Original article

Digital Self-Harm Among Adolescents

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A B S T R A C T

Purpose: Despite increased media and scholarly attention to digital forms of aggression directed toward adolescents by their peers (e.g., cyberbullying), very little research has explored digital aggression directed toward oneself. "Digital self-harm" is the anonymous online posting, sending, or otherwise sharing of hurtful content about oneself. The current study examined the extent of digital self-harm among adolescents.
Methods: Survey data were obtained in 2016 from a nationally representative sample of 5,593 American middle and high school students (12–17 years old). Logistic regression analysis was used to identify correlates of participation in digital self-harm. Qualitative responses were also reviewed to better understand motivations for digital self-harm.
Results: About 6% of students have anonymously posted something online about themselves that was mean. Males were significantly more likely to report participation (7.1% compared to 5.3%). Several statistically significant correlates of involvement in digital self-harm were identified, including sexual orientation, experience with school bullying and cyberbullying, drug use, participation in various forms of adolescent deviance, and depressive symptoms.
Conclusions: Digital self-harm is a new problem that demands additional scholarly attention. A deeper inquiry as to the motivations behind this behavior, and how it correlates to offline self-harm and suicidal ideation, can help direct mental health professionals toward informed prevention approaches.

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IMPLICATIONS AND CONTRIBUTION

This study empirically explores digital self-harm behaviors among middle and high school aged youth with a large nationally representative sample. Several significant covariates were identified, including experience with bullying, depression, and adolescent problem behaviors.

Over the last decade, teens have embraced and exploited social media and the online world to engage in self-expression and self-construction, explore the boundaries of their identity,

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and come into their own [1–3]. During this transformative season of life, many youth are using communications technology in predominantly positive and productive ways to meet certain psychological, emotional, social, and relational needs [4]. Others, however, are meeting those needs in maladaptive ways that trouble the professionals and families who care for them. One newly identified online behavior of concern—digital self-harm occurs when an individual creates an online account and uses it to anonymously send hurtful messages or threats to oneself. These behaviors first entered the public spotlight in 2013 when it was learned that 14-year-old Hannah Smith, from Leicestershire, England, had anonymously sent hurtful messages to herself on the social media platform Ask.fm in the weeks leading up to her suicide [5].

Much attention in clinical, school, and community settings has been given to traditional forms of self-injury among teens (e.g., cutting and burning) [6], not only because of the damage that is physically done and the internal turmoil it betrays, but also because self-harm has been linked to suicide [7–11]. The online variant of self-harm—also known as self-cyberbullying, cyber self-harm, or self-trolling—has only recently been identified and has therefore not yet been adequately examined despite preliminary evidence that a nontrivial amount of youth have engaged in the behavior [12,13]. We use the term "digital self-harm," which we define as the "anonymous online posting, sending, or otherwise sharing of hurtful content about oneself." This conceptualization encompasses self-harm as it occurs through SMS, email, social media, gaming consoles, web forums, virtual environments, and any other online platform yet to be conceived.

In the text that follows, we briefly summarize the extant literature on adolescent self-harm with particular focus on prevalence rates and motivations. This serves as the backdrop for the current work, which utilizes a nationally representative sample of U.S. youth to determine the extent to which those aged 12–17 years are engaging in digital self-harm. Apart from parsing out how certain demographic variables differentiate participant behaviors, we examine the relationship to several salient covariates such as bullying and cyberbullying victimization, drug use, participation in traditional forms of deviance, and depressive symptoms. After discussing the findings, we provide suggestions for future work to help society better understand and address this emerging behavior.

The nature and extent of adolescent self-harm

Research among general samples of adolescents across the world suggests that approximately 13%–18% engage in self-injurious behaviors during their lifetime and that this behavior has been on the rise over the last two decades [14,15]. To be sure, prevalence rates have varied based on what behaviors are considered. Typical conceptualizations include cutting, scratching, biting, or hitting (oneself); abusing pills; eating disorders; and/or reckless or bone breaking behaviors [16].

An adolescent's decision to self-harm may not be as much a call for help as a demonstration of felt pain and distress. Indeed, an analysis of studies examining self-reported reasons for physical self-harm—including those featuring adolescent samples—found a widespread theme of affect regulation. Specifically, top reasons endorsed were the desire to stop bad feelings (such as emptiness, abandonment, guilt, or desperation), to release tension and stress, or because the respondent was unhappy or depressed [17]. Other explanations include self-hatred and self-punishment and to a lesser extent antidisassociation (the desire to feel something other than numbness), interpersonal-influence (to get others to act differently or to care more), sensation seeking (to feel excitement or stimulation), to prevent suicidal behavior or attempts, or to exert control and ownership over one's body [18].

Social media researcher boyd [13] first wrote about digital self-harm in a blog post in 2010 and speculated that it may reflect a cry for help, a desire to look cool, or an effort to trigger compliments as others defend against the harassment. A year later, Englander [12] explored the phenomena among a sample of 617 college students and found that 9% had done so in high school (13% of boys and 8% of girls). This study also found that while depression did not differentiate between those who engaged in digital self-harm, drug and alcohol use did [12]. Englander [12] found that both males and females engaged in digital self-harm mostly to gain the attention of peers. Interestingly, girls did it to prove they could handle it, encourage others to worry, or get attention from adults, while boys did it because they were mad at someone and wanted to start a fight [12].

It has also been suggested that digital self-harm might relate to empathy seeking, serve as a way to demonstrate a measure of toughness and strength, help clarify whether certain negative perceptions of them are universally shared by others, and make their pain more visible and, consequently, more real [19]. That is, pain may be not only something they feel, but something they perform in order to elicit a desired response from others [19]. The ubiquity of social media and the way in which youth present and represent themselves in order to obtain attention, validation, and feedback from an audience may enhance the likelihood they choose online spaces as the preferred venue through which they can affect and reach others.

The current study seeks to expand upon these early observations by systematically examining digital self-harm among adolescents. We inquire both about participation in digital self-harm and motivations for such behavior. In addition, we examine if certain correlates identified in offline self-harm research also apply to digital forms of self-harm. We discuss their relevance before detailing how research on digital self-harm might further develop to better inform our understanding and response.

Methods

Data

Data for the current work came from a survey administered to a nationally representative sample of English-speaking 12- to 17-year-old middle and high school students residing in the U.S. A survey was distributed digitally between August and October 2016 that examined perceptions of, and experiences with, bullying, cyberbullying, and related teen behaviors. Parental consent and child assent were obtained for all participants, and the survey took 23 minutes to complete on average. Three separate research firms were contracted with to distribute the instrument through four different sample sources via email. Although this data collection practice is not well entrenched in the history of survey research, such a cost-effective and comparatively efficient approach has been utilized in recent years by other researchers [20]. Furthermore, it seems especially appropriate for exploratory inquiries into relatively new phenomena among youthful populations.

With regard to the sampling design, nested age, sex, and region quotas were used to ensure a diverse sample of respondents that was representative of students across U.S. After the data were cleaned, the final sample size totaled to 5,593 adolescents. The final response rate for this survey was approximately 15%. Admittedly, this is lower than other methods of data collection and not ideal [21,22] but still satisfactory for a preliminary inquiry to an understudied problem. It is worth mentioning that findings from the current study on other measures (e.g., cyberbullying) were comparable to previous research we have conducted using different methodologies [23]. We are therefore more confident in the results obtained. Nevertheless, the relatively low response rate, and limitations to the methodology

overall (e.g., email recruitment to participate), should be kept in mind when interpreting the results [24,25]. The project methodology was approved by the Institutional Review Board of University of Wisconsin-Eau Claire (PATCHINJ51502016).

Measures

Digital Self-Harm. Two items were used to assess youth involvement in digital self-harm: (1) "In my lifetime, I have anonymously posted something online about myself that was mean" and (2) "In my lifetime, I have anonymously cyberbullied myself online." The response set for these questions was "never," "once," "a few times," and "many times," where "never" = 0 and "many times" = 4. Responses were dichotomized with no involvement coded as 0, while any involvement was coded as 1. Respondents were also asked to describe why they engaged in the behavior(s) via a single open-ended question.

Covariates. As an exploratory study, we first examined demographic variables such as age, sex, and race. *Age* was included as a continuous variable representing the respondent's age in years (range 12–17; mean = 14.5). Generally, previous research has found that self-harm is inversely related to age and occurs (along with suicidal ideation) disproportionately among youth and young adult populations [26]. *Sex* was a dichotomous item where 1 = male and 0 = female. The sample was evenly divided across sex (49.9% female and 49.7% male). Recent research indicates that traditional self-harm becomes more prevalent among boys during the later teen years, while girls participate more frequently than boys earlier in adolescence [27]. To note, Englander [12] found that boys were more likely to engage in digital self-harm. *Race* was a categorical variable where respondents indicated if they were white/Caucasian, black/African-American, Hispanic, Asian, American Indian/Native American, multiracial, or another race. These groups were collapsed into the following four categories: 1 = white, 2 = African-American, 3 = Hispanic, and 4 = other. Sixty-six percent of the sample identified as white, 12% African-American, 11.9% Hispanic, and 10% identified as multiracial or some other race. Research on race and ethnicity largely shows that self-harming occurs among people from all backgrounds, although there may be regional variations to consider [28].

Next, we explored a series of other variables that could be related to digital self-harm. *Sexual orientation* is a dichotomous variable where students who identified as heterosexual were coded as 0 and those who identified as lesbian, gay, bisexual, questioning, or other were coded as 1. Previous research has found that sexual minority youth are more likely to engage in traditional self-harm [29].

Victim of school bullying and *victim of cyberbullying* were collected as categorical variables with a response set of never (0), once (1), a few times (2), and many times (3). Both were dichotomized into single-item variables where students who reported that they had been bullied at school (or online) at some point in the 30 days preceding the survey (1 or higher) were coded as 1, while those who were not were coded as 0. School bullying victimization has been moderately to strongly linked with self-harming behaviors in both cross-sectional and longitudinal studies involving adolescents, and the limited research on cyberbullying victimization indicates a similar trend [30–32]. *Depressive symptoms* was a dichotomous single-item variable where students who responded yes to the following question

were coded as 1: "In the past year, did you feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some of your usual activities?" Those who responded no were coded as 0. Various indicators and manifestations of depression have been consistently associated with self-harm, particularly among youthful populations [33]. *Offline self-harm* was a dichotomous single-item variable where students who responded yes to the following question were coded as 1: "In the past year, have you ever hurt yourself on purpose in any way (for example, by taking an overdose of pills or by cutting yourself)." Those who responded no were coded as 0. No previous research has explored the link between traditional self-harm and digital self-harm, but we hypothesize that they are related [7–11].

Used drugs was a dichotomous variable where students who said they had used (1) marijuana or (2) other illegal drugs in the previous 30 days were coded as 1, while those who had not were coded as 0 (Cronbach's α = .54). Some research has found that alcohol and drug use are associated with self-harm among girls [34], while other studies have found it a correlate among both sexes [33]. *Deviance* was a dichotomous variable where students who said they had (1) stolen money or things worth $100 or less, (2) stolen money or things worth more than $100, or (3) attacked someone with the idea of seriously hurting them (all in the past 30 days) were coded as 1, while those who had not participated in any of these activities were coded as 0 (Cronbach's α = .73). Delinquency and aggression have been linked to self-harm among populations of Korean [35] and Finnish youth [36] based on parent evaluations of their child's behavioral problems.

Analysis

We first present the prevalence rates of digital self-harm, using both operationalizations of the behavior ("I have anonymously posted something online about myself that was mean" and "I have anonymously cyberbullied myself"). We utilized t-tests to determine if there were any statistically significant differences across sex, race, and age with respect to respondent involvement in digital self-harm. We then computed a series of binary logistic regression models, testing the unique influence of each of the covariates of interest while controlling for age, sex, and race. Quantitative statistical analyses were performed using SPSS 18, and p < .05 was considered statistically significant (two-tailed). Finally, responses to the open-ended questions were reviewed by both authors to identify recurring themes or general patterns of motivations for participation in digital self-harm. We did not develop categories ahead of time but instead relied on the data to construct themes during our review [37].

Results

As shown in Table 1, 6.2% of students in our sample reported that they had "anonymously posted something online about myself that was mean." Among those who had, about half (51.3%) said they did it just once, about one-third (35.5%) said they did it a few times, while 13.2% said they had done it many times. Similarly, 5.3% said they had "anonymously cyberbullied myself." Again focusing on those who had, 44.4% had done it once, 37.2% had done it a few times, and 18.4% had done it many times. When looking at demographic factors related to digital self-harm, boys were significantly more likely to report participating in the behavior (in line with the findings by Englander [12] involving

Table 1
Experience with digital self-harm

	Sample size (%)	I have anonymously posted something online about myself that was mean (%)	I have anonymously cyberbullied myself (%)
Total	5,593	6.2	5.3
Male	2,777 (49.7)	7.1[a]	6.3[a;**]
Female	2,792 (49.9)	5.3	4.2
White[b]	3,691 (66.0)	6.4	5.4
African-American	637 (12.0)	5.8	4.8
Hispanic	667 (11.9)	4.8	4.1
Other	561 (10.0)	7.3	6.0
12	850 (15.2)	6.1	4.4
13	1,011 (18.1)	6.9	5.9
14[b]	917 (16.4)	5.7	5.0
15	1,018 (18.2)	7.4	7.2
16	946 (16.9)	5.6	4.2
17	851 (15.2)	5.5	4.6

[a] $p < .01$, t-test.
[b] represents reference group.

college students), while neither race nor age was significantly related to digital self-harm.

Table 2 presents results of the binary logistic regression analyses. Even though the table lists all of the measures together, each covariate of interest was entered separately in the models, while controlling for age, race, and sex. Just over 7% of our sample identified as nonheterosexual and those who did were three times more likely to post something online that was mean about themselves than heterosexual students and 2.75 times more likely to say they cyberbullied themselves. Nearly 40% of students had been bullied at school, and 16.5% had been bullied online. Both groups were significantly more likely to have participated in digital self-harm than those who were not bullied. Specifically, victims of cyberbullying were nearly 12 times as likely to have cyberbullied themselves compared to those who were not victims. Similarly, those who reported using drugs or participating in deviance, had depressive symptoms, or had previously engaged in self-harm behaviors offline were all significantly more likely to have engaged in digital self-harm.

To better understand the nature and motivations for this behavior, we included an open-ended question where we simply asked respondents to tell us why they had engaged in digital self-harm. Among the 347 students who reported that they had posted something mean about themselves anonymously online, 160 provided comments about why they did it (see Table 3). Most comments centered around certain themes: self-hate (32), "That

time was a time full of hate for myself;" attention seeking (13), "So people could see that people bully me too and that I could be mean to other people because 'people' were mean to me;" depressive symptoms (15), "I did it mainly out of depression and a time that I was feeling suicidal; " and, to be funny (24), "I do not like hurting others, but it's easy to make fun of myself. I was bored and did it to maybe make others laugh as a joke." Others were simply doing to see if anyone would react (20), "A couple times to see how people I know would react so I would know if they were talking about me behind my back."

Discussion

Digital self-harm first gained public attention with the suicide of 14-year-old Hannah Smith in 2013. In November 2016, a 15-year-old girl from Texas took her own life after apparently posting anonymous comments toward herself saying she was "ugly" and "should kill herself." [38]. Despite these heartbreaking examples, very little academic attention has been directed toward this problem. The current work is the first comprehensive empirical investigation of this behavior among middle and high school students. According to our data, about one in twenty 12- to 17-year-olds have participated in the behavior. In addition, students who reported being depressed or participating in off-line self-harm were significantly more likely to be involved in digital self-harm. Research has shown that self-harm and depression are linked to increased risk for suicide and so, like physical self-harm and depression, it is possible that digital self-harm behaviors might precede suicide attempts [7–9]. More research is necessary to better understand the temporal ordering of these behaviors and experiences. For example, does depression lead to self-harm (online or offline) which then leads to suicidal thoughts or attempts? Alternatively, do suicidal thoughts manifest themselves as various forms of self-harm that can surface offline and/or online?

The findings also illustrate a connection between digital self-harm and experience with bullying. Those who were bullied (either at school or online) were significantly more likely to report that they had engaged in digital self-harm. This was evidenced in the open-ended responses as well. A 16-year-old white female wrote: "After this happened at school, and online, I became very depressed. I didn't like myself very much. I felt like I deserved to be treated that way, so I thought I would get in on the 'fun'." Research has shown that some who have self-harmed have experienced interpersonal conflict or relationship break-down [6,16]. As such, it is logical that relational conflict, drama,

Table 2
Logistic regression examining predictors of digital self-harm

	%	I have anonymously posted something online about myself that was mean			I have anonymously cyberbullied myself		
		B (S.E.)	Exp(B)	95% CI	B (S.E.)	Exp(B)	95% CI
Nonheterosexual	7.2	1.09 (.16)	3.00[***]	2.19–4.04	1.01 (.21)	2.75[***]	1.82–4.15
Victim of school bullying	38.6	1.34 (.13)	3.82[***]	2.99–4.89	1.71 (.16)	5.53[***]	4.01–7.64
Victim of cyberbullying	16.5	2.02 (.12)	7.51[***]	5.99–9.41	2.48 (.15)	11.88[***]	8.87–15.92
Deviance	6.3	2.21 (.19)	9.14[***]	6.35–13.16	2.57 (.20)	13.07[***]	8.85–19.31
Used drugs	9.0	1.60 (.19)	4.95[***]	3.43–7.16	1.84 (.21)	6.28[***]	4.20–9.39
Depressive symptoms	15.4	1.58 (.16)	4.86[***]	3.57–6.62	1.64 (.18)	5.17[***]	3.63–7.36
Offline self-harm	7.2	.87 (.08)	2.38[***]	2.03–2.79	.98 (.09)	2.67[***]	2.26–3.16

[***]$p < .001$.
All analyses include individual indicator while controlling for age, sex, and race.
CI = confidence interval; SE = standard error of the mean.

Table 3
Motivations for digital self-harm

Motivation	Number	Example
Self-hate	32	"Self-hate is a strong thing." "Because I already felt bad and just wanted myself to feel worse."
To be funny	24	"I don't like hurting others, but it's easy to make fun of myself. I was bored and did it to maybe make others laugh as a joke."
Looking for reaction	20	"I did it to see what others were saying and to see how others saw me." "I wanted to see if someone was really my friend."
Depressive symptoms	15	"Because I was very sad and upset and nobody would listen or talk to me so I posted how I really felt about myself online."
Attention seeking	13	"Because I feel sad and needed attention from others."
Other	61	"At the time, I had very low self-esteem and didn't rely on myself for happiness, I expected others to make me happy. This resulted in my own belief that everyone hated me, which was of course completely false."

and strife—manifested in school based or online bullying—might trigger self-harming behaviors because of the dysphoria it produces.

It was also evident from the qualitative data that many who had participated in digital self-harm were looking for a response. Of the 160 responses to the question of why the youth engaged in digital self-harm, nearly half (73) included some reference to others. For example, a 14-year-old white male from Wisconsin said that he "wanted other people's pity" and "wanted to be validated that someone did actually care about me." Some thought it would be a way to get help, like a 14-year-old male from Virginia: "Everyone is going to have moments in their lives hating themselves, sometimes it helps posting about it online. People try to help you out and make you feel better. The internet might be a terrible place, but there [are] tons of people around the world who [are] willing to help you." As such, these incidents are often outwardly visible and therefore subject to our observation and intervention. Parents, youth-serving professionals, and teens themselves should be trained to identify—and empowered to intervene—in all instances of online abuse, irrespective of who is responsible. A first step would be to acknowledge the hurtful content and offer support to the target. Later, an investigation can be performed to determine whether the cyberbullying was self-inflicted (and, if so, the motivations for such behavior).

Even though the current study was able to shed some additional light on the understudied problem of digital self-harm, it is not without limitations. We sought to obtain a nationally representative sample of middle and high school students across the U.S. but can never be certain of the generalizability of the sample of youth who ultimately completed surveys. Even though the demographic characteristics of the sample closely match to those of the U.S. as a whole, there could be uncontrolled for differences between those who ultimately agreed to complete our survey and those who did not. Moreover, the low response rate (about 15%) suggests that the findings should be interpreted with caution. Another limitation is that the data were collected at

one point in time. As a result, we are unable to ensure proper temporal ordering of key variables and therefore do not know whether experience with bullying at school caused students to engage in digital self-harm or if these behaviors occurred concurrently. In fact, it is possible that many of the experiences examined in this study co-occur—that is, that digital self-harm is another manifestation of depression [39]. Finally, some have argued that data stemming from individuals' recollection about the past are inherently unreliable because of the tendency for them to misrepresent or distort facts from a previous time period [40].

Considerations for future research

One notable concern that bears mention has to do with the perceived prevalence and acceptability of digital self-harm among youth. Research on traditional self-harm has identified a clustering and contagion effect among young people and that knowledge of self-harming among one's immediate peer group is a noteworthy risk factor for similar engagement [41,42]. Moreover, messages on social media sites like Facebook, YouTube, Tumblr, Instagram, and Twitter which condone or even encourage this behavior might contribute to—or exacerbate—the problem [43,44], even though the Terms of Service of most sites specifically ban representations of self-harm. If a critical mass of adolescents comes to believe that self-cyberbullying is a normative and justifiable behavior, or if disclosure or help seeking is discouraged in certain online channels of communication, it stands to reason that others may be more inclined to participate.

It is also unclear whether those who self-harmed online did so because they were genuinely but maladaptively coping with serious pain or stressors in their lives or if they intentionally lied to provide themselves some sort of misguided pleasure in deceiving others. Over the last 20 years, the latter explanation has been explored by journalists [45,46] and researchers [47,48] who have examined how some individuals have "virtual factitious disorder" and gravitate online to fake pain and suffering in various Internet-based support groups (now termed Munchausen by Internet or "MBI"). Future inquiries should flesh out differences in participants' motivations and rationalizations in order to determine whether medicine, cognitive behavior therapy, or other psychiatric approaches are best suited to help these self-harmers. It has also been suggested that MBI be formally acknowledged as a disorder in a revised version of the Diagnostic and Statistical Manual (DSM-5) to help identify and minimize its growth [47]. Perhaps, subsequent research will strengthen the case for such a call.

Given that "human beings are highly responsive to cultural and social norms, and this aspect of the prevention of suicide and self-harm has been neglected" [6], educators, coaches, mentors, celebrities, athletes, and other adults who have a platform and voice into the lives of youth should continue to speak out against any form of self-injurious behavior. This has been done with the help of new technology and social media by various organizations (such as *To Write Love On Her Arms* [twloha.org], which caters to millennials and the *It Gets Better* project [itgetsbetter.com], which focuses on LGBT youth). We believe these efforts should be redoubled by other far-reaching entities, especially given the powerful and unparalleled influence that digital content and communications have on this population.

To be sure, much more work needs to be done to understand digital self-harm. As boyd aptly points out, irrespective of who the perpetrator is, targets of cyberbullying need help. "Teens who are the victims of bullying—whether by a stranger, a peer, or themselves—are often in need of support, love, validation, and, most of all, healthy attention" [13]. Researchers should continue to shed light on the epidemiological precursors and enduring associated outcomes of digital self-harm. Their efforts can then inform the work of youth professionals, who must consider the gravity of this phenomenon and collectively work to develop therapies and programming to provide struggling teens with the help they need well before they decide to hurt themselves.

Funding Sources

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