

Digital Media, Anxiety, and Depression in Children

Elizabeth Hoge, MD,^a David Bickham, PhD,^b Joanne Cantor, PhD^c

abstract There are growing concerns about the impact of digital technologies on children's emotional well-being, particularly regarding fear, anxiety, and depression. The 2 mental health categories of anxiety and depression will be discussed together because there is significant symptom overlap and comorbidity. Early research has explored the impact of traditional media (eg, television, movies) on children's acute fears, which can result in anxieties and related sleep disturbances that are difficult to remedy. More recent research deals with the interactive nature of newer media, especially social media, and their impacts on anxiety and depression. Key topics of inquiry include the following: anxiety and depression associated with technology-based negative social comparison, anxiety resulting from lack of emotion-regulation skills because of substituted digital media use, social anxiety from avoidance of social interaction because of substituted digital media use, anxiety because of worries about being inadequately connected, and anxiety, depression, and suicide as the result of cyberbullying and related behavior. A growing body of research confirms the relationship between digital media and depression. Although there is evidence that greater electronic media use is associated with depressive symptoms, there is also evidence that the social nature of digital communication may be harnessed in some situations to improve mood and to promote health-enhancing strategies. Much more research is needed to explore these possibilities.

^aDepartment of Psychiatry, Georgetown University Medical Center, Washington, DC; ^bDepartment of Medicine Research, Boston Children's Hospital, Harvard Medical School, Boston, Massachusetts; and ^cDepartment of Communication Arts, University of Wisconsin–Madison, Madison, Wisconsin

All authors reviewed portions of the literature (including some of their own research), contributed to the writing and editing of this paper, and approved the final manuscript as submitted.

The analysis, conclusions, and recommendations contained in each paper are solely a product of the individual workgroup and are not the policy or opinions of, nor do they represent an endorsement by Children and Screens: Institute of Digital Media and Child Development or the American Academy of Pediatrics.

DOI: <https://doi.org/10.1542/peds.2016-1758G>

Accepted for publication Apr 19, 2017

Address correspondence to Elizabeth Hoge, MD, Department of Psychiatry, Georgetown University Medical Center, 2115 Wisconsin Ave NW, Washington, DC 20007. E-mail: eah103@georgetown.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2017 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: This special supplement, "Children, Adolescents, and Screens: What We Know and What We Need to Learn," was made possible through the financial support of Children and Screens: Institute of Digital Media and Child Development.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

In an effort to summarize emerging areas in the field concerning the relationship between digital media use (eg, television, video games, computers, tablets, smart phones, and other devices) and symptoms of anxiety and depression in children and adolescents, we have focused on 6 different areas for which research evidence is available. These areas are in various levels of research development; we discuss each one separately, offer suggestions for future research, and translate what is currently known into recommendations for pediatricians and other stakeholders.

CURRENT STATE

Fear and Anxiety Produced by Contents of Traditional Media

A variety of surveys dating back as far as the 1930s have shown that a substantial proportion of children experience acute fearful reactions to various aspects of the content of media, especially movies, television dramas, and the news.¹ Correlational studies reveal an association between amount of television viewing and sleep problems, and retrospective reports² reveal that intense, trauma-like symptoms from media exposure are common in children and adolescents. Developmental differences are important influences on what is frightening and on which strategies for alleviating media-induced fears are effective. The consequences of exposure to material that is frightening to a child of a specific developmental stage can be dramatic. It is often difficult to calm a child who has been intensely frightened by a program or movie, and the resulting loss of sleep and heightened levels of unnecessary anxiety can cause physical, cognitive, and emotional problems. Therefore, efforts to shield children from inappropriately disturbing content are warranted.³ Little research has been conducted

on acute fear reactions delivered by newer technologies, such as the Internet, social media, and portable devices. However, considering that these types of technologies are often used to access video entertainment, much of what we know about fear and children is applicable to modern types of media use.

Research on traditional media has found that the representation of attractive people leading exciting and idealized lives in media programs invites social comparison and contributes to dissatisfaction with oneself.⁴ Similarly, with digital media, researchers have examined whether exposure to social networking sites can influence depression and anxiety in adolescents through technology-based negative social comparison, resulting in negative self-evaluation or anxiety about evaluation by others.

Although largely cross-sectional, associations have been observed between the use of social networking sites and depression or anxiety symptoms in children and adolescents.⁵ In contrast, research with adults showed that using the Internet to communicate with friends and family was linked with decreases in depression.⁶ The direction of causality cannot be determined in such cross-sectional data, but a few studies using measurements over time suggest a possible directionality. For example, in a study in which young adults were asked over a span of 2 weeks about well-being, life satisfaction, and Facebook use, the authors reported that more Facebook use predicted decreases in these measures; in addition, the more they used Facebook over the 2 weeks, the more their life satisfaction decreased over time.⁷ In another study, adolescents completed questionnaires at 2 time points regarding technology use (ie, cell phones, Facebook, and Instagram) and indicators of social comparison; results indicated

that technology-based social comparison and feedback seeking were associated with depressive symptoms that exceeded previous depressive symptom history.⁸

Anxiety Resulting From Lack of Emotion-Regulation Skills Because of Substituted Digital Media Use

Adolescents may seek digital distraction from emerging anxiety or distress emotions, creating a reinforced behavioral avoidance of emotional experiences. Emotion regulation is an important skill that is developed in childhood and adolescence because individuals learn to handle and cope with strong emotions by experiencing them and developing internal regulatory processes. Psychological theory has widely acknowledged that emotion regulation is an essential component of mental health, and problems with it are a hallmark characteristic of a variety of psychopathological disorders, such as anxiety and depression.⁹ Research has shown that individuals with Internet overuse or addiction report using it to avoid negative emotions, such as anxiety and depression.^{10,11} Although no studies showing causal relationships yet exist, problematic Internet use is associated with having greater difficulties in emotion regulation,¹² and depression symptoms predict an increase in the use of the Internet for mood regulation, which “seems to act as a dysfunctional regulator of emotional distress.”¹³ Additional work is needed to examine the effects of digital devices on emotion-regulation skills.

Social Anxiety and Depression From Lack of Social Interaction because of Substituted Digital Media Use

Social anxiety disorder is a psychiatric illness characterized by fear of embarrassment or humiliation, leading to the avoidance of social situations. The disorder interferes with social and occupational functioning and

increases the risk for substance abuse and suicide. Researchers have documented that the options of texting, instant messaging, and emailing have become preferred by some individuals over face-to-face interactions for some types of contact.^{14,15} Although this preference is understandable, the behavior may actually increase risk in individuals vulnerable to social anxiety disorder. For these individuals, opting to substitute digital media for interpersonal communication to avoid feared situations may become cyclically reinforced over time, making the person even more avoidant and worsening the symptoms and severity of social anxiety disorder.¹⁶

Preliminary research suggests that time spent online displaces in-person interactions.¹⁷ Although primarily correlational, research suggests that young people who replace in-person exchanges with virtual interactions intensify their social impairments, whereas those who use online exchanges to supplement existing friendships report improvements in the quality and closeness of their existing relationships. If adolescents preferentially seek online experiences over in-person ones, social anxiety symptoms could worsen in vulnerable individuals. Furthermore, researchers have found that individuals reporting symptoms consistent with social anxiety disorder endorsed a growing “reliance upon the Internet as a social outlet to the exclusion of face-to-face interactions.”¹⁶

Similarly, depression has been postulated to be caused by substituted digital communication, such as excessive mobile phone use that takes the place of face-to-face contact and causes subsequent social isolation.¹⁸ In fact, researchers conducting a recent longitudinal study of adolescents found that greater use of mobile phones at

baseline was associated with higher levels of depression 1 year later.¹⁹

Anxiety Because of Worries About Being Inadequately Connected

The use of social technology (eg, texting, instant messaging, e-mailing) has become a primary method of communication for a majority of young adults, and interrupting the use of these technologies can lead to increased levels of anxiety.²⁰ In Japan, researchers noted anxiety in students (mean age = 18.4 years) such that when they did not receive an instant reply to their text message, they felt a fear of being ostracized.²¹ Researchers conducting study of adults found that greater amounts of text messaging were associated with higher anxiety and depression levels and that a feeling of being dependent on text messaging was associated with depression.²² The tendency to be constantly connected to one’s social network through digital devices, therefore, potentially contributes to feelings of anxiety.

Anxiety, Depression, and Suicide as the Result of Cyberbullying and Other Media Use Behaviors

A recent meta-analysis of 131 studies²³ highlighted the following key findings: (1) most estimates of the prevalence of cyberbullying among adolescents fall between 11% and 48%, depending on the definition of cyberbullying, group demographics, and the reporting time frame; (2) there is a substantial degree of overlap between adolescents who bully others offline and those who engage in cyberbullying (similarly, victims of cyberbullying are often victimized offline); and (3) adolescents who experience cyberbullying are at increased risk for a wide range of mental and physical health problems.¹⁷ The majority of victims report negative feelings, such as embarrassment, worry, fear, depression, or loneliness after cyberbullying events.²⁴

Internet use in general and the specific experience of being a victim of cyberbullying are both associated with more suicidal thoughts and self-injurious behaviors.²⁵ Using the Internet exposes young people to stories and conversations about suicides, and such exposure, especially in the form of discussion forums, increases suicidal ideation.²⁶ Furthermore, groups that congregate specifically to discuss issues related to suicide and self-injury provide any youth exploring the topic with details and potential support through the normalization of the behavior.²⁷ Youth who exhibit self-injurious behaviors use the Internet more and in ways that might expose them to high-risk situations.²⁸ Youth who are cyberbullied are more likely than their peers to think about and attempt suicide.²⁵ Even in the face of these findings, it is important to recognize that the social nature of the Internet positions it to be an effective source of therapeutic support. Being active in an online support group may lead to lower levels of distress potentially through increased exposure to messages that support positive behaviors and efforts and applaud successful behavior change.²⁷ The impact of Internet use on suicidal behaviors is dependent, it seems, on the specific information accessed and people contacted.

Similarly, not all types of electronic media use would be expected to worsen depression. Because increases in momentary positive affect may lower some people’s risk for depression, certain types of media use that have this effect could be therapeutic. Media use that provides effective distraction, humor, connection to peers, and a wide social network could serve to help adolescents avoid depression and potentially reduce its impact on their functioning.²⁹ Although emerging research seems to point to communication technology as contributing to depression through

social comparison and other means, not enough work has been completed examining if and how depressed young people turn to this type of contact to help cope with negative affect. To date, there has not been a systematic examination of how young people with depression use media to manage their affect and the effectiveness of these behaviors. This type of work can help reveal the causal directions or otherwise complex relationships between affective disorders and use of electronic media and communication technologies.

FUTURE RESEARCH

- How does digital media and social networking affect anxiety, depression, and related well-being? Does a societal emphasis on online social networking contribute to this effect? If so, could school-based education about these issues with adolescents decrease negative effects (eg, discussion about online identity versus real identity, social desirability, authenticity, etc)? If use is related to anxiety and depression symptoms, what are the mediators and moderators? Previous work has largely been cross-sectional; future work could use controlled designs with an intervention arm receiving increased digital media use opportunities and a control arm not having those opportunities;
- Could overreliance on digital media devices interfere with normal emotion-regulation development? This question has broad-reaching mental health consequences but has heretofore not been examined; and
- How are different types of communication technologies used by young people suffering from depression, and does their use alleviate or aggravate its symptoms?

RECOMMENDATIONS

Clinicians and Providers

- Pediatricians should be reminded to screen for media exposure (amount and content) to help treat patients suffering from high levels of anxiety, insomnia, and other symptoms potentially indicative of exposure to problematic media;
- pediatricians can also counsel parents to help guide children to appropriate content by using ratings, reviews, plot descriptions, and by screening material before allowing their child to access it, while taking developmental differences into account;
- for children and adolescents whose pediatricians feel they may be vulnerable to social anxiety disorder, parents could be counseled to give children ample opportunities to practice face-to-face communication and to limit online communication;
- pediatricians, counselors, and others can help educate parents on strategies for developing and implementing household rules about media use because such rules have been linked to reduced levels of depression in young people¹⁹; and
- clinicians can help youth suffering from depression to access the social resources they seek through multiple rich channels of communication, including both face-to-face and mediated interactions.

Policy Makers

- Policy makers can support the development of more accurate, helpful media ratings and blocking technologies and enforce their proper application.

Educators

- Stakeholders in child health should encourage young people to explore entertainment opportunities apart

from television viewing because it has been shown to increase one's odds of developing depression.³⁰

REFERENCES

1. Cantor J, Riddle K. Media and fear in children and adolescents. In: Gentile DA, ed. *Media Violence and Children: A Complete Guide for Parents and Professionals*. 2nd ed. Santa Barbara, CA: Praeger; 2014:179–207
2. Harrison K, Cantor J. Tales from the screen: enduring fright reactions to scary media. *Media Psychol*. 1999;1(2):97–116
3. Cantor J, Byrne S, Moyer-Gusé E, Riddle K. Descriptions of media-induced fright reactions in a sample of US elementary school children. *J Child Media*. 2010;4(1):1–17
4. Richins ML. Social comparison and the idealized images of advertising. *J Consum Res*. 1991;18(1):71–83
5. Pantic I, Damjanovic A, Todorovic J, et al. Association between online social networking and depression in high school students: behavioral physiology viewpoint. *Psychiatr Danub*. 2012;24(1):90–93
6. Bessière K, Pressman S, Kiesler S, Kraut R. Effects of internet use on health and depression: a longitudinal study. *J Med Internet Res*. 2010;12(1):e6
7. Kross E, Verduyn P, Demiralp E, et al. Facebook use predicts declines in subjective well-being in young adults. *PLoS One*. 2013;8(8):e69841
8. Nesi J, Prinstein MJ. Using social media for social comparison and feedback-seeking: gender and popularity moderate associations with depressive symptoms. *J Abnorm Child Psychol*. 2015;43(8):1427–1438
9. Mennin DS, Heimberg RG, Turk CL, Fresco DM. Applying an emotion regulation framework to integrative approaches to generalized anxiety disorder. *Clin Psychol Sci Pract*. 2002;9(1):85–90
10. Greenfield DN. *Virtual Addiction*. Oakland, CA: New Harbinger Publications; 1999

11. Spada MM, Langston B, Nikčević AV, Moneta GB. The role of metacognitions in problematic Internet use. *Comput Human Behav.* 2008;24(5):2325–2335
12. Vajda A, Láng A, Péley B. Investigation of the compulsive and impulsive behavioral addictions among adolescents [in Hungarian]. *Psychiatr Hung.* 2014;29(2):152–157
13. Gámez-Guadix M. Depressive symptoms and problematic internet use among adolescents: analysis of the longitudinal relationships from the cognitive-behavioral model. *Cyberpsychol Behav Soc Netw.* 2014;17(11):714–719
14. Joinson AN. Self-esteem, interpersonal risk, and preference for e-mail to face-to-face communication. *Cyberpsychol Behav.* 2004;7(4):472–478
15. Leung L. Loneliness, social support, and preference for online social interaction: the mediating effects of identity experimentation online among children and adolescents. *Chin J Commun.* 2011;4(4):381–399
16. Erwin BA, Turk CL, Heimberg RG, Fresco DM, Hantula DA. The Internet: home to a severe population of individuals with social anxiety disorder? *J Anxiety Disord.* 2004;18(5):629–646
17. George MJ, Odgers CL. Seven fears and the science of how mobile technologies may be influencing adolescents in the digital age. *Perspect Psychol Sci.* 2015;10(6):832–851
18. Kumar SS. Mobile phone and adolescents- addiction a mindful check in! *Int J Adv Nurs Stud.* 2014;3(1):42–46
19. Bickham DS, Hswen Y, Rich M. Media use and depression: exposure, household rules, and symptoms among young adolescents in the USA. *Int J Public Health.* 2015;60(2):147–155
20. Durocher JJ, Lufkin KM, King ME, Carter JR. Social technology restriction alters state-anxiety but not autonomic activity in humans. *Am J Physiol Regul Integr Comp Physiol.* 2011;301(6):R1773–R1778
21. Lu X, Katoh T, Chen Z, Nagata T, Kitamura T. Text messaging: are dependency and excessive use discretely different for Japanese university students? *Psychiatry Res.* 2014;216(2):255–262
22. Lu X, Watanabe J, Liu Q, Uji M, Shono M, Kitamura T. Internet and mobile phone text-messaging dependency: factor structure and correlation with dysphoric mood among Japanese adults. *Comput Human Behav.* 2011;27(5):1702–1709
23. Kowalski RM, Limber SP. Psychological, physical, and academic correlates of cyberbullying and traditional bullying. *J Adolesc Health.* 2013;53(suppl 1):S13–S20
24. Ortega R, Elipe P, Mora-Merchán JA, et al. The emotional impact of bullying and cyberbullying on victims: a European cross-national study. *Aggress Behav.* 2012;38(5):342–356
25. Daine K, Hawton K, Singaravelu V, Stewart A, Simkin S, Montgomery P. The power of the web: a systematic review of studies of the influence of the internet on self-harm and suicide in young people. *PLoS One.* 2013;8(10):e77555
26. Dunlop SM, More E, Romer D. Where do youth learn about suicides on the Internet, and what influence does this have on suicidal ideation? *J Child Psychol Psychiatry.* 2011;52(10):1073–1080
27. Messina ES, Iwasaki Y. Internet use and self-injurious behaviors among adolescents and young adults: an interdisciplinary literature review and implications for health professionals. *Cyberpsychol Behav Soc Netw.* 2011;14(3):161–168
28. Mitchell KJ, Ybarra ML. Online behavior of youth who engage in self-harm provides clues for preventive intervention. *Prev Med.* 2007;45(5):392–396
29. Morgan AJ, Jorm AF. Self-help interventions for depressive disorders and depressive symptoms: a systematic review. *Ann Gen Psychiatry.* 2008;7(1):13
30. Primack BA, Swanier B, Georgiopoulos AM, Land SR, Fine MJ. Association between media use in adolescence and depression in young adulthood: a longitudinal study. *Arch Gen Psychiatry.* 2009;66(2):181–188

Digital Media, Anxiety, and Depression in Children

Elizabeth Hoge, David Bickham and Joanne Cantor

Pediatrics 2017;140;S76

DOI: 10.1542/peds.2016-1758G

Updated Information & Services

including high resolution figures, can be found at:
http://pediatrics.aappublications.org/content/140/Supplement_2/S76

References

This article cites 28 articles, 0 of which you can access for free at:
http://pediatrics.aappublications.org/content/140/Supplement_2/S76.full#ref-list-1

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<https://shop.aap.org/licensing-permissions/>

Reprints

Information about ordering reprints can be found online:
<http://classic.pediatrics.aappublications.org/content/reprints>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since . Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN:

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Digital Media, Anxiety, and Depression in Children

Elizabeth Hoge, David Bickham and Joanne Cantor

Pediatrics 2017;140;S76

DOI: 10.1542/peds.2016-1758G

The online version of this article, along with updated information and services, is located on the World Wide Web at:

http://pediatrics.aappublications.org/content/140/Supplement_2/S76

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since . Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN:

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

