

# Psychopathology of Cyberbullying and Internet Trolling

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Bullying is defined in psychology and law as “influencing, crushing, and intimidating the other person who is in a superior position or stronger”.<sup>[1]</sup> This can occur directly in the form of verbal or physical abuse, or more subtly in the form of coercing a reluctant person, threatening or manipulating them to do what they want. According to a study, bullying has four basic characteristics:<sup>[2]</sup> It is aggressive and negative, it repeats, it is seen when there is a power imbalance between the parties, and it is aimed at a specific goal. Due to the progress of communication technologies, society’s behavior in the real world has been moved to the virtual environment. One of the most serious consequences is that people project their real-life bullying behavior into virtual environments.<sup>[3]</sup> Bullying has been described in various ways in different researches. Bullying is defined in a study as putting physical and psychological pressure on others and engaging in behavior that offends them.<sup>[4]</sup> Bullying is an antisocial behavior that results in negative effects,<sup>[5]</sup> and if it occurs online, it is referred to as cyberbullying or virtual bullying.<sup>[3]</sup> Cyberbullying is a form of bullying that appears over the internet and through mobile phones.<sup>[6]</sup> In general, nine types of cyberbullying have been identified: “stonking, faking attitude, incitement, harassment, threats, slander-humiliation, disclosure, exclusion, trolling”.<sup>[7]</sup>

## ABSTRACT

Today, there is a disturbing growth in the number of cyberbullies and trolls because of global conditions and the increase of internet communication. Cyberbullying is a virtual form of real-life bullying, and trolling is a kind of online harassment. Therefore, bullying and trolling are not totally different concepts. Trolling is considered an online behavioral incompatibility that has been linked to specific personality types such as psychopathy, narcissism, Machiavellism, and sadism. Bullying is explained by pathological studies as a result of changes in brain chemistry and social brain regions during adolescence, spiritual transitions, and emotional imbalances. Although understanding trolls are essential for detecting them, due to unintentional behavior, anyone can become a troll ruining someone’s day. For this reason, a “cyber victimization scale” has been added at the end of the article to help readers become more mindful of their online activity. To raise awareness, the notion of trolls was defined in this review, and the behavioral tactics and types of troll attacks were explained; although there are few studies and the psychological counterpart of trolling, literature on its mechanisms in the brain was reviewed.

**Keywords:** Cyberbullying, dark triad, internet trolling, online sadism, schadenfreude, trolling

## TROLLING AS A CONCEPT AND METHOD OF HARM

People who enjoy causing disagreement on the Internet, attempting to start discussions, and upsetting people are called “trolls”,<sup>[8]</sup> and their behavior is called “trolling”.<sup>[9]</sup> Trolls engage in trolling behaviors to “annoy, humiliate, disturb, tease, provoke, or provoke people to react emotionally to those they target” for fun.<sup>[10]</sup> Trolling actions on social media, online newspapers, news commentary, or other online media can be consciously dissenting or aggressive, abusive, provocative, sexist, or racist rhetoric.<sup>[11]</sup> Trolls see online communication spaces as convenient places for their bizarre sense of humor and are unaware that they are harming real people. To them, other internet users are not exactly human,

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but a form of digital abstraction. Accordingly, they feel no sadness for the pain they have caused on the other side. In fact, the more suffering they cause, the more successful they are.<sup>[8]</sup> Trolls are completely closed to any constructive or disruptive criticism. You can't negotiate with them, you can't make them feel shame or mercy, and you can't reason with them and make them feel sorry. But since trolls, for some reason, do not feel bound by the rules of kindness or social responsibility.<sup>[12]</sup>

There are so many trolling methods that can be used in various ways. Ad hominem attacks, which try to discredit an idea by saying negative things about the person who supports it, gathering emotional responses by sharing content that provokes others and consciously opposing or showing aggression, and sharing in abusive, provocative, sexist, racist, incendiary, deceptive ways are some common trolling techniques. Trolls can purposefully post "false facts". Distracting the topic and engaging in meaningless discussions, questioning spelling errors in texts rather than their content is what trolls also love to do, especially on some social communication platforms.<sup>[13,14]</sup>

## TROLLING TYPES AND CLASSIFICATION OF TROLLS

Troll behavior can be seen in the comment sections of forum or blog pages, or on various online platforms. It is important to know the ways in which trolling occurs to understand whether a behavior is trolling. Hardaker has identified several types of trolling pathways, according to her study.<sup>[15]</sup> Digress is a way in which people are drawn into pointless discussions that are disconnected from context. "Hypo" criticism is a method of hostile criticism in which posts are focused on spelling and grammatical errors rather than on themselves. Antipathise is a way of creating an alarming environment in society by making repulsive posts and manipulating emotions, sharing provocative content, or deliberately sharing erroneous and incomplete information. Endanger is a method of pretending to be an expert and making suggestions that put people in difficult situations and encourage risky behavior. Shock is a method of displaying insensitivity in sensitive situations and making fun of issues such as religion and death. Aggress is a method of using vulgar, abusive, and teasing phrases, as well as reputation-damaging and derogatory comments.

Trolls use their online behavior for a range of purposes. For these purposes, they have been classified in various ways. Veszelszki examined trolls

as two species based on their interactions with those with whom they communicated: Aggressive and Provocative.<sup>[16]</sup> Aggressive trolls are trolls who insult specific users, intentionally misinterpret words, and engage in behavior such as sending personal messages to them. On the other hand, provocative trolls try to get people's attention or disrupt the flow of conversation by posting a comment meant to enrage them. Bishop<sup>[17]</sup> classified the trolls into four groups: haters, lolcows, bzztters, eyeballs, and examined them with a total of 12 subcategories. According to this classification, haters provoke people to act vengefully and make mistakes. "Vindictive trolls" are those who oppose or commit attacks on stereotyped thought, tradition, or institutions. This group is one of the most active in terms of data sharing. They have a high risk of causing harm to audiences by sharing provocative content. There are three types of lolcows: "Big man" wants to create order and posts about other people's worldviews. "Ripper" constantly focuses on negative issues, such as death and illness, and exhibits depressive behavior toward individuals. "Chatroom Bob" tries to use individuals to their advantage by sharing and drawing attention to a variety of joke content. Bzztters constantly talk about meaningless topics, thereby avoiding the main point of debate. Eyeballs utilize other people's instant mistakes and distractions to send provocative content. They then observe the reactions to themselves and enjoy the situations they encounter.

## THE PSYCHOLOGICAL EQUIVALENT OF TROLLING: DARK TETRAD, THE CONCEPT OF SCHADENFREUDE, AND THE ONLINE DISINHIBITION EFFECT

Motivation, according to psychological science, is what affects human behavior<sup>[18]</sup> Trolls also need the necessary motivation to engage in trolling behavior.

According to various opinions, these motivational sources are; boredom or attraction,<sup>[19,20]</sup> being a phenomenon, having fun, creating conflict, gaining reputation, discrediting others, experiencing psychological fulfillment, taking revenge,<sup>[21]</sup> loneliness, curiosity, malevolence.<sup>[22]</sup> It has also been stated that political motives can be a good reason to troll.<sup>[23]</sup> Individuals have fun doing these trolling behaviors for whatever reason or enjoy the devastating consequences of the behavior.<sup>[24,19]</sup>

Trolls have been referred to as personality traits known as the Dark Triad and Dark Tetrad as a result of research about the causes of trolling.<sup>[25-27]</sup> The Dark

Triad: Psychopathy, Narcissism, Machiavellism.<sup>[28]</sup>

- Psychopathy: A lack of regret and empathy
- Narcissism: Selfishness and self-obsession
- Machiavellianism: A willingness to manipulate and deceive others

With the addition of “sadism” to the dark triad, the term dark tetrad has also emerged.<sup>[29]</sup>

- Sadism: Enjoying the suffering of others

Psychopathy characteristics include belittling, ridiculing, remorse, acting impulsively, staying shallow in human relationships, and being unable to maintain long-term relationships.<sup>[30]</sup> People with narcissism exhibit behaviors such as believing they are privileged and making claims, as well as exploitative, arrogant and selfish attitudes.<sup>[31]</sup> Machiavellianism, on the other hand, is a communication strategy in which manipulation is used for personal gain.<sup>[32]</sup> Machiavellianism, also known as the philosophy of “the ends justify the means,” is known to share some characteristics with narcissism. Sadism is another psychological condition in which people are treated cruelly and enjoy dominating them by harming them. Sadists can showcase these tendencies in all aspects of daily life.<sup>[33]</sup>

Canadian research<sup>[34]</sup> examined the Dark Four’s trolling behavior. Researchers conducted two online studies with over 1200 “internet users. Users were first subjected to a personality test. Then they were asked to complete a survey about their online commenting habits. According to the study’s results, people who said their favorite internet activity was trolling were also the people with the highest Dark Tetrad scores. Overall, the researchers concluded that the relationship between sadism and trolling was the strongest and stated about the findings:

*“...In fact, the associations between sadism and GAIT scores were so strong that it might be said that online trolls are prototypical everyday sadists.”*

*“Both trolls and sadists feel sadistic glee at the distress of others.”*

*“Sadists just want to have fun ... and the Internet is their playground!”*

Another study<sup>[25]</sup> examined the personality traits and social motivations of people who engaged in trolling behavior on social media, specifically Facebook. The study looked at the relationship between individuals’ Dark Tetrad personality traits and social pleasure, as well as the impact on trolling

behavior on Facebook. According to the findings, people with psychopathy and sadism traits are more prone to trolling behavior, and negative social power is the most common trigger for trolling. Although the effects of dark personality traits are significant, it has been stated that negative social rewards can better explain trolling behavior. The psychological harms inflicted on people by trolls online and the psychological harms inflicted by bullying in everyday life have similar effects.

In a study at Brigham Young University,<sup>[35]</sup> the concept of schadenfreude was mentioned alongside dark personality types. Schadenfreude is a German term that means “enjoying another person’s plight or misfortune”<sup>[36]</sup> and it can sometimes imply “wishing for that bad outcomes”.<sup>[37]</sup> Schadenfreude people enjoy watching others suffer because, according to Nietzsche, “schadenfreude is a pleasure gained by passively observing others suffering rather than actively inflicting suffering on others”. There is a link between schadenfreude and self-esteem as well. Individuals with low self-esteem experience schadenfreude more frequently and intensely.<sup>[38]</sup> The aim of this research was to look into the motivations of people with antisocial behavior disorder who maliciously observe others online. In this study, researchers edited an online survey of nearly 400 Reddit (global social news and discussion site) users by using the survey results to conduct personality analysis. According to survey results, the majority of online trolls were seen to exhibit schadenfreude traits and Dark Triad personality traits such as narcissism, Machiavellianism, and psychopathy. According to the study, schadenfreude people believe that trolling is a form of communication that enriches rather than inhibits online discussion, and as a result, they are unaware of how their words or actions affect the other side. Trolling is viewed as a tool for establishing dialogue rather than a disruptive thing by people with such personality traits.<sup>[35]</sup>

Another factor that has a direct impact on users’ online behavior is their ability to be anonymous. This phenomenon is so common that it has been termed the Online Disinhibition Effect in the literature. Anonymous communication triggers online disinhibition because when a person sends a message over the internet, they can log off without receiving an immediate response. Therefore, it is not required to think about what is being said.<sup>[39,40]</sup> Online disinhibition effect is a sense of freedom when communicating online as compared to face-to-face communication, as well as a lack of restraint.<sup>[41]</sup> People

feel safer saying things online that they can't say in real life because they can remain completely anonymous and invisible behind a computer screen.<sup>[42]</sup> In the real world, people evaluate the behavior of those around them subconsciously and adjust their own behavior accordingly. However, there is no such feedback mechanism online. According to some, the consequences of such an effect can be both positive and negative. Antisocial behavior caused by toxic disinhibition can manifest itself in a variety of ways, including cyberbullying, trolling, and social idleness on multiple online platforms such as blogs, hate sites, and comment sections.<sup>[42,43]</sup>

A study that looked at the effect of anonymity on social behavior tested the hypothesis that "group membership facilitates antisocial behavior, group membership causes a sense of anonymity, and anonymity facilitates antisocial behavior".<sup>[44]</sup> In the study, participants are divided into four groups: disguised or not disguised alone and disguised or not disguised in a group. Participants were given banners that read "Masturbation is fun" and asked to walk around campus with them to simulate antisocial behavior. As a result, when engaging in antisocial behavior, participants stated that they would rather be disguised, but also in a group, than alone. When the results were found to be statistically significant, the hypotheses were concluded to be correct.

## TROLL MIND: A SOCIOLOGICAL AND BIOLOGICAL REVIEW OF BULLYING

There are so many studies that focus on victim behavior or the consequences of bullying after attacks for people who have been bullied.<sup>[45-48]</sup> However, the state of bullying for individuals who are perpetrators of bullying behavior has rarely been examined to date. Although there is a wealth of literature on attackers and aggression, there are few studies that examine bullying while taking into account power imbalance, frequency of repetition, and variables that distinguish bullying from other forms of peer aggression.<sup>[49]</sup> One factor that makes reviews about bullying difficult is the complicated relationship between acceptance, and rejection.<sup>[50]</sup> The reason for this complexity is a stereotypical view about bullying people. Based on this stereotype, people who bully should have high psychopathologies, low social skills, and less value and competence than their peers. While there are some studies that support this viewpoint,<sup>[51-53]</sup> unlike traditional bullies, cyberbullies can now be of any position or age, removing the balance of power required to become more physically dominant thanks

to anonymous accounts.

When the social status is examined in relation to the emergence of bullying, a different profile emerges than expected. According to studies, the majority of bullied children and young people wield significant power within peer dynamics, and bullies with high status are viewed as popular, socially talented, and leaders by their peers.<sup>[54-58]</sup> High-status bullies have also been found to rank high on competencies and assets valued by their peers, such as being attractive or being good athletes.<sup>[58,59]</sup> They were also discovered to have the lowest psychopathology scores and to use aggression as a tool to gain and maintain dominance.<sup>[60,61]</sup> For example, a study in Argentina examined several emotional issues among cyberbullies. Differences have been compared between traditional bullies, cyberbullies, and other peers who are not involved in them. According to the research results, 8% of people were identified as cyberbullies, while only 4% were identified as both traditional and cyberbullies. Interestingly, cyberbullies have reported lower levels of depression or anxiety than traditional bullies. The study also concluded that cyberbullies are less neurotic and more acceptable than traditional bullies.<sup>[62]</sup> While the mental consequences of cyberbullying are well documented, research on issues such as brain development and the impact of neurobiological factors is very limited. Although brain studies investigate neural mechanisms associated with behavioral disorders, personality types, antisocial behaviors, and aggression, there are few studies that specifically examine these factors in relation to cyberbullying and investigate how cyberbullying affects the brain using techniques such as MRI.

The development of "social brain" regions during adolescence (prefrontal cortex, temporoparietal junction, posterior superior temporal sulcus, and anterior temporal cortex) is thought to be critical for social understanding and communication and thus plays an important role in social issues such as cyberbullying.<sup>[63,64]</sup> This development is especially important because white matter pathways play a critical role in cognitive, behavioral, emotional, and motor development during childhood and adolescence, explaining why adolescents frequently exhibit less psychosocial maturity than adults. So white matter development during adolescence plays an important role in cyberbullying.<sup>[65]</sup> Numerous studies show that white matter density increases and gray matter density decrease in the frontal and parietal cortexes throughout adolescence.<sup>[66-72]</sup> The

volume of white matter increases between the ages of 10 and 15, then decreases until the early twenties and finally stabilizes.<sup>[73]</sup> These changes are said to be able to identify key neurobiological traits associated with the onset of mental illness or personality disorders.<sup>[74-77]</sup>

Due to the multiple changes that occur in their brains as adolescents mature, they are extremely vulnerable to problems affecting their mood and behavior. So they are more prone to risk-taking, recklessness, and emotional problems.<sup>[78,79]</sup> Depression and anxiety levels rise during the transition from childhood to adolescence, and this is a time when many important mental disorders for young people are at their peak.<sup>[80,81]</sup> When experiencing such a transition, young people's mental health can become seriously unstable.<sup>[82]</sup> In adolescence, there is also a tendency for getting away from parents but towards peers. This is especially important because, if they are rejected by their peers during this period, adolescents may experience a significant increase in stress which can result in certain mood disorders.<sup>[83,84]</sup> Based on their emotional sensitivity to such an event, adolescents with increased activity in the subgenual anterior cingulate cortex in response to peer rejection were found to be more likely to develop depressive symptoms and experience greater distress.<sup>[85]</sup> Given these major transitions in adolescence, there are thought to be links between significant brain changes and problems socializing and bullying.<sup>[86,78]</sup>

A study investigated the connection between cortisol levels and cyberbullying discovered that cortisol release and perceived stress in 11-18-year-olds were associated with cyberbullying roles, as well as that cyber victims perceived more stress and had higher cortisol levels than cyberbullies.<sup>[87]</sup> Also, the lowest cortisol secretion has been seen in extreme cyberbullies. Similarly in another study, cortisol was found to regulate the relationship between childhood traditional bullying victimization and adolescent ventrolateral prefrontal cortex (vlPFC) structure, which is linked to sex. According to researchers, this could be due to a stress sensitivity that affects brain development, particularly in boys, and victimization could be one of the factors that trigger bullying in the brain. While both of these studies indicate that different biological variables are associated with cyberbullying roles and that cortisol levels may be especially important in terms of brain development, more research is needed to understand how adolescent brain development may be affected over time.<sup>[88]</sup>

A study that used functional magnetic resonance imaging (fMRI) to measure how online participants respond to cyberbullying stimuli discovered that exposure to such stimuli activated many areas of the brain related to social and emotional processing, as well as those who had no previous experience with cyberbullying caused a larger response in the field of the brain responsible for feeling self-conscious.<sup>[89]</sup> However, this is a pilot study. It has not addressed how age influences how the brain responds to cyberbullying and has focused on cyber victimization rather than cyberbullying. Even so, because the fMRI technique is used, it is a pioneer in this field and vital for future research. While the aforementioned studies shed light on how bullying victims perceive bullying, more research, specifically on cyberbullying and its mechanisms, is needed. Repeated MRI scans of adolescents are needed to fully understand how cyberbullying experiences affect brain development at various stages of adolescence. While it is acknowledged that age and gender differences may play a major role in brain responses to cyberbullying, there has been little research to date that specifically addresses this.<sup>[87-96]</sup>

Some factors that may influence cyberbullying behavior have been identified as a result of these studies. Adolescence is a time when full consciousness is increased, mind development is reorganized,<sup>[97]</sup> and there are changes in self-assessment and self-emotional regulation.<sup>[98]</sup> These changes in the development of a self-governing and regulated mind<sup>[99]</sup> also affect improvements in judgment and decision-making.<sup>[100]</sup> Meanwhile, the brain can experience social pain in the same way that it does physical pain.<sup>[101]</sup> There is also an increased risk of low empathy (especially in males) in cyberbullies,<sup>[102]</sup> as well as an increased risk of mental illness in victims of bullying.<sup>[103]</sup> Some executive function weaknesses, combined with an adolescent vulnerability, result in increased rates of depression and anxiety as children enter puberty.<sup>[104-106]</sup> As a result, there may be problems in adolescence such as excitement-seeking, reward orientation, high sensitivity to taking risks, and difficulty regulating behaviors.<sup>[78]</sup> However, because factors such as age and gender are so important in adolescence, more research is needed to explain the causes of cyberbullying.

## WAYS TO AVOID TROLLS: DON'T FEED THE TROLLS!

Trolling isn't the only way to harass and bully people online. Flaming, cyberbullying, cyber

vandalism, and trolling are all terms that are frequently misunderstood by internet users. Thus, explaining the differences between these concepts would be useful for having awareness against trolls.

- Flaming is the use of offensive or insulting statements in online communication against others. Text elements that contain hostile language, swearing, sarcastic or defamatory names, negative comments, threats, and sexually inappropriate statements are commonly used in such situations.<sup>[105]</sup>

- Cyberbullying is defined as aggressive behavior committed by a group or individual online in a repetitive and intentional manner against a vulnerable victim.<sup>[106-108,4]</sup>

- Cyber vandalism is defined as online community behavior that deletes or deconstructs digital content, artifacts, and products.<sup>[109]</sup>

- Trolling, on the other hand, is an act committed by the troll individual by throwing or instigating fodder at other group members, attracting them to unproductive arguments, and distracting them from their original purpose.<sup>[110]</sup>

It is extremely important to respond appropriately when confronted with a troll attack. The slogan "Don't feed the troll" has recently been used persistently in an attempt to keep trolls from becoming the center of attention.<sup>[111]</sup> Since the reactions to it are a troll's main food source. Getting into an argument with a troll, responding to it, or attempting to help it will always result in failure. In this case, the best way to deal with a troll is to ignore it. That's why, being unresponsive to troll messages, words, and similar posts have become a popular strategy for dealing with troll behavior.<sup>[112,19]</sup> Depriving trolls of the attention they seek has a similar effect to the rapid extinguishment of a fire deprived of oxygen.<sup>[113,114]</sup> It is critical to raise awareness about such persons. While it is true that cyberbullying and trolling have corrosive and devastating consequences for those who are victims, the consequences are not always mild and superficial, such as demoralization or boredom. The following are some of the events that have received a lot of attention in the media due to cyberbullying and trolling. These are tragic incidents that demonstrate how cyberbullying and playing with people's emotions under the guise of trolling can have serious consequences.

Megan Meier, a 13-year-old girl, committed

suicide in 2006 in the United States after being cyberbullied, in a case that made headlines at the time.<sup>[115]</sup>

August Ames, a pornographic film actor, faced heavy criticism and cyberbullying after her statement in 2017. As a result, she took her own life.<sup>[116]</sup>

Amanda Todd, a 15-year-old high school student, killed herself after posting a video on YouTube. In her video, she only showed the texts she had written on the papers without speaking; that the photos she showed of her breasts were spread across the internet by a man; and, on top of that, she told about horrific cyberbullying, physical and emotional abuse, and violence both online and offline.<sup>[117]</sup>

Rebecca Ann Sedwick committed suicide when she was just 12 because of the peer bullying and cyberbullying she experienced. Rebecca, who struggles with depression and anxiety, has been haunted by harassing messages she has received over platforms like Kik, Voxer, and Ask.fm, such as "No one cares about you." "You seriously deserve to die." and "Drink bleach and die." On September 9, 2013, in her last message to her friend, she said, "I'm jumping. I can't take it anymore..." and she ended her life by jumping from a concrete silo tower.<sup>[118]</sup>

To prevent cyberbullying, the Cyberbullying Act, also known as the Megan Meier Act in the United States, was enacted in the United Kingdom under the Malicious Communications Act, and many countries reorganized their laws to include cyberbullying, troll awareness activities increased such as SpotTheTroll, and platforms such as Twitter and Youtube changed their policies over time. Despite all these, mass measures against trolls are extremely limited because of a variety of reasons, including the difficulty of defining the legal boundaries of trolling, the lack of a psychologically recognized illness or personality disorder,<sup>[119]</sup> and thus no definitive cure. So, taking individual action against trolls and gaining awareness is necessary.

There are technical measures that can be taken to protect against negative social behavior online, such as preventing people who engage in negative behavior from contacting them online, changing passwords, usernames, and email addresses registered to the system when faced with a negative situation, and deleting anonymous incoming messages without reading them.<sup>[120,108]</sup> Proposed anti-trolling strategies can differ depending on

the purpose and complexity of the online space in which trolls exist. Topics relating to combating online trolling include how to identify trolls, how to respond to trolling, and where to report those who exhibit these behaviors. Taking screenshots or printing offensive web pages while dealing with trolls can provide evidence of trolling or incitement. Where there is a security-threatening situation, trolls should be reported to the legal authorities. Complaining to competent units in cases of defamation and insult can also be a solution.<sup>[19]</sup> The victim in such a situation should be patient and prefer to remain silent. Or the victim can act with anger and become a criminal. It would be helpful to understand the scope of crime in that state's laws if it was somehow involved in the act of trolling. When users break the law, they are punished according to the terms of these laws.

Following are the recommendations from Hertfordshire Police UK,<sup>[121]</sup> what needs to be done to prevent online trolling and bullying.

- Ignoring: Don't respond to nasty, immature, or offensive comments. Giving the trolls the importance they want only makes them stronger.
- Blocking: Blocking trolls deprives them of their power. You can block them again if they create a new account.
- Report: Trolls should be reported to the site's administrators. If they keep appearing with different names, you can report them to the police for further assistance.
- Talk/Share: If you get upset by trolls, please share your feelings with your family and friends. Since the problem in this situation isn't you; it's them.
- Helping Victims: You must protect not only yourself but also your friends, from trolls. If trolls irritate a friend, advise him to ignore them, block them, and file a complaint. Encourage your friends to get support.

## CYBER VICTIMIZATION SCALE

Anyone online can be attacked by a troll. Moreover, some people may blame themselves for this without realizing what they are going through. Therefore, measuring exposure to trolling behavior is very important in overcoming trolls. The Cyber Victimization Scale is presented in Figure 1 to raise the reader's awareness.

<b>1 = It hasn't happened at all in the past couple of months</b> <b>2 = Only 1 or 2 times in the past couple of months</b> <b>3 = 2 or 3 times a month</b> <b>4 = About once a week</b> <b>5 = Several times a week</b>					
<i>For questions 1 to 17, think about things that have happened to you. In the last 2 to 3 months...</i>					
1. ...has something been written about you or posted online that made you feel upset?	1	2	3	4	5
2. ...has something been written about you or posted online that made others laugh at you?	1	2	3	4	5
3. ...have you been teased online / electronically?	1	2	3	4	5
4. ...have you been called names online / electronically?	1	2	3	4	5
5. ...have you been made fun of online / electronically?	1	2	3	4	5
6. ...have rumors been spread about you online / electronically?	1	2	3	4	5
7. ...has someone pretended to be you online in order to hurt you?	1	2	3	4	5
8. ...has someone pretended to be someone else online / electronically in order to tease or hurt you?	1	2	3	4	5
9. ...has someone posted pictures of you online/electronically in order to hurt you?	1	2	3	4	5
10. ...has someone lied about you online/electronically?	1	2	3	4	5
11. ...have you been physically threatened online/electronically?	1	2	3	4	5
12. ...has someone intentionally shared a private message that you sent to a friend in order to hurt you?	1	2	3	4	5
13. ...has someone intentionally shared an embarrassing picture or video of you in order to hurt you?	1	2	3	4	5
14. ...have you felt excluded while involved in an online activity (gaming, chatting, texting, instant messaging) with others?	1	2	3	4	5
15. ...have you seen conversations or pictures online that made you feel left out or excluded?	1	2	3	4	5
16. ...have you been denied access to a peer's webpage?	1	2	3	4	5
17. ...have you been denied access to a friend's webpage?	1	2	3	4	5

**Figure 1.** Cyber victimization scale were used with permission from Demaray<sup>[122]</sup> "Cyber Victimization in High School: Measurement, Overlap With Face-to-Face Victimization, and Associations With Social-Emotional Outcomes" Brown et al.<sup>[122]</sup>

Bergson had described the man as a "laughing animal" and said, "likewise, an animal that makes people laugh." Trolls are people who remain on the other side of the definition. They do it all for laughs and fun, but they don't care about the devastation and damage they cause to other people. According to Freud, every joke requires its own audience. Even though trolls are consistent within their own audience, they need people who aren't like them to get fed. The currency of trolls and bullies is exploitability, and the biggest mistake when dealing with such people is taking everything seriously. Unfortunately, the system we live in has become more prone to producing trolls and cyberbullies as internet culture amplifies corruption in society and people's daily stress levels rise. Research has shown that trolls' mindsets, common traits, and harms are partially uncovered. But the seriousness of social "trolling" is poorly understood. That is why it is extremely crucial to be well-informed about trolls because people may suffer serious effects as a result of trolling. It is important to remember that the main source of a troll's motivation is the reactions

it receives. So, while indifference and recklessness are unwelcome traits in daily life, they are the most effective ways of defending against trolls. Trolling, the online behavior of people who use other people for their own entertainment and have the purpose of showing social dissonance, is, as Phillips puts it, the "latrinalia" of popular culture: that is, the writing on the toilet wall...

In conclusion, why should scientists be interested in trolls and conduct more research on the subject? The Broken Windows theory could be the answer to that question. Let's consider a building with several broken windows. Crime-prone people will want to break a few more windows if their windows are not repaired. After a while, all of the windows in the building could be broken, causing potential fires if the building was abandoned. Or let's think of a sidewalk. On this pavement, some trash may accumulate over time. If this continues, the garbages will mount up even more. So much so that people passing by and restaurants in the area eventually could start dumping their garbage here. People can even bring their garbage bags and dispose of them here. In short, a broken window, according to this theory, can spark a wave of rebellion, just as nasty comments can invite worse. If antisocial behavior becomes the norm, society can perpetuate it, even if it is unwanted behavior. That is why trolling behaviors and troll people should be examined more thoroughly, and their motivations should be uncovered. Are antisocial people or ordinary people more likely to engage in trolling behavior? Is trolling congenital, or does it vary from person to person? What circumstances influence a person's decision to engage in such behavior? And, if trolls can influence people, can trolling spread from one person to the next? If we understand what causes trolling and how it spreads in communities, we can reduce unwanted behavior and design stronger social systems.

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## **REFERENCES**

- Farrington DP. Understanding and preventing bullying. *Crime and justice*. 1993;17:381-458.
- DeVoe JF, Kaffenberger S. Student Reports of Bullying: Results From the 2001 School Crime Supplement to the National Crime Victimization Survey. U.S. Department of Education, National Center for Education Statistics. Washington (DC) U.S. Government Printing Office: 2005 July. Report No: NCES 2005-310.
- Eroğlu Y, Güler N. Koşullu Öz-Değer, Riskli İnternet Davranışları ve Siber Zorbalık/Mağduriyet Arasındaki İlişkinin İncelenmesi. *Sakarya University Journal of Education* 2015; December5/3:118-29.
- Solberg ME, Olweus D, Endresen IM. Bullies and victims at school: are they the same pupils? *Br J Educ Psychol*. 2007 Jun;77(Pt 2):441-64.
- Taylor R. An Evaluation of Owning Up; Impact on Perceptions of Relational Aggression, Bullying, and Victimization (dissertation). Hofstra Univ.; 2006.
- Vandebosch H, Van Cleemput K. Defining cyberbullying: a qualitative research into the perceptions of youngsters. *Cyberpsychol Behav*. 2008 Aug;11:499-503.
- Nadali S, Murad MAA, Sharef NM, Mustapha A, Shojaee S. A review of cyberbullying detection: An overview. In 2013 13th International Conference on Intelligent Systems Design and Applications; 2013 Dec 8-10; Putra, Malaysia; 2013. p. 325-30.
- Campbell T. Internet trolls. 2001. Available from: <http://web.archive.org/web/20011026130853/http://members.aol.com/intwg/trolls.htm#NTWM>
- Kopecký K. Misuse of web cameras to manipulate children within the so-called webcam trolling. *Telematics and Informatics* 2016;33:1-7.
- Rafferty R, Vander Ven T. I hate everything about you: A qualitative examination of cyberbullying and online aggression in a college sample. *Deviant Behavior* 2014;35:364-77.
- Doğan D, Çınar M, Seferoğlu S. Sosyal medyanın karanlık yüzleri trollerle ilgili bir inceleme. In: Odabaşı F, Akkoyunlu B, İşman A, editors. Eğitim teknolojileri okumaları. 1sted. Adapazarı; TOJET and Sakarya Üniversitesi; 2017. p. 887-911.
- March E, Marrington J. A Qualitative Analysis of Internet Trolling. *Cyberpsychol Behav Soc Netw*. 2019 Mar;22(3):192-7.
- Kızıltepe F. Çevrimiçi Trol Davranış Ölçeğinin Geliştirilmesi ve Trol Davranışlarına Yönelik Farkındalığın İncelenmesi (dissertation). Ankara: Hacettepe Univ.; 2019.
- Berghel H. Trolling Pathologies. *Computer* 2018;51:66-9.
- Hardaker C. "Uh. . . not to be nitpicky,,,,,but...the past tense of drag is dragged, not drug.": An overview of trolling strategies *Journal of Language Aggression and Conflict* 2013;1:58-86.
- Veszelski A. Verbal and Visual Aggression in Trolling. In: Benedek A, Veszelszki Á, editors. Virtual Reality - Real Visuality. Frankfurt: Peter Lang; 2017.p.141-55.
- Bishop J. Dealing with Internet Trolling in Political Online Communities: Towards the This is Why We Can't Have Nice Things Scale. *International Journal of E-Politics (IJEP)*; 2012 January;5:1-20.
- Simon HA. The bottleneck of attention: connecting thought with motivation. *Nebr Symp Motiv*. 1994;41:1-21.
- Hardaker C. Trolling in asynchronous computer-mediated



- communication: From user discussions to academic definitions. *Journal of Politeness Research Language Behavior Culture* 2010;6;:215-42.
20. Shachaf P, Hara N. Beyond Vandalism: Wikipedia Trolls. *Journal of Information Science* 2010;36: 357-70.
  21. Herring S, Scheckler R, Job-Sluder K, Barab SA. Searching for Safety Online: Managing "Trolling" in a Feminist Forum. *The Information Society* 2002;18:371-84
  22. Fichman P, Sanfilippo MR. The Bad Boys and Girls of Cyberspace: How Gender and Context Impact Perception of and Reaction to Trolling. *Social Science Computer Review* 2014;33:163-80.
  23. Özsoy D. Tweeting Political Fear: Trolls in Turkey. *Journal of History School (JOHS)*. 2015;12:535-52.
  24. Petykó, M. "You're trolling because..." - A Corpus-based Study of Perceived Trolling and Motive Attribution in the Comment Threads of Three British Political Blogs. *Proceedings of the 5th Conference on CMC and Social Media Corpora for the Humanities; 2017 3-4 Oct; Bolzano, Italy; 2017.p.56-60.*
  25. Craker N, March E. The Dark Side of Facebook: The Dark Tetrad, Negative Social Potency and Trolling Behaviours. *Personality and Individual Differences* 2016;102:79-84.
  26. Masui K. Loneliness Moderates the Relationship Between Dark Tetrad Personality Traits and Internet Trolling. *Personality and Individual Differences* 2019;150:09475.
  27. Sest N, March E. Constructing the Cyber-troll: Psychopathy, Sadism and Empathy. *Personality and Individual Differences* 2017; 119:69-72.
  28. Paulhus DL, Williams KM. The Dark Triad of Personality: Narcissism, Machiavellianism and Psychopathy 2002;36:556-63.
  29. Marcus DK, Zeigler-Hill V. A Big Tent of Dark Personality Traits. *Social and Personality Psychology Compass* 2015;9:434-46.
  30. Özsoy E, Ardiç K. Karanlık Üçlünün (Narsisizm, Makyavelizm ve Psikopati) İş Tatminine Etkisinin İncelenmesi. *Yönetim ve Ekonomi Celal Bayar Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi* 2017;24:391.
  31. Karaaziz M, Atak İE. Narsisizm ve Narsisizmle İlgili Araştırmalar Üzerine Bir Gözden Geçirme. *Nesne Psikoloji Dergisi* 2013;1:44-59.
  32. Özdemir B, Atan E. Karanlık Üçlünün Örgütsel Muhalefete Etkisi: Bir yapısal Eşitlik Modeli. *İş Ahlakı Dergisi* 2018;11:275-298.
  33. Pfattheicher S, Schindler S. Understanding the Dark Side of Costly Punishment: The Impact of Individual Differences in Everyday Sadism and Existential Threat. *European Journal of Personality* 2015;29:498-505.
  34. Buckels EE, Trapnell PD, Paulhus DL. "Trolls Just Want to Have Fun." *Personality and Individual Differences* 2014;67:97-102.
  35. Brubaker PJ, Montez D, Church SH. The Power of Schadenfreude: Predicting Behaviors and Perceptions of Trolling Among Reddit Users. *Social Media+ Society* April-June 2021;7 1-13.
  36. Lange J, Boecker L. Schadenfreude as social-functional dominance regulator. *Emotion*. 2019;19: 489-502.
  37. Dalakas V, Melancon JP, Sreboth T. A Qualitative Inquiry on Schadenfreude by Sport Fans. *Journal of Sport Behavior* 2015;38:161-79.
  38. van Dijk WW, van Koningsbruggen GM, Ouwerkerk JW, Wesseling YM. Self-esteem, Self-affirmation and Schadenfreude. *Emotion*. 2011 Dec;11:1445-9.
  39. Terry C, Jeff C. The Emerging Issue of Digital Empathy. *American Journal of Pharmaceutical Education*. 2016;80:58.
  40. Akkoz M, Erbaş O. The relationship between social media use and narcissism. *D J Tx Sci* 2020;5:32-8.
  41. Suler J. The Online Disinhibition Effect. *CyberPsychology & Behavior*. 2004;7:321-6.
  42. Lapidot-Lefler N, Barak A. Effects of anonymity, invisibility and lack of eye-contact on toxic online disinhibition. *Computers in Human Behavior*. 2012;28:434-43.
  43. Erbaş O, Akseki HS, Aktuğ H, Taşkıran D. Low-grade chronic inflammation induces behavioral stereotypy in rats. *Metab Brain Dis*. 2015 Jun;30:739-46.
  44. Mathes EW, Guest TA. Anonymity and group antisocial behavior. *The Journal of Social Psychology*, 1976;100:257-62.
  45. Gini G, Pozzoli T. Association between bullying and psychosomatic problems: A meta-analysis. *Pediatrics*. 2009;123:1059-65.
  46. Lereya ST, Copeland WE, Costello EJ, Wolke D. Adult mental health consequences of peer bullying and maltreatment in childhood: Two cohorts in two countries. *The Lancet Psychiatry*. 2015;2:524-31.
  47. Reijntjes A, Kamphuis JH, Prinzie P, Telch MJ. Peer victimization and internalizing problems in children: A meta-analysis of longitudinal studies. *Child Abuse & Neglect*. 2010;34:244-52.
  48. Ttofi MM, Farrington DP, Lösel F, Loeber R. Do the victims of school bullies tend to become depressed later in life? A systematic review and meta-analysis of longitudinal studies. *Journal of Aggression, Conflict and Peace Research*. 2011;3:63-73.
  49. Committee on the Biological and Psychosocial Effects of Peer Victimization: Lessons for Bullying Prevention; Board on Children, Youth, and Families; Committee on Law and Justice; Division of Behavioral and Social Sciences and Education; Health and Medicine Division; National Academies of Sciences, Engineering, and Medicine. *Preventing Bullying Through Science, Policy, and Practice*. Rivara F, Le Menestrel S, editors. Washington (DC): National Academies Press (US); 2016 Sep 14.
  50. Veenstra R, Lindenberg S, Munniksma A, Dijkstra JK. The complex relation between bullying, victimization, acceptance, and rejection: Giving special attention to status, affection, and sex differences. *Child Development*. 2010;81:480-86.
  51. Kumpulainen K, Räsänen E, Puura K. Psychiatric disorders and the use of mental health services among children involved in bullying. *Aggressive Behavior*. 2001;27:102-10.
  52. Olweus D. *Bullying at School. What We Know and What We Can Do*. 1st ed. Oxford: John Wiley and Sons Ltd; 1993.
  53. Sourander A, Jensen P, Rönning JA, Elonheimo H, Niemelä

- S, Helenius H, Kumpulainen K, Piha J, Tamminen T, Moilanen I, Almqvist F. Childhood bullies and victims and their risk of criminality in late adolescence. *Archives of Pediatrics and Adolescent Medicine*. 2007;161:546-52.
54. de Bruyn E, Cillessen A, Wissink I. Associations of peer acceptance and perceived popularity with bullying and victimization in early adolescence. *Journal of Early Adolescence*. 2010;30:543-66.
55. Dijkstra JK, Lindenberg S, Veenstra R. Beyond the class norm: Bullying behavior of popular adolescents and its relation to peer acceptance and rejection. *Journal of Abnormal Child Psychology*. 2008;36:1289-99.
56. Peeters M, Cillessen AH, Scholte RH. Clueless or powerful? Identifying subtypes of bullies in adolescence. *Journal of Youth and Adolescence*. 2010;39:1041-52.
57. Thunfors P, Cornell D. The popularity of middle school bullies. *Journal of School Violence*. 2008;7:65-82.
58. Vaillancourt T, Hymel S, McDougall P. Bullying is power: Implications for school-based intervention strategies. *Journal of Applied School Psychology*. 2003;19:157-76.
59. Farmer TW, Estell DB, Bishop JL, O'Neal KK, Cairns BD. Rejected bullies or popular leaders? The social relations of aggressive subtypes of rural African American early adolescents. *Developmental Psychology*. 2003;39:992-1004.
60. Rodkin PC, Espelage DL, Hanish LD. A relational framework for understanding bullying: Developmental antecedents and outcomes. *American Psychologist*. 2015;70:311-21.
61. Vaillancourt T, McDougall P, Hymel S, Sunderani S. The relationship between power and bullying behavior. In: Jimerson SR, Swearer SM, Espelage DL, editors. *Handbook of Bullying in Schools: An International Perspective*. New York: Routledge; 2010. p. 211-22.
62. Resett S, Gámez-Guadix M. Traditional bullying and cyberbullying: Differences in emotional problems, and personality. Are cyberbullies more Machiavellians? *Journal of Adolescence*. 2017;61:113-6.
63. Mills KL, Lalonde F, Clasen LS, Giedd JN, Blakemore SJ. Developmental Changes in the Structure of the Social Brain in Late Childhood and Adolescence. *Social Cognitive and Affective Neuroscience*. 2014; 9:123-31.
64. Üzümcü İ, Erbaş O. Brain-Derived Neurotrophic Factor (BDNF) Polymorphism and Depression-Suicide. *JEB Med Sci* 2021;2:170-80
65. Corrado R, Mathesius J. Developmental Psycho-Neurological Research Trends and Their Importance for Reassessing Key Decision-Making Assumptions for Children, Adolescents and Young Adults in Juvenile/Youth and Adult Criminal Justice Systems. *Bergen Journal of Criminal Law & Criminal Justice*. 2014;2:141-63.
66. Pfefferbaum A, Mathalon DH, Sullivan EV, Rawles JM, Zipursky, RB ve Lim, KO. A Quantitative Magnetic Resonance Imaging Study of Changes in Brain Morphology from Infancy to Late Adulthood. *Archives of Neurology*. 1994;51:874-87.
67. Giedd JN, Snell JW, Lange N, Rajapakse JC, Casey BJ, Kozuch PL, et al. Quantitative Magnetic Resonance Imaging of Human Brain Development: Ages 4-18. *Cerebral Cortex*. 1996;6:551-59.
68. Giedd JN, Blumenthal J, Jeffries NO, Castellanos FX, Liu H, Zijdenbos A, et al. Brain Development During Childhood and Adolescence: A Longitudinal MRI Study. *Nature Neuroscience*. 1999;2:861.
69. Reiss AL, Abrams MT, Singer HS, Ross JL, Denckla MB. Brain Development, Gender and IQ in Children A Volumetric Imaging Study. *Brain*. 1996;119:1763-1774.
70. Sowell ER, Thompson PM, Tessner KD, Toga AW. Mapping Continued Brain Growth and Gray Matter Density Reduction in Dorsal Frontal Cortex: Inverse Relationships During Postadolescent Brain Maturation. *Journal of Neuroscience*. 2001;21:8819-29.
71. Barnea-Goraly N, Menon V, Eckert M, Tamm L, Bammer R, Karchemskiy A, et al. White Matter Development During Childhood and Adolescence: A Cross-Sectional Diffusion Tensor Imaging Study. *Cerebral Cortex*. 2005;15:1848-54.
72. Ostby Y, Tamnes CK, Fjell AM, Westlye LT, Due-Tønnessen P, Walhovd KB. Heterogeneity in Subcortical Brain Development: A Structural Magnetic Resonance Imaging Study of Brain Maturation from 8 to 30 Years. *Journal of Neuroscience*. 2009;29:11772-82.
73. Mills KL, Goddings AL, Herting MM, Meuwese R, Blakemore SJ, Crone EA, et al. Structural Brain Development Between Childhood and Adulthood: Convergence Across Four Longitudinal Samples. *Neuroimage*. 2016;141:273-81.
74. Hatton SN, Lagopoulos J, Hermens DF, Naismith SL, Bennett MR, Hickie IB. Correlating Anterior Insula Gray Matter Volume Changes in Young People with Clinical and Neurocognitive Outcomes: an MRI Study. *BMC Psychiatry*. 2012;12:45.
75. Lagopoulos J, Hermens DF, Naismith SL, Scott EM, Hickie IB. Frontal Lobe Changes Occur Early in the Course of Affective Disorders in Young People. *BMC Psychiatry*. 2012;12:4.
76. Lagopoulos J, Hermens DF, Hatton SN, Tobias-Webb J, Griffiths K, Naismith SL, Scott EM, Hickie IB. Microstructural white matter changes in the corpus callosum of young people with Bipolar Disorder: a diffusion tensor imaging study. *PLoS One*. 2013;8:e59108
77. Ün M, Akbaş Y, Erbaş O. Psikopati. *FNG & Bilim Tıp Dergisi* 2018;4:225-8
78. Steinberg L. Cognitive and Affective Development in Adolescence. *Trends in Cognitive Sciences*. 2005;9:69-74.
79. Casey BJ, Jones RM, Levita L, Libby V, Pattwell SS, Ruberry EJ, et al. The Storm and Stress of Adolescence: Insights from Human Imaging and Mouse Genetics. *Developmental Psychobiology*. 2010;52:225-35.
80. Paus T, Keshavan M, Giedd, JN. Why Do Many Psychiatric Disorders Emerge During Adolescence?. *Nature Reviews Neuroscience*. 2008;9:947-57.
81. Albayrak İ, Erbaş O. Experimental Models of Depression. *JEB Med Sci* 2020;1:117-25.
82. Hankin BL, Abramson LY, Moffitt TE, Silva PA, Mcgee R, Angell KE. Development of Depression from Preadolescence to Young Adulthood: Emerging Gender Differences in a 10-Year Longitudinal Study. *Journal of*

- Abnormal Psychology. 1998;107:28
83. Masten CL, Eisenberger NI, Borofsky LA, Mcnealy K, Pfeifer JH, Dapretto M. Subgenual Anterior Cingulate Responses to Peer Rejection: A Marker of Adolescents' Risk for Depression. *Development and Psychopathology*. 2011;23:283-92.
  84. Masten CL, Eisenberger NI, Borofsky LA, Pfeifer JH, Mcnealy K, Mazziotta JC, et al. Neural Correlates of Social Exclusion During Adolescence: Understanding the Distress of Peer Rejection. *Social Cognitive and Affective Neuroscience*. 2009;4:143-57.
  85. Ekmekçi AM, Erbaş O. Current status of anorexia nervosa treatment. *D J Med Sci* 2020;6:146-52.
  86. Solmaz V, Delibas DH, Inanir S, Erbas O. Antipsychotic Like Effects of Atorvastatin and Melatonin in a Psychosis Model in Rats. *Journal of Mood Disorders* 2015;5:120-5.
  87. González-Cabrera J, Calvete E, León-Mejía A, Pérez-Sancho C, Peinado JM. Relationship Between Cyberbullying Roles, Cortisol Secretion and Psychological Stress. *Computers in Human Behavior*. 2017;70:153-60.
  88. du Plessis MR, Smeekens S, Cillessen AHN, Whittle S, Güroglu B. Bullying the Brain? Longitudinal Links Between Childhood Peer Victimization, Cortisol and Adolescent Brain Structure. *Frontiers in Psychology*. 2019;9:2706.
  89. McLoughlin LT, Shan Z, Broadhouse KM, Winks N, Lagopoulos J, Hermens DF. Neurobiological underpinnings of cyberbullying: a pilot functional magnetic resonance imaging study. *Hum. Brain Mapp*. 2020b;41:1495-504.
  90. Vaillancourt T, Hymel S, Mcdougall P. The biological underpinnings of peer victimization: understanding why and how the effects of bullying can last a lifetime. *Theory Into Pract*. 2013;52:241-8.
  91. Sherman LE, Payton AA, Hernandez LM, Greenfield PM, Dapretto M. The power of the like in adolescence: effects of peer influence on neural and behavioral responses to social media. *Psychol. Sci*. 2016;27:1027-35.
  92. Crone EA, Konijn EA. Media use and brain development during adolescence. *Nat. Commun*. 2018;9:588.
  93. Quinlan EB, Barker ED, Luo Q, Banaschewski T, Bokde ALW, Bromberg U, et al. Peer victimization and its impact on adolescent brain development and psychopathology. *Mol. Psychiatry*. 2018;1-11.
  94. Muetzel RL, Mulder RH, Lamballais S, Cortes Hidalgo AP, Jansen P, Güroglu B, et al. Frequent bullying involvement and brain morphology in children. *Front. Psychiatry*. 2019;10:696.
  95. McLoughlin LT, Shan Z, Broadhouse KM, Lagopoulos J, Winks N, Hermens DF. Elucidating the neurobiology of cyberbullying using functional magnetic resonance imaging(fMRI): a hypothesis. *Aggress. Violent Behav*. 2020a;50:101360.
  96. Solmaz V, Köse Özlece H, Fatih Bozkurt M, Özkul B, Erbaş O. Repeated gadoteric acid and gadobutrol exposure causes deterioration of behavior and memory functions in rats: MRI, histopathological and biochemical evidence. *Brain Res*. 2021 Mar 1;1754:147256.
  97. Blakemore SJ. The social brain in adolescence. *Nat Rev Neurosci*. 2008 Apr;9:267-77.
  98. Paus T. Mapping brain maturation and cognitive development during adolescence. *Trends Cogn Sci*. 2005 Feb;9:60-8.
  99. Keating DP. Cognitive and brain development. *Handbook of adolescent psychology* 2004. p. 45-84.
  100. Fried CS, Reppucci ND. Criminal decision making: the development of adolescent judgment, criminal responsibility, and culpability. *Law Hum Behav*. 2001 Feb;25:45-61.
  101. Ang RP, Goh DH. Cyberbullying among adolescents: the role of affective and cognitive empathy, and gender. *Child Psychiatry Hum Dev*. 2010 Aug;41:387-97.
  102. McLoughlin LT, Spears BA, Taddeo CM, Hermens DF. Remaining connected in the face of cyberbullying: Why social connectedness is important for mental health. *Psychology in the Schools*. 2019 Jun;56:945-58.
  103. Dodge KA, Lansford JE, Burks VS, Bates JE, Pettit GS, Fontaine R, et al. Peer rejection and social information-processing factors in the development of aggressive behavior problems in children. *Child Dev*. 2003 Mar-Apr;74:374-93.
  104. McLoughlin LT, Lagopoulos J, Hermens DF. Cyberbullying and Adolescent Neurobiology. *Front Psychol*. 2020 Jun 26;11:1511.
  105. Voggeser BJ, Singh RK, Göritz AS. Self-control in Online Discussions: Disinhibited Online Behavior as a Failure to Recognize Social Cues. *Front Psychol*. 2018 Jan 11;8:2372.
  106. Olweus D, Awiria O, Byrne B. Bullying at School-What We Know and What We Can Do. *British Journal of Educational Studies* 1994;42:403.
  107. Slonje R, Smith PK. Cyberbullying: Another Main Type of Bullying?. *Scandinavian Journal of Psychology* 2008;49:147-54.
  108. Smith PK, Mahdavi J, Carvalho M, Fisher S, Russell S, Tippett N. Cyberbullying: Its Nature and Impact in Secondary School Pupils. *J Child Psychol Psychiatry*. 2008 Apr;49:376-85.
  109. Williams M. Understanding King Punisher and His Order: Vandalism in an Online Community-Motives, Meanings and Possible Solutions. *Internet Journal of Criminology (IJC)*. 2004.
  110. Bishop J. Scope and Limitations in the Government of Wales Act 2006 for Tackling Internet Abuses in the Form of 'Flame Trolling'. *Statute Law Review* 2012;33:207-16.
  111. Binns A. Don't Feed the Trolls!. *Journalism Practice* 2012;6:547-62.
  112. Binark M, Karataş Ş, Çomu T, Koca E. Türkiye'de Twitter'da Trol Kültürü. *Toplum ve Bilim* 2015;135:124-58.
  113. Coles BA, West M. Trolling the Trolls: Online Forum Users Constructions the Nature and Properties of Trolling. *Computers in Human Behavior* 2016;60:233-44.
  114. Karabaşoğlu C, Güneş B, Erbaş O. Suicide-Related Genes. *JEB Med Sci* 2021;2:18-26.
  115. Cohen-Almagor R. Cyberbullying, Moral Responsibility, and Social Networking: Lessons from the Megan Meier

- Tragedy. *European Journal of Analytic Philosophy* 2020;16, 75-98.
116. Arntfield M. Toward a Cybervictimology: Cyberbullying, Routine Activities Theory, and the Anti-Sociality of Social Media. *Can. J. Commun.* 2015;40,371-88.
117. Stefan S. *Rational Suicide, Irrational Laws: Examining Current Approaches to Suicide in Policy and Law*. 1st ed. Oxford University Press; 2016.
- 118: Cyberbullying Research Center. *Criminal Charges Filed Against Two Involved in Rebecca Sedwick Suicide*. 2013. Available from: <https://cyberbullying.org/criminal-charges-filed-two-involved-rebecca-sedwick-suicide>
119. Köse SS, Erbaş O. Personality disorders diagnosis, causes, and treatments. *D J Tx Sci* 2020;5:22-31.
120. Arıcak OT, Siyahhan S, Uzunhasanoglu A, Saribeyoglu S, Ciplak S, Yilmaz N, et al. Cyberbullying among Turkish Adolescents. *Cyberpsychology & Behavior*. 2008;11:253-61.
121. Department for Digital, Culture, Media and Sport. 'Rapid Evidence Assessment: The Prevalence and Impact of Online Trolling'. 2019. Available from: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/811449/DCMS\\_REA\\_Online\\_trolling\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/811449/DCMS_REA_Online_trolling_.pdf)
122. Brown CF, Demaray MK, Tennant JE, Jenkins LN. Cyber Victimization in High School: Measurement, Overlap With Face-to-Face Victimization, and Associations With Social-Emotional Outcomes. *School Psychology Review*. 2017;46:288-303