. Besides, we aimed to examine whether this new form of trolling behavior is also intended to deceive and provoke others aggressively, mainly for the perpetrators’ own enjoyment as in traditional trolling. As indicated by Bishop (2014), the way trolls and trolling are represented on mass media can convey a particular image can depend on the objective of the author or the website. This diversity can hinder the accurate perception of
trolling by Internet users, which can be problematic for a healthy online environment. Presenting a unified picture of the characteristics and reasons behind different trolling behaviors can provide a general framework for the profile of people who perform trolling and also mitigate different representations of trolling.

The associations between sarcastic trolling with the existing trolling measures, namely, the Troll Deviancy Scale and GAFT, were also examined to provide information about the construct validity of the newly developed scale. Second, the Troll Deviancy Scale was adapted into Turkish to examine the psychometric properties. The last objective of the present research is to test how different forms of trolling behaviors are associated with dark personality traits and overt/relational aggression.

Method

Participants

There were 809 students ($M_{age} = 21.5, SD = 7.92$; 66.8% female) from different departments of local universities in Turkey in this study. They participated in the study in exchange for extra course credits. The majority of the participants were recruited through Sona Systems. The remaining participants from different universities were recruited through enrolled psychology courses.

Procedure

This study was advertised as a questionnaire investigating attitudes toward online interactions. If participants see the term “trolling,” they may not want to participate in the study due to the possibility of labeling (Zezulka & Seigfried-Spellar, 2016) and the possible legal consequences of their actions. Ethical approval was obtained from the Middle East Technical University’s (METU) institutional review board. The study was advertised through the Sona Systems (a data collection tool allowing researchers to share their projects online and participants to search and complete these studies). Participants completed an informed consent form at the beginning of the online surveys. New items measuring sarcasm in trolling were written and administered together with the Troll Deviancy Scale for item-pretest. Item writing started with a literature review. Mainly, we reviewed existing trolling measures (Troll Deviancy Scale, GAIT, and GAFT) to generate Likert types of items. We also reviewed trolling research, including sarcasm as a component of trolling. We also interviewed 17 people about their opinions and perceptions of trolling by asking open-ended questions. Mainly, we wrote items in a similar manner to the Troll Deviancy Scale, which measures the behavioral frequency of trolling behaviors. After the item writing procedure was over, eight items were reviewed by the authors of the study and one other expert from the education faculty in terms of clarity. These experts also translated the Turkish items into English. All experts were in agreement with the latest version of both Turkish and English versions of the items.

The data collection took place between January and November 2019. The whole scale was applied to 10 people to detect shortcomings of the items before the main data collection. For the ambiguous, irrelevant, or confusing items, some minor modifications were made for clarity. Afterward, the main data collection period was started and an online survey package was provided to participants via Qualtrics. The survey was completed in 20–25 min on average.

Measures

Cyberbully/Troll Deviancy Scale. The trolling subscale of the Cyberbully/Troll Deviancy Scale (CTDS; Zezulka & Seigfried-Spellar, 2016) was used to measure trolling behaviors in the study. Participants indicated how many times they engaged in the behavior in question in the past month. In total, the trolling subscale has 13 items which were rated on a 1 (never) to 6 (more than six). An example item from the scale: “Insulting someone that you did not know in an interactive game room...” This scale measures trolling behaviors implicitly. In such a way that individuals rate the behaviors without seeing the word “trolling.” Some minor modifications were made to the wording of the Troll Deviancy Scale. Specific labels were removed and “online environments” were written instead to represent general Internet use. In addition to the authors of this study, one doctoral student knowledgeable about the topic translated the items of this scale into Turkish and the authors of this study back-translated the items. Reliability analyses showed that Cronbach’s $\alpha$ of the scale was .91 for this study.

Sarcastic Trolling Scale. Eight Likert types of items (originally in Turkish) were written and used in data collection. The wording of the eight items can be found in Table 1. We wrote items of the sarcastic trolling scale based on the general definition and characteristics of sarcasm (Cheang & Pell, 2011; Kreuz & Glucksberg, 1989) and items of the Troll Deviancy Scale measuring behavioral frequencies of trolling behaviors. An example item from the sarcastic trolling scale: “Writing humorous comments on online platforms to someone’s posts on a topic that I see the other party has wrong information.” Items were rated on a 1 (never) to 6 (more than six). Reliability analyses showed that Cronbach’s $\alpha$ was .91 for the sarcastic trolling.

GAFT. GAFT (Craker & March, 2016) was used to measure trolling enjoyment, identification, and experience. It is the extended version of GAIT, which includes four items. GAFT includes more items tapping more diverse behaviors. That is why we preferred using GAFT instead of GAIT in this study. It is a single-factor scale with nine items (3 of
Table 1. Factor Loadings, Explained Variance, Eigenvalues, and Cronbach’s Alphas for the Sarcastic Trolling and the Factors of the Troll Deviancy Scale.

| Item                                                                 | Factor loadings |            |            |            |
|---------------------------------------------------------------------|-----------------|------------|------------|------------|
|                                                                    | 1   | 2   | 3   |
| **Factor 1: (α = .91); eigenvalue = 8.99; explained variance = 25.64%** |     |     |     |
| 19. Writing humorous comments online to people whom I see advocating obviously absurd ideas. | .86  | .05  | .14  |
| 18. Writing humorous comments on online platforms to someone’s posts on a topic that I see the other party has wrong information. | .85  | .05  | .18  |
| 21. Writing humorous comments to the content (e.g., news, status updates etc.) which I obviously know that is a lie. | .81  | .08  | .12  |
| 17. Writing sarcastic comments to the content (e.g., news, status updates etc.) which I obviously know that is a lie. | .79  | .23  | .11  |
| 16. Writing sarcastic comments online to people whom I see advocating obviously absurd ideas. | .75  | .22  | .29  |
| 14. Writing sarcastic comments in online platforms to someone’s post on a topic that I see the other party has wrong information. | .76  | .22  | .28  |
| 20. While online, writing humorous comments to others in a situation which I feel ignorant/insufficient. | .66  | .08  | .20  |
| 15. While online, writing sarcastic comments to others in a situation which I feel ignorant/insufficient. | .51  | .28  | .25  |

**Factor 2: (α = .85); eigenvalue = 2.86; explained variance = 19.09%**

| 1. Insulted someone that you did not know in an interactive game room. | .50  | .34  | .31  |
| 5. Posted to a guestbook saying rude or mean things about a stranger. | .09  | .83  | .29  |
| 8. Visited a Facebook/website memorial page for a deceased person that you did not know and made negative comments. | -.01 | .78  | .40  |
| 6. Posted on a website or a comment thread in order to make people that you did not know to make them feel uncomfortable. | .21  | .70  | .12  |
| 4. Voted at an online bashing poll saying rude or mean things about someone you did not know. | .22  | .62  | .25  |
| 7. Posted a comment on YouTube based on an opinion you didn’t actually have in order to cause disturbance playing devil’s advocate. | .22  | .60  | .51  |
| 3. Posted rude comments or lies about a stranger that you did not know online. | .17  | .60  | .37  |
| 2. Used profanity or insulting language toward an online (just because). | .20  | .60  | .06  |

**Factor 3: (α = .85); eigenvalue = 1.22; explained variance = 17.48%**

| 13. Posting ambiguous comments on a website/forum in order to cause confusion. | .28  | .23  | .80  |
| 11. Given an inappropriate or non-related answer to a question asking for advice in an online forum, website, or social media site to be disruptive. | .11  | .27  | .76  |
| 12. Became a member of an online group and acted as if you were really interested in the topic of discussion, but later began opposing the beliefs of the group to be disruptive. | .12  | .37  | .71  |
| 10. Posted comments on websites with intentions to change the direction of the conversation (go off on a tangent). | .23  | .21  | .70  |
| 9. Made a comment on social media or a website to make others mad for your own pleasure. | .42  | .23  | .61  |

Note. Scales ranged from 1 (never) to 7 (more than 6).

them were reverse). An example item from the scale: “I enjoy upsetting other people on Facebook.” Participants rated the items on a scale of 1 (strongly disagree) to 7 (strongly agree). The wording of the scale was adapted to the Internet context (the word “Facebook” was replaced with the “Internet”) and translated into Turkish. Cronbach’s α was .61 in this study.

**Overt and Relational Aggression.** Two dimensions of aggression, overt and relational, were measured among the four principal dimensions of aggressive behavior (Little et al., 2003). Overt aggression was measured with six items. One sample item from the scale: “I often threaten others to get what I want.” Relational aggression was also measured with six items. One sample item from the scale: “To get what I want; I often ignore or stop talking to others.” All items were rated on a 1 (strongly disagree) to 7 (strongly agree) scale. Higher scores indicate higher levels of aggression. Cronbach’s α was .86 for overt aggression and .85 for relational aggression in this study.
Short Dark Triad. Short Dark Triad (SD3; Jones & Paulhus, 2014) was used to assess socially aversive personality traits, namely, Machiavellianism, narcissism, and psychopathy. It is a 27-item measure with five reverse-scored items. Each subscale is formed by averaging all items. Sample items from the scale: “It is not wise to tell your secrets” (Machiavellianism), “I hate being the center of attention” (narcissism, reverse), and “People who mess me always regret it” (psychopathy). Items were rated on a 1 (strongly disagree) to 7 (strongly agree) scale. The scale was adapted to Turkish by Özsoy et al. (2017). Cronbach’s $\alpha$ was .80 for Machiavellianism, .67 for narcissism, and .68 for psychopathy in this study.

Marlowe–Crowne Social Desirability Scale. Social desirability was measured with the Marlowe–Crowne Social Desirability Scale. For this research, the shorter version of the scale (7 items) that was adapted by Ural and Özbirecikli (2006) was used. Items were rated on a 1 (strongly disagree) to 7 (strongly agree) scale. This scale was adapted to Turkish by Özsoy et al. (2017). Cronbach’s $\alpha$ was .80 for Machiavellianism, .67 for narcissism, and .68 for psychopathy in this study.

Results

Exploratory Factor Analysis

Exploratory factor analysis (EFA) was performed in SPSS Version 25. Data were first analyzed for missing values and all scales were below 5%. The eight new items were added at the end of the Troll Deviancy Scale, which was originally composed of 13 items. In total, 21 items were factor analyzed using principal component analysis with Varimax (orthogonal) rotation to ascertain the underlying factor structure of the scale. Bartlett’s Test of Sphericity and Kaiser–Meyer–Olkin (KMO) Measure of Sampling Adequacy indicated that data was homogeneous and suitable to proceed with the factor analysis (KMO = .91, $\chi^2(210) = 10,649.111, p < .001$. Three factors explaining 62.21% of the variance for the entire set of variables with eigenvalues greater than 1 emerged. The scree plot also indicated a three-factor solution.

The first factor, named sarcastic trolling, with an eigenvalue of 8.99, explained 25.64% of the variance. All items in this factor were the initial eight items written by the authors. The second and third factors belong to Troll Deviancy Scale and the factor structure of the scale was not explained in the original article (see Zezulka & Seigfried-Spellar, 2016). Thus, a total score was calculated for the second and third factors and used in the analyses, as in the original article. The large correlation between sarcastic trolling and with an eigenvalue of 8.99, explained 25.64% of the variance. All items in this factor were the initial eight items written by the authors. The second and third factors belong to Troll Deviancy Scale and the factor structure of the scale was not explained in the original article (see Zezulka & Seigfried-Spellar, 2016). Thus, a total score was calculated for the second and third factors and used in the analyses, as in the original article. The large correlation between sarcastic trolling and Troll Deviancy Scale ($r = .57, p < .01$) indicates the convergent validity (subtype of construct validity) of the newly developed scale. Moreover, the small correlation between sarcastic trolling and social desirability ($r = -.14, p < .01$) indicates divergent validity (subtype of construct validity) (Whitley & Kite, 2012). The present research provides evidence that the sarcastic trolling scale measures what it purports to measure.

Hypothesis Testing

Variance inflation factor (VIF) was calculated to determine the potential multicollinearity among the predictors. The VIF values were between 1.02 and 2.10, indicating that multicollinearity was not an issue (O’Brien, 2007). Descriptive statistics and correlations among all variables used in this study are demonstrated in Table 2. Results showed that sarcastic
trolling correlated positively with male gender, all aggression, and dark triad variables; and negatively with social desirability. The majority of these associations are in the expected direction. Unsurprisingly, the low means of around 1.3 from 7-point scales for both trolling and aggression scales are associated with skewness. The distributions of responses from the trolling scales appeared to violate the assumption of normality (Sarcastic trolling: skewness = 2.51, kurtosis = 6.71; Troll Deviancy: skewness = 5.69, kurtosis = 40.21). The non-transformed version of the data was used in the analyses due to the nature of the trolling behaviors (the transformed version of the data did not change the results). Previous research also found similar mean scores regarding trolling scores (e.g., Goldstein, 2016; Strimbu & O’Connell, 2021).

A three-step hierarchical regression analysis was performed in SPSS to examine the predictors of sarcastic trolling and the Troll Deviancy Scale separately (see Tables 3 and 4 for the regression results). We did not use GAFT as a dependent variable due to its low-reliability score (.61) but we used it to predict Sarcastic trolling and Troll Deviancy. In all analyses, gender and social desirability were entered at the first step to control their effects. Dark personality traits and overt and relational aggression were entered in the second step. Trolling measures were entered at the last step to see their predictive value in explaining other forms of trolling.

In the first regression analysis, sarcastic trolling was predicted by gender and social desirability and 6% of the total variance was explained at the first step (adjusted $R^2$, $R^2 = .06, F(2, 761) = 24.08, p < .001$. In Step 2, sarcastic trolling was predicted by Machiavellianism, psychopathy, and relational aggression, independent of the influence of gender and social desirability and 20% of the total variance was explained (adjusted $R^2$, $R^2 = .20, F(7, 756) = 24.80, p < .001$. This change is significant, $F(5, 756) = 25.77, p < .001$. At the last step, the Troll Deviancy Scale predicted sarcastic trolling beyond the influences of dark personality traits and overt and relational aggression, but Internet Trolling did not predict sarcastic trolling, which is a surprising finding. The whole model explained 35% of the total variance of sarcastic trolling (adjusted $R^2$, $R^2 = .36, F(9, 754) = 46.91, p < .001$. 

### Table 3. Summary of the Hierarchical Regression Analyses for the Variables Predicting Sarcastic Trolling.

| Predictors                  | Sarcastic trolling |
|-----------------------------|--------------------|
|                             | $B$    | $\beta$ | $SE$ | 95% CI            |
| **Step 1**                  |        |        |     |                  |
| Gender                      | .46    | .20    | .08 | [.30, .62]        |
| Social desirability         | -11    | -11    | .04 | [-.19, -.04]      |
| **Step 2**                  |        |        |     |                  |
| Gender                      | .23    | .10    | .08 | [.07, .39]        |
| Social desirability         | -11    | -11    | .04 | [-.19, -.04]      |
| Machiavellianism            | .09    | .10    | .03 | [.02, .15]        |
| Narcissism                  | -03    | -03    | .04 | [-.11, -.05]      |
| Psychopathy                 | .14    | .13    | .04 | [.05, .23]        |
| Overt aggression            | .15    | .09    | .08 | [-.01, .30]       |
| Relational aggression       | .10    | .07    | .06 | [-.02, .22]       |
| Troll Deviancy              | 1.09   | .49    | .08 | [.93, .1124]      |
| GAFT                        | -11    | -05    | .07 | [-.25, .03]       |
| $R^2$                       | .36    |        |     |                  |
| $F$                         | 46.91  |        |     |                  |

**Note.** CI = confidence interval; GAFT = Global Assessment of Facebook Trolling.

### Table 4. Summary of the Hierarchical Regression Analyses for the Variables Predicting Troll Deviancy.

| Predictors                  | Troll Deviancy |
|-----------------------------|----------------|
|                             | $B$    | $\beta$ | $SE$ | 95% CI            |
| **Step 1**                  |        |        |     |                  |
| Gender                      | .16    | .15    | .04 | [.09, .23]        |
| Social desirability         | -10    | -21    | .02 | [-.13, -.07]      |
| **Step 2**                  |        |        |     |                  |
| Gender                      | .09    | .08    | .04 | [.02, .16]        |
| Social desirability         | -04    | -08    | .02 | [-.17, -.01]      |
| Machiavellianism            | .01    | .01    | .01 | [.02, .03]        |
| Narcissism                  | -01    | -02    | .02 | [.04, .02]        |
| Psychopathy                 | .02    | .03    | .02 | [-.02, .05]       |
| Overt aggression            | .19    | .26    | .03 | [.13, .25]        |
| Relational aggression       | .18    | .29    | .03 | [.13, .24]        |
| Sarcastic trolling          | .19    | .41    | .01 | [.16, .21]        |
| GAFT                        | .16    | .16    | .03 | [.10, .22]        |
| $R^2$                       | .47    |        |     |                  |
| $F$                         | 74.99  |        |     |                  |

**Note.** CI = confidence interval; GAFT = Global Assessment of Facebook Trolling.
At Step 2, the addition of dark personality traits and overt and relational aggression to the model lowered the predictive utility of gender but it was still significant in predicting sarcastic trolling. Social desirability, on the contrary, became nonsignificant. At the last step, relational aggression also became nonsignificant with the addition of other trolling measures to the model. These findings showed that the first hypothesis was not confirmed (H1: Overt and relational aggression will positively predict sarcastic trolling). However, our second and third hypotheses (H2: Machiavellianism would positively predict sarcastic trolling; H3: Psychopathy would positively predict sarcastic trolling) were confirmed.

In the second analysis, the same variables were used to show their predictive power on the Turkish version of the Troll Deviancy Scale. Similar to sarcastic trolling, Troll Deviancy was predicted by gender and social desirability, and 7% of the total variance was explained at the first step (adjusted \( R^2 \)). \( R^2 = .08 \), \( F(2, 761) = 31.55, p < .001 \). In Step 2, only overt and relational aggression was significant and 31% of the total variance was explained with the addition of dark personality and overt and relational aggression (adjusted \( R^2 \)). \( R^2 = .32 \), \( F(7, 756) = 49.67, p < .001 \). This change is significant, \( F(5, 756) = 52.64, p < .001 \). In the last step, overt and relational aggression, sarcastic trolling, and Internet trolling were significant predictors. The whole model explained a total of 47% of the variance in trolling (adjusted \( R^2 \)). \( R^2 = .47 \), \( F(9, 754) = 74.99, p < .001 \). At Step 3, gender and social desirability became nonsignificant with the addition of other trolling measures. However, overt and relational aggression remained significant.

Some notable differences between the sarcastic trolling scale and the Troll Deviancy Scale emerged. First, overt and relational aggression predicted Troll Deviancy but did not predict sarcastic trolling when other trolling measures were included in the model. Psychopathy and Machiavellianism, on the contrary, predicted sarcastic trolling but did not predict Troll Deviancy at the last step of the hierarchical regression. These findings suggest that overt and relational aggression and dark personality traits are associated with different forms of trolling behaviors differently.

**Discussion**

We aimed to examine the role of sarcasm in trolling and its associations with the Troll Deviancy Scale, GAFT, the dark triad, and overt and relational aggression. Sarcastic trolling scale, of which reliability and validity were demonstrated, was developed and Troll Deviancy Scale was adapted into Turkish in this study. With the development of the sarcastic trolling scale, a new form of trolling behavior was conceptualized. All items in the sarcastic trolling scale measure frequency of behavioral manifestations of trolling, which is similar to the Troll Deviancy Scale. Thus, although it can be used separately on its own, sarcastic trolling can also be used as a subfactor of the Troll Deviancy Scale.

Anonymity and physical distance are certain features of the Internet and allow trolls to tease or ridicule their targets at a lower cost. In this respect, the most common indicators attributed to sarcastic trolling (e.g., humiliating others and writing irrelevant comments to tease others) can be regarded as a subtype of trolling behavior. The sarcastic trolling scale covers new forms of trolling behaviors. The findings of this study suggest that when the sarcastic trolling scale and Troll Deviancy Scale are used together, they are comprehensive enough to detect a variety of trolling behaviors.

**Predictors of Sarcastic Trolling Scale and Troll Deviancy Scale**

Contrary to our prediction, both overt and relational aggression did not predict sarcastic trolling when other variables were included in the model (H1). As mentioned previously, sarcasm is a component of an aggressive form of humor (Martin et al., 2003), so this finding is surprising. However, when dark personality traits were eliminated from the model, relational aggression became significant. What is clear from this finding, the contribution of psychopathy and Machiavellianism seems to be beyond the influence of overt and relational aggression. This finding also suggests that psychopathy and Machiavellianism include more relevant features for predicting sarcastic trolling (e.g., deception, manipulation, and low empathy) (Austin et al., 2007; Jones & Paulhus, 2011), which are less incorporated in overt and relational aggression. Expressing something counter to the facts and truths and insincere expressions with the intent to wound others are prototypical examples of sarcasm (Kreuz & Glucksberg, 1989) and seem to be associated with the aforementioned features of psychopathy and Machiavellianism. Taken together, psychopathy and Machiavellianism have predictive value on sarcastic trolling above and beyond the effects of overt and relational aggression.

In contrast to sarcastic trolling, Troll Deviancy was predicted by relational and overt aggression but not predicted by dark personality. This finding suggests that overt and relational aggression comprises the effects of dark personality traits on Troll Deviancy and includes variance not reflected by dark personality traits. Relational aggression is characterized by manipulation or disruption of individuals’ social networks or relationships and it is generally covert (Archer & Coyne, 2005). Online platforms are more suitable for expressing relational aggression due to certain features of the Internet, such as anonymity and physical distance. Overt aggression, on the contrary, includes both verbal and physical behaviors directed at others to harm and involves pushing, kicking, hitting, threatening, and insulting (Buss & Perry, 1992). The findings of this study suggest that
individuals may continue to express verbal forms of overt aggression (e.g., insulting) and display it at a lower personal cost on online platforms. In other words, these individuals behaving aggressively offline may also behave aggressively online. With these findings, we also corroborated the previous research examining the link between aggression and cyber trolling in terms of online and offline consistency of self (see Strimbu & O’Connell, 2021). On the whole, our findings suggest that overt and relational aggression has a more prominent role in the Troll Deviancy Scale as compared with the sarcastic trolling scale.

Moreover, Machiavellianism predicted sarcastic trolling as expected (H2). However, previous research showed that Machiavellianism did not have a unique predictive power on trolling (e.g., Buckels et al., 2014; Craker & March, 2016). As mentioned, Machiavellianism is commonly associated with deception and manipulative tactics to make victims feel embarrassed or guilty (Austin et al., 2007). Sarcasm also includes counterfactual expressions to convey disapproval to deceive someone or some group of people (Kreuz & Glucksberg, 1989). The items of the sarcastic trolling scale correspond to these forms of commenting behaviors (see Table 1). Thus, it is not surprising that Machiavellianism predicted the sarcastic trolling in this study. Finally, as expected, narcissism did not predict trolling, which is in line with the previous research (e.g., Lopes & Yu, 2017; March et al., 2017). Thus, narcissism seems to be a less relevant construct for constructing the psychological profile of those engaging in sarcastic trolling.

Similarly, the predicted role of psychopathy was revealed in sarcastic trolling (H3). Previous studies showed that psychopathy is a consistent predictor of trolling (Craker & March, 2016; Lopes & Yu, 2017; March et al., 2017; Sest & March, 2017). By definition, trolls show disregard for the damage to others, which is a characteristic of psychopathy (Jones & Paulhus, 2011). Depending on the findings of this study, we claim that sarcastic trolling is also marked by low empathy toward others after their actions.

Furthermore, both forms of trolling (i.e., sarcastic trolling and Troll Deviancy) predicted each other indicating that they share a common aspect. That is, if participants scored high on the Troll Deviancy Scale, they are more likely to have higher scores on sarcastic trolling and vice versa. As mentioned previously, all items in the sarcastic trolling scale and Troll Deviancy Scale measure the behavioral frequency of trolling. Last, GAFT did not predict sarcastic trolling but predicted Troll Deviancy. The reason for this finding can be associated with the different item styles of sarcastic trolling and GAFT. The items of sarcastic trolling indicate specific behaviors and their frequencies rather than general tendencies of trolling. However, this finding should also be interpreted with caution as Cronbach’s alpha of GAFT (.61) was lower than the accepted value (Schmitt, 1996) in this study.

**Contributions and Implications**

This study advances our current knowledge about different forms of trolling and the predictors of trolling. A new form of trolling emerged and a new scale assessing these trolling behaviors was developed in the course of the study. The association between sarcastic trolling and Troll Deviancy Scale also attracts attention. What is evident from these findings, the sarcastic trolling scale, of which reliability and validity were shown, uniquely contributes to the literature by providing a more detailed understanding of a new form of trolling. Moreover, the Troll Deviancy Scale was adapted to Turkish and the psychometric properties of the scale seem satisfactory. Therefore, the present research also contributes to the literature by examining different trolling behaviors in Turkish university students. Moreover, the reviewed trolling literature mainly focused on Western samples. We, on the other hand, focused on Eastern culture consisting of Turkish university students in this study. Our results suggested that trolling in this context has some distinct features compared with trolls in the Western context, as the internal consistency of GAFT was not satisfactory and did not predict sarcastic trolling. There is a need for further research to reach more precise conclusions about this issue.

The majority of the past research focused on the personality traits of trolls. This research also provides the first empirical evidence for the relationship between sarcastic trolling and overt and relational aggression. Both overt and relational aggression were found to be good predictors of trolling behaviors measured with the Troll Deviancy Scale. As suggested by previous research (Strimbu & O’Connell, 2021), this information can be helpful in developing intervention programs targeting overt and relational aggression before they create online problems. Furthermore, the well-documented role of dark personality traits in trolling was shown for the sarcastic trolling scale as well. However, additional research is needed to replicate these results. Moreover, as past research showed (Hamarta et al., 2021; Sanfilippo et al., 2018), trolling is a multidimensional construct, and the present research demonstrated that sarcastic trolling is one dimension of trolling. Finally, a social desirability scale was used to see whether individuals performing trolling were concerned with obtaining social approval and there was a negative association between trolling measures and social desirability in this study. As suggested by March (2019), we controlled the self-report bias by using a social desirability scale in this study.

**Limitations**

While this study resulted in a novel measurement tool, some limitations should be considered when drawing conclusions. One particular limitation is that the sampling procedure may impact the results negatively. Specifically, although the participation is voluntary and anonymous, it is impossible to
find out whether participants trolled the self-report questionnaires due to the very nature of trolling. However, to handle this potential problem, the term “trolling” was not used either in participant recruitment advertisements, voluntary participation forms, or the questionnaires themselves as in the past research (e.g., Cook et al., 2018; Zezulka & Seigfried-Spellar, 2016). Moreover, given that the present research has a correlational design, causality cannot be discerned. Third, GAFT was not validated in the present research as it has a low-reliability coefficient than the accepted value. The present research suggests that GAFT may not be suitable to use in a Turkish university student sample. Last, there may be an identification problem with the labeling of trolling behaviors with sarcastic trolling scale. For example, one can argue that the researcher’s labeling might contrast with the person who is engaging in the behavior. However, writing trolling comments with sarcasm requires a conscious awareness as sarcasm includes negativity and the owners of these comments want others to interpret these comments non-literally. Therefore, we claim that individuals writing sarcastic comments perform this behavior on purpose. However, they may deny it due to other reasons (labeling, fear of legal consequences).

Conclusion

There is a great deal yet to be learned about the psychological profile of the individuals who engage in trolling. The ever-changing nature of trolling should be taken into consideration while evaluating trolling behaviors. A new scale was developed in this study to address this issue. Another critical outcome of this study is that overt and relational aggression has a more prominent role in the trolling behaviors included in the Troll Deviancy Scale. Psychopathy and Machiavellianism, on the contrary, are more salient in predicting sarcastic trolling. Overall, the findings of this study have built a solid foundation for the link between aggression and different forms of trolling. Our work extends current knowledge regarding a different form of trolling and also creates directions for future work toward studying the role of other constructs in explaining sarcastic trolling.

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The data of this research can be requested from the corresponding author.

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