Pro-social Tendencies and Aggression among College Students with Smart Phone Addiction

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Abstract

The aim was to study pro-social tendencies and aggression among college students with and without smart phone addiction. The objective was to study the difference in pro-social tendencies and aggression between college students with and without smart phone addiction. The sample consisted of male and female college students pursuing their degree course in government and private colleges, aged between 18 and 21 years. A between group design with purposive sample was opted for the study. The college students were administered General Health Questionnaire to rule out probable case of pathology and then students below the cutoff score on General Health Questionnaire were administered the Short Version of Smartphone Addiction Scale (SAS-SV) and individuals with and without smart phone addiction on this scale were considered for the study. Further both the groups were administered Pro-social Tendencies Measure and Aggression Scale. 't' test was computed to study the significant difference in the mean scores on the Pro-social Tendencies Measure and Aggression scale between college students with and without smart phone addiction. The results indicated that the pro-social tendencies were significantly low and the aggression was significantly high among the college students with smart phone addiction than the college students without smart phone addiction. Over all the study shows that though smart phones have a major role to play among the college students but over exposure to smart phone reduces pro-social tendencies and increases the aggressive behavior among college students.

Key words: Aggression, College Students, Pro-Social Tendencies and Smart Phone Addiction

Introduction:

A smartphone is a mobile device that combines traditional cell phone features with advanced computing capabilities, allowing users to make calls, send texts, and connect to the internet. Unlike basic cell phones, smartphones have operating systems (like iOS or Android) that support a wide range of applications (apps) for various tasks, including browsing the web, accessing social media, taking photos and videos, playing games, managing personal schedules, and using GPS for navigation. They generally feature touchscreens, internet connectivity, and a suite of sensors and hardware (such as cameras and microphones), which make them versatile tools for communication, entertainment, work, and personal organization.

Smartphone addiction refers to the excessive and compulsive use of smartphones, resulting in negative consequences in various aspects of life, such as work, academics, social relationships, and mental well-being. It is

often characterized by behavioral patterns similar to substance addiction, including preoccupation with the device, withdrawal symptoms when the smartphone is unavailable, tolerance (needing to use it more over time), and an inability to reduce use despite adverse effects. This concept has gained attention with the increasing prevalence of smartphones and their impact on daily life.

Several authors have contributed to defining and studying smartphone addiction. Kwon et al. (2013) describe smartphone addiction as a behavioral addiction that involves the extensive use of smartphones, often accompanied by disturbances in daily life. Lee et al. (2014) emphasize the similarities between smartphone addiction and internet or gaming addictions, particularly in how they affect mental health and social relationships. Demirci et al. (2015) further highlight smartphone addiction's impact on mental well-being, noting associations with sleep disturbances, anxiety, and depression. Elhai, Levine, Dvorak, and Hall (2016) explore the role of anxiety and depression as factors associated with increased smartphone use and addiction, pointing to the complex relationship between smartphone use and emotional regulation.

Prosocial tendencies refer to a person's inclination or willingness to help others, cooperate, and behave in ways that benefit society or others as a whole. It includes behaviors such as volunteering, donating to charity, sharing resources, and showing empathy and compassion towards others. According to Daniel Batson, prosocial behavior is "action intended to benefit another or others" (Batson, 1998, p. 4). Prosocial behavior can be understood as voluntary actions that are intended to help or benefit another individual or group of individuals (Carlo and Randall, 2002). Prosocial behavior is also defined as "voluntary acts that are intended to benefit or promote the well-being of another person or group of people" (Dovidio, Piliavin, Schroeder and Penner, 2006).

Smartphone addiction has been associated with reduced prosocial behaviors, hindering individuals' willingness to engage in altruistic actions. Twenge et al. (2018) found that excessive smartphone use correlates with fewer face-to-face interactions, crucial for developing empathy and prosocial tendencies. Dependence on smartphones for communication limits exposure to social cues and emotional connections that foster altruism. Holt-Lunstad et al. (2015) observed that high smartphone use can lead to loneliness and social isolation, weakening motivations for helping behaviors as individuals feel less connected to their communities.

Research by Rithika and Dhamodharan (2018) indicates that smartphone addiction can cause emotional dysregulation, reducing empathy and making it difficult for individuals to recognize others' needs. Błachnio et al. (2016) found that smartphone-addicted individuals tend to exhibit higher self-centeredness and lower altruism, potentially due to prioritizing personal entertainment and information available through smartphones.

Rosen et al. (2013) suggested that smartphone distractions prevent users from noticing opportunities to help others, leading to a decrease in spontaneous prosocial actions. Kuss and Griffiths (2017) noted that heavy smartphone use may shift social norms towards digital interactions, reducing traditional prosocial activities like volunteering. Together, these studies highlight how smartphone addiction diminishes prosocial tendencies by reducing face-to-face engagement, fostering emotional disconnection, and increasing self-interest. The erosion of traditional social norms and heightened emotional dysregulation further hinder empathy and compassion, ultimately diminishing individuals' inclination toward altruistic behavior.

Aggression is behavior that is intended to injure or harm another person, either physically or psychologically (Geen, 2001) and any form of behavior directed toward the goal of harming or injuring another living being who is motivated to avoid such treatment (Baron and Richardson, 1994). Aggression can take a variety of forms and can be physical or be communicated verbally or non-verbally.

Smartphone addiction has been associated with an increase in aggressive behavior among individuals, as highlighted by several studies. The pervasive use of smartphones can lead to heightened levels of irritability and frustration, particularly when access to devices is restricted or interrupted. Kuss and Griffiths (2017) noted that excessive smartphone use could contribute to increased aggression due to the frustration experienced when users are unable to engage with their devices. Elhai et al. (2017) found a significant correlation between problematic smartphone use and aggression, suggesting that individuals who exhibit addictive behaviors towards their smartphones are more likely to respond aggressively to stressors or perceived threats. The study indicated that the emotional regulation difficulties stemming from smartphone addiction can result in impulsive reactions, leading to aggressive responses.

Smartphone addiction has been shown to negatively impact interpersonal relationships, often leading to conflicts and aggressive behaviors. Ravichandran et al. (2018) found that constant connectivity can increase social media conflicts, which may escalate aggression. Gentile et al. (2012) suggested that excessive smartphone use fosters impulsivity, potentially leading to aggressive reactions under stress due to the expectation of instant gratification. Anderson et al. (2010) observed that frequent exposure to violent media on smartphones can normalize aggressive behaviors, making individuals more likely to act aggressively offline. Kowert et al. (2014) highlighted how smartphone addiction may lead to cyberbullying, where anonymity can encourage aggressive actions online, impacting offline interactions.

Additionally, Coyne et al. (2011) noted that smartphone addiction can cause relationship conflicts due to distractions and neglect of face-to-face interactions, which can escalate into aggression. Bányai et al. (2017) found that smartphone addiction often results in emotional dysregulation, where difficulty managing emotions heightens aggression when individuals feel provoked. Finally, Przybylski and Weinstein (2018) linked smartphone addiction

to increased stress and anxiety, further exacerbating aggression, as stressed individuals might become irritable or aggressive, particularly if reliant on devices as coping mechanisms. Overall, the literature suggests that smartphone addiction may be a contributing factor to increased aggressive behavior, driven by frustration, emotional dysregulation, and social conflicts arising from excessive smartphone use.

In conclusion, smartphone addiction significantly diminishes prosocial behaviors, reducing face-to-face interactions essential for empathy and social connection. Emotional dysregulation caused by excessive smartphone use weakens empathy and fosters self-centered attitudes, eroding traditional social norms and diminishing spontaneous acts of altruism. Furthermore, smartphone addiction is linked to increased aggression, stemming from frustration when devices are unavailable, exposure to violent content, and reliance on smartphones as a coping mechanism. This addiction often escalates social conflicts, intensifying irritability and aggressive responses in stressful situations. Addressing smartphone addiction is crucial to mitigate its negative effects on mental health and social behavior.

Need for the Study

The prevalence of smartphone addiction among college students has risen dramatically in recent years, raising concerns about its potential effects on behavioral and psychological outcomes. Given that college students are in a critical developmental stage, understanding the implications of smartphone addiction on prosocial tendencies and aggression is essential. Prior research has shown a correlation between excessive smartphone use and negative social behaviors, suggesting that addiction may hinder the development of empathy and cooperation while fostering aggressive responses to stressors (Kuss & Griffiths, 2017; Twenge et al., 2018). The exploration of these relationships is vital, as prosocial behavior plays a significant role in interpersonal relationships and community engagement, while aggression can lead to conflict and social disruption (Anderson et al., 2010; Gentile et al., 2012). By investigating the differences in prosocial tendencies and aggression among college students with and without smartphone addiction, this study aims to contribute to the understanding of how smartphone use influences social behaviors.

Methodology:

The aim was to study pro-social tendencies and aggression among college students with and without smart phone addiction. The objective was to study the difference in pro-social tendencies and aggression between college students with and without smart phone addiction. It was hypothesized that there will be significant difference in pro-social tendencies and aggression between college students with and without smart phone addiction. The college students with and without smart phone addiction were considered as independent variable and responses on pro-social tendencies scale and aggression were considered as dependent variable. The sample consisted of male and female college students pursuing their degree course in government and private colleges, aged between 18 and 21 years. The differently abled students (physical), students scoring more than cut of point on General

Health Questionnaire and students who reported (demographic data sheet) of being diagnosed with psychological issues and being in some sort of therapy were not considered for the study. A between group design with purposive sample was opted for the study. The college students full filing inclusion criteria and willing to be part of the study were administered the Short Version of Smartphone Addiction Scale (SAS-SV) and individuals with and without smart phone addiction on this scale were considered for the study. Further both the groups were administered Pro-social Tendencies Measure and Aggression Scale. 't' test was computed to study the significant difference in the mean scores on the Pro-social Tendencies Measure and Aggression scale between college students with and without smart phone addiction.

Tools:

General Health Questionnaire (Goldberg, 1972):

The General Health Questionnaire consisting of 28 statements to be rated on a four point scale was used for the study. The questionnaire's psychometric properties are adequate with test-retest reliability found to be 0.77, and split half reliability at 0.92. The sensitivity and specificity of the GHQ-28 was 91.4% and 87% respectively (Goldberg and Williams, 1988). A cut-off score of six was used in the study (Range= zero to 28) to rule out as probable case of pathology.

The Smartphone Addiction Scale (SAS-SV) (Kwon, Kim, Cho & Yang, 2013):

The Smartphone Addiction Scale – Short Version (SAS-SV), developed by Kwon et al. in 2013, is a validated tool designed to evaluate the risk of smartphone addiction, particularly in adolescents and young adults. This self-report questionnaire consists of 10 items rated on a 6-point Likert scale, allowing for a total score ranging from 10 to 60, where higher scores indicate a greater risk of addiction. The SAS-SV encompasses various dimensions related to smartphone overuse, including daily-life disturbance, positive anticipation, withdrawal symptoms, preference for online relationships, overuse behaviors, and tolerance. The scoring system typically identifies scores of 31 or higher for males and 33 or higher for females as indicative of addiction risk. While initially standardized on South Korean adolescents, the SAS-SV has demonstrated cross-cultural validity. Psychometric analysis shows that the SAS-SV has high internal consistency (Cronbach's alpha above 0.80), strong construct validity, and good discriminant validity, effectively distinguishing between normal and high-risk users. Its brevity and comprehensive coverage make it suitable for large-scale surveys, clinical assessments, and cross-cultural research. The SAS-SV is widely used across different populations, making it a reliable measure for understanding smartphone addiction and its implications for behavior and mental health. Overall, the SAS-SV stands out as an efficient and psychometrically robust tool for assessing smartphone addiction, contributing valuable insights to both clinical practice and research.

Aggression Scale (A-Scale) (Roma Pal and Tasneem Naqvi, 1986):

The aggression scale developed by Roma Pal and Tasneem Naqvi (1986) was used to collect the data related to aggression. This scale is applicable for the age group 14-24 years. The test consists of 30 statements related to the personality/behaviors in everyday life of an individual to which the participants responded. Each item has six alternative answers (multiple choice) with options of - very much; much; ordinary; 'Less' very less', 'not at all' graded on five point scale. Thus, each item had six alternative answers graded on five point scale on the positive dimension and a zero point on the negative dimension. The scoring pattern for the statements is 5, 4, 3, 2, 1, and 0 for each item and followed by total score. The range of score of aggression scale varies between 0 and 150. Higher score indicating higher-high aggression (saturated) and lower score indicating low aggression-no aggression (clean). The reliability y coefficient of the test was found to be 0.82. The split-half reliability and test-retest reliability of the scale are 0.82 and 0.78, respectively and content validity of the test being 0.78.

Pro-social Tendencies Measure (PTM) Gustavo and Brandy (2002):

Pro-social Tendencies Measure (PTM) developed by Gustavo and Brandy (2002) **c**onsists of 25 items to be rated on a five point scale ranging from 1 (does not describe me at all) to 5 (describes me greatly) related to 6 types of pro-social behaviors like altruistic, compliant, emotional, dire, public, and anonymous. The Likert 5-point scoring method is used to score from 1 to 5 points corresponding to (does not describe me at all) to 5 (describes me greatly). The higher the total score, the higher the degree of prosocial tendencies. Items for the PTM were selected from previously developed prosocial disposition and behavior scales (Schroeder, Penner, Dovidio and Piliavin, 1995) and from responses to prosocial moral reasoning interviews (Eisenberg, Miller, Shell, McNalley and Shea, 1995). Carlo and Randall (2001) reported adequate model fit coefficients using confirmatory factor analysis with college students.

Procedure:

The study was conducted among college students who met the inclusion criteria and expressed a willingness to participate. Following the provision of informed consent, participants were initially assessed using the General Health Questionnaire (GHQ) to screen for any probable pathological conditions. This step ensured that only those students with scores below the established GHQ cutoff—indicating no likely mental health issues—progressed to the next phase of the study. Subsequent to this initial screening, eligible students were administered the Short Version of the Smartphone Addiction Scale (SAS-SV) to assess their levels of smartphone addiction. Based on their scores, participants were divided into two groups: those scoring above the SAS-SV cutoff point, identified as having smartphone addiction, and those scoring below the cutoff point, identified as non-addicted to smartphones. With the sample thus segmented into "addicted" and "non-addicted" groups, both groups were then administered the Pro-social Tendencies Measure and the Aggression Scale. These assessments aimed to evaluate each participant's levels of pro-social behavior and aggression, respectively, providing insight into behavioral and social

tendencies associated with smartphone addiction. To analyze differences between the two groups, a t-test was conducted to compare mean scores on the Pro-social Tendencies Measure and Aggression Scale, determining whether there were statistically significant differences in pro-social and aggressive behaviors between college students with and without smartphone addiction.

Analysis of results:

Mean, standard deviation was computed for descriptive analysis. 't' test was computed to study the significant difference in the mean scores on the Pro-social Tendencies Measure and Aggression scale between college students with and without smartphone addiction.

Results:

Table1

Demographic details of the sample:

Areas	Categories	With smart phone addiction	Percentage	Without smart phone addiction	Percentage
Gender	Male	18	56.25	19	55.88
	Female	14	43.75	15	44.12
	Total	**32**	**100.00**	**34**	**100.00**
Age	18-19 years	12	37.50	12	35.29
	19-20 years	12	37.50	16	47.06
	20-21 years	8	25.00	6	17.65
	Total	**32**	**100.00**	**34**	**100.00**
Course	B.Sc.	10	31.25	13	38.24
	B.A	12	37.50	12	35.29
	B.Com	10	31.25	9	26.47
	Total	**32**	**100.00**	**34**	**100.00**
Type of family	Nuclear family	24	75.00	27	79.41
	Joint family	8	25.00	7	20.59
	Total	**32**	**100.00**	**34**	**100.00**
Type of college	Government college	20	62.50	18	52.94
	Private college	12	37.50	16	47.06
	Total	**32**	**100.00**	**34**	**100.00**
Category	SC/ST	6	18.75	5	14.71
	OBC	20	62.50	21	61.76
	GM	6	18.75	8	23.53
	Total	**32**	**100.00**	**34**	**100.00**

Table 1 presents demographic details of college students in a study on prosocial tendencies and aggression among those with and without smartphone addiction. Both groups are gender-balanced, with the addiction group consisting of 56.25% males and 43.75% females, and the non-addicted group comprising 55.88% males and 44.12% females.

Age distribution indicates that most participants are 18-20 years old. Specifically, 37.5% of the addiction group and 35.29% of the non-addicted group are aged 18-19, while 37.5% and 47.06% fall into the 19-20 age range. Educational backgrounds show that B.A., B.Sc., and B.Com students are evenly distributed across groups, with the addiction group comprising 37.5% B.A., 31.25% B.Sc., and 31.25% B.Com students, while the non-addicted group includes 38.24% B.Sc., 35.29% B.A., and 26.47% B.Com students. Family structures reveal that most participants are from nuclear families (75% of the addiction group and 79.41% of the non-addicted group). A majority are from government colleges, with 62.5% in the addiction group and 52.94% in the non-addicted group. Additionally, most participants belong to the OBC category (62.5% in the addiction group, 61.76% in the non-addicted group).

Table 2
Mea, SD and interpretation on Pro-social Tendencies Measure for college students with and without smart phone addiction:

Group	Mean	SD	Interpretation
With smart phone addiction	36	2.61	Low Pro-social tendencies
Without smart phone addiction	48	3.12	Below average Pro-social tendencies

Table 2 presents the Pro-social Tendencies Measure for college students with and without smartphone addiction. In the group with smartphone addiction, the mean score is 36, with an SD of 2.61, which is interpreted as indicating low pro-social tendencies. This suggests that students in this group demonstrate lower levels of socially constructive behaviors such as empathy, cooperation, and helping others.

For the group without smartphone addiction, the mean score is 48, with an SD of 3.12, interpreted as below average pro-social tendencies. While these students do not score high on pro-social tendencies, they exhibit somewhat higher levels of these behaviors compared to their smartphone-addicted counterparts.

Table 3
Mean, SD and t values on Pro-social Tendencies Measure for college students with and without smart phone addiction:

Group	Mean	SD	t value
With smart phone addiction	36	2.61	8.36**
Without smart phone	48	3.12	
**significant at 0.01 level			

The group with smartphone addiction has a mean score of 36, with an SD of 2.61, while the group without smartphone addiction has a higher mean score of 48, with an SD of 3.12. The calculated t value is 8.36, which is statistically significant at the 0.01 level. This significant difference suggests that students without smartphone addiction exhibit notably higher pro-social tendencies than those with smartphone addiction (table 3).

The analysis of results indicate that there was significant difference between the means of with and without smart phone addiction group on Pro-social Tendencies Measure ($t = 8.36$; Significant $p<0.01$) (table 3), hence the result

of the study is in accordance to the hypothesis stated that there will be significant difference in Pro-social Tendencies between college students with and without smart phone addiction. The present study results indicated that the Pro-social Tendencies was significantly better among the college students without smart phone addiction than the college students with smart phone addiction.

The present study indicates that college students without smartphone addiction exhibit significantly better prosocial tendencies than those with addiction, suggesting that smartphone addiction correlates with reduced empathy, cooperation, and willingness to help others. While students without addiction do not show exceptionally high prosocial behavior, they still demonstrate better social engagement and pro-social attitudes.

Supporting this, Emirtekin et al. (2018) found a link between problematic smartphone use and lower empathy along with increased social withdrawal, indicating that excessive smartphone engagement can negatively affect social interactions and prosocial behaviors.

Horwood and Anglim (2018) noted that frequent smartphone users often exhibit lower interpersonal empathy, further hindering their prosocial engagement. Similarly, Samaha and Hawi (2016) reported that increased smartphone use leads to social isolation, with reliance on smartphones diminishing meaningful face-to-face connections.

A systematic review by Khang, Woo, and Kim (2013) highlighted that motivations for smartphone addiction, such as escapism, correlate negatively with prosocial behaviors. David, Roberts, and Christenson (2018) also noted that heightened smartphone use disrupts emotional regulation and decreases participation in positive social activities, thereby reducing prosocial tendencies. Gola et al. (2017) emphasized that digital overuse fosters self-centered gratification over collaborative behaviors. Collectively, these studies support the conclusion that smartphone addiction adversely affects prosocial tendencies.

Table 4:
Mean and SD values on Aggression scale for college students with and without smart phone addiction:

Group	Mean	SD	Interpretation
With smart phone addiction	113	5.53	Saturated
Without smart phone	88	4.26	Average

The mean aggression score for students with smartphone addiction is 113, with an SD of 5.53. This high mean score indicates that aggression is notably elevated in this group, labeled as "Saturated" on the aggression scale. Such high levels suggest that smartphone addiction may be associated with increased aggression, potentially due to factors like frustration, impulsivity, or reduced emotional regulation linked to excessive smartphone use (table 4). In contrast, students without smartphone addiction have a mean aggression score of 88 and an SD of 4.26,

falling within the "Average" range. This average score implies a more balanced emotional state, which could facilitate more stable social interactions and reduced aggressive tendencies (table 4).

Table 5
Mean, SD and t values on Aggression scale for college students with and without smart phone addiction:

Group	Mean	SD	t value
With smart phone addiction	113	5.53	5.37**
Without smart phone	88	4.26	
**significant at 0.01 level			

Students with smartphone addiction have a mean aggression score of 113 (SD = 5.53), and those without smartphone addiction show a mean score of 88 (SD = 4.26). The t-test value of 5.37, significant at the 0.01 level, confirms that the difference in aggression levels between the groups is statistically significant. This significant difference suggests that students without smartphone addiction exhibit notably lower aggression than those with smartphone addiction (table 5).

The analysis of results indicate that there was significant difference between the means of with and without smart phone addiction group on aggression score ($t = 5.37$; Significant $p<0.01$) (table 5), hence the result of the study is in accordance to the hypothesis stated that there will be significant difference in aggression between college students with and without smart phone addiction. The present study findings reveal that college students without smartphone addiction demonstrate significantly lower levels of aggression compared to their counterparts with smartphone addiction. This outcome is consistent with existing literature that links excessive smartphone use to behavioral changes such as increased irritability, impulsivity, and frustration, which may contribute to aggressive tendencies.

Research indicates a significant correlation between smartphone addiction and aggressive behavior. Gao et al. (2018) found that smartphone addiction is linked to increased irritability, impulsivity, and reduced emotional regulation, leading to greater susceptibility to aggression in frustrating situations. Elhai et al. (2017) saw a connection between problematic smartphone use and heightened levels of anxiety, depression, and aggression, suggesting that the psychological distress associated with excessive smartphone use can worsen aggressive tendencies. Karadağ et al. (2015) confirmed that smartphone addiction results in negative behavioral outcomes, including heightened aggression and lower social connectedness, which adversely affects prosocial behavior. Moreover, studies on media consumption by Anderson & Dill (2000) and Lemmens et al. (2011) show that exposure to violent content, including mobile gaming, can increase aggression among users.

Rachaniotis et al. (2017) reported a significant link between high smartphone usage and increased aggression, especially in social contexts. Kuss & Griffiths (2012) provided an overview of the psychological impacts of

smartphone addiction, highlighting its connection to aggression, particularly in adolescents. Additionally, Smahel et al. (2016) and Bianchi & Phillips (2005) reaffirmed that higher smartphone usage is associated with increased aggression and behavioral issues. Collectively, these studies emphasize the troubling relationship between smartphone addiction and aggression, indicating a need for further exploration.

Conclusions:

- College students with smartphone addiction showed low pro-social tendencies, whereas the group without smartphone addiction had below average pro-social tendencies. While these students do not score high on pro-social tendencies, they exhibit somewhat higher levels of these behaviors compared to their smartphone-addicted counterparts.
- The mean aggression score for students with smartphone addiction indicated that aggression was notably elevated in this group, labeled as "Saturated" on the aggression scale. Whereas in contrast, students without smartphone addiction have a mean aggression score falling within the "Average" range. This average score implies a more balanced emotional state, which could facilitate more stable social interactions and reduced aggressive tendencies.
- The pro-social tendencies were significantly better among the college students without smart phone addiction than the college students with smart phone addiction. The result is in accordance to the hypothesis stated that there will be significant difference in Pro-social Tendencies between college students with and without smart phone addiction.
- Aggression was significantly high among the college students with smart phone addiction than the college students without smart phone addiction. The result is in accordance to the hypothesis stated that there will be significant difference in aggression between college students with and without smart phone addiction.
- Though smart phone has a major role to play among the college students but smart phone addiction has reduced pro-social tendencies and increased the aggressive behavior.

Limitations:

- The sample was limited to college students within a narrow age range (18-21 years) and from specific educational backgrounds (government and private colleges), which may limit the generalizability of the findings.
- Longitudinal studies would better assess how smartphone addiction impacts aggression and prosocial tendencies over time.
- Factors such as personality traits, social influences, and mental health issues were not controlled for and could influence levels of aggression and prosocial behavior.
- Cultural attitudes towards smartphone use, aggression, and prosocial behavior were not examined, though they could influence the behavior and attitudes of participants and vary widely across regions or communities.

- The study focused on smartphone addiction but did not account for other forms of technology use (such as gaming consoles, computers, or tablets) that could similarly affect prosocial tendencies and aggression, potentially confounding the results.
- The study did not investigate the psychological mechanisms that might link smartphone addiction to aggression or reduced prosocial behavior, such as stress, impulsivity, or social anxiety. Understanding these mechanisms could provide insight into why smartphone addiction has these effects.
- Since data was collected at a single point in time, it cannot account for fluctuations in smartphone usage or behavior. Students' levels of addiction or aggressive tendencies may vary, especially during high-stress times like exams, potentially affecting results.
- The study did not differentiate between types of smartphone use (e.g., social media, gaming, academic use), which could have varying impacts on aggression and prosocial behavior.
- The study does not consider contextual factors such as family dynamics, peer influence, or academic pressures that might also affect levels of aggression and prosocial behavior among college students, alongside or separate from smartphone addiction.

Implications:

- This study highlights that smartphone addiction among college students correlates with reduced pro-social tendencies and increased aggression, prompting several intervention strategies. Colleges could foster face-to-face socialization and empathy-building activities, such as encouraging participation in clubs, community service, and group projects, to counteract the social impact of smartphone overuse.
- Given the elevated aggression in smartphone-addicted students, colleges should consider aggression-reduction workshops focused on mindfulness, stress management, and emotional regulation. Additionally, counseling centers could raise awareness about the emotional benefits of moderate smartphone use, encouraging students to adopt healthier digital habits.
- Institutions may implement digital well-being campaigns and smartphone usage guidelines to help students monitor and limit screen time, promoting a balanced relationship with technology. Collaborations with technology companies to incorporate reminders, screen-time limits, and digital health features within popular apps could further support healthier smartphone habits.
- To ensure long-term digital health, colleges might integrate digital literacy and emotional regulation into the curriculum, equipping students with skills to manage smartphone use responsibly. Support programs like peer counseling, wellness workshops, and safe spaces for discussing technology's impact on mental health could be invaluable resources.
- Finally, mental health professionals could develop intervention programs, including digital detox strategies and awareness sessions on smartphone addiction, focusing on both prevention and reduction of its adverse effects.

Future research may investigate the efficacy of these interventions, specifically exploring how reduced smartphone use could enhance pro-social behaviors and reduce aggressive tendencies.

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