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Adolescent Digital Stress: Frequencies, Correlates, and Longitudinal Association with Depressive Symptoms

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Abstract

Purpose.—Adolescents are among the most frequent users of social media and are highly attuned to social feedback. However, digital stress, or subjective distress related to social media demands, expectations, and others' approval and judgment, is understudied in adolescents.

Methods.—We conducted a preliminary investigation of self-reported digital stress and its hypothesized correlates (social media, peer status, and mental health variables) among 680 students ($M_{\text{age}} = 14.27$, $SD = .62$; 49.2% female).

Results.—Nearly half of participants reported experiencing digital stress at least “sometimes,” regardless of race or ethnicity; sex differences were small. Digital stress was associated with greater social media use and importance, peer importance, popularity, and all mental health variables. Digital stress was also associated longitudinally with increases in depressive symptoms.

Conclusions.—These preliminary findings suggest the importance of further investigation of digital stress and its effects on adolescent health.

Keywords

digital stress; social media; adolescents; depression; peer relations

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Conflicts of Interest

We have no conflicts of interest.

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As adolescents are among the most frequent users of the internet [1], much research has focused solely on the effects of internet use frequency (“screen time”) on adolescents’ mental health [2]. However, remarkably little has focused on adolescents’ reactions to social media environments themselves, the social information they provide, and the social expectations associated with them.

Research on *digital stress*, a nascent construct capturing aspects of stressful responses to social media, attempts to fill this gap. Emerging definitions for digital stress and its components vary (e.g., [3, 4]) but may include feeling overwhelmed by excessive notifications, others’ expectations, responses, or judgments, and relational pressures. Here, we specifically investigate subjective pressure to meet social media demands regarding availability to and approval of peers (e.g., presenting the best version of oneself and responding quickly to peers). Given adolescents’ developmental drives for affiliation, sensitivity to social feedback and comparison, and attunement to peer approval and norms [5], as well as social media affordances to affiliate, interact, and collect social feedback, investigation of digital stress in adolescents is especially relevant. Moreover, while research suggests that associations between social media use frequency and mental health are weak [6], as a highly relevant interpersonal stressor, digital stress specifically may confer risk for depression just as in-person social stress does [7].

Though limited, prior research with adults and adolescents on aspects of digital stress does suggest it is associated concurrently with worse mental health (see [3] for a review) as well as greater tech use. In this preliminary prospective study, we examine digital stress’s frequency, demographic differences, and correlates including technology use/attitudes, peer status, and psychosocial adjustment. We will also explore its incremental utility in the longitudinal prediction of depression. We hypothesize girls will report greater digital stress, given their greater concern about others’ judgments [8, 9] and that greater digital stress will be related to higher levels of its correlates and later depression.

Methods

Full methodology details are provided in online Supplementary Materials.

Participants

At Time 1, 680 public school students in a rural, lower-middle class community completed study measures ($M_{\text{age}} = 14.27$, $SD = .62$; 49.2% female; 38.1% White, 23.2% Black; 29.2% Hispanic/Latino). All procedures were approved by the University Institutional Review Board; both parental consent and adolescent assent were obtained. One year later (Time 2), 583 (85.7%) participants completed a measure of depressive symptoms. Attrition analyses revealed no differences, except that those retained perceived social media as less important in their lives.

Measures

Participants completed all measures at Time 1; the measure of depressive symptoms was repeated at Time 2. Internal consistency is reported when applicable in Table 1.

Digital stress.—Four items adapted from previous national surveys ([1, 10, 11]) assessed subjective experiences of distress and pressure due to social media on a 5-point Likert scale (1=*Never*; 5=*Always*); items were averaged (e.g., “Feel pressure to show the best version of myself” and “Feel pressure to quickly respond or ‘like’ your closest friends’ posts).

Correlates.—We measured and calculated sociometric popularity and likeability using standard peer nomination procedures and scoring (i.e., standardized difference scores; [12]) and used 90% winsorization to address outliers. We assessed frequency and importance of social media use with single items. We measured the following variables by averaging items on established scales: peer importance (desire to attain acceptance and popularity), social anxiety, rejection sensitivity, loneliness, and depressive symptoms.

Results

Descriptive Statistics

Descriptive statistics appear in Table 1. On average, participants reported experiencing digital stress relatively infrequently ($M = 1.91$, $SD = .97$). Some participants (36.5%) reported “never” experiencing digital stress. However, 45.2% reported experiencing digital stress at least “sometimes.”

Demographic Differences

Participants of different racial ($F(676) = .90$, $p = .48^1$) or ethnic ($t(678) = .46$, $p = .65^2$) groups did not report different levels of digital stress. Girls reported more frequent digital stress than boys ($t(678) = -1.98$, $p = .048^2$). Though statistically significant, this mean difference was small ($M_{\text{girls}} = 1.99$, $SD = .97$, $M_{\text{boys}} = 1.84$, $SD = .96$; Cohen’s $d = .15$).

Cross-Sectional Correlates

Participants who reported higher levels of digital stress also reported higher levels of social media use, importance ascribed to social media use, peer-reported popularity, peer importance, social anxiety, rejection sensitivity, depressive symptoms, and loneliness (Table 1). Digital stress was not significantly associated with peer-reported likeability. Correlations were not meaningfully different when controlling for participants’ frequency of social media use, with the exception of the association between digital stress and peer-nominated popularity ($r = .05$, $p = .27$).

Incremental Predictive Utility

Multiple regression with full information maximum likelihood estimation (FIML) demonstrated that higher levels of digital stress at Time 1 were associated with higher levels of depressive symptoms at Time 2, controlling Time 1 depressive symptoms (Table 2, Model 1). This effect remained significant when controlling for adolescents’ frequency of social media use (Model 2). Potential moderators (sex, peer importance, social anxiety, importance of social media) were nonsignificant, except for peer importance (Model 3). Probing this

¹One-way ANOVA

²Independent samples *t* test

interaction, however, suggested the region of significance for peer importance (below 1.667 and above 7.36) largely did not overlap with reported values of peer importance (range = 1–5, $M = 2.09$; $SD = .94$). Thus, effect of digital pressure on later depressive symptoms only becomes noticeably stronger at the lowest levels of peer importance.

Discussion

This preliminary investigation of the nascent construct of digital stress revealed that many adolescents, largely regardless of race, ethnicity, or sex, feel distress and pressure when using social media. Moreover, as hypothesized, digital stress is associated concurrently with greater proclivities towards social interaction and status, reflected by higher levels of social media use and importance, greater peer importance, and greater popularity. Higher levels of digital stress were associated concurrently with greater mental health and psychosocial difficulties. This is consistent with previous work describing positive correlations between aspects of digital stress and worries about inclusion and belonging on Facebook among adolescents [13] and in social groups among adults [14], and anxiety and depression among adolescents [15] and adults [16].

Digital stress was also associated longitudinally with higher levels of depressive symptoms; this effect remained when controlling for adolescents' social media use frequency. Although small in size, this effect was statistically significant over a one-year longitudinal lag. Digital stress represents a new and relevant facet of interpersonal stress (a known depression predictor; [7]) for many youth as they enter the online world that may have downstream effects on mental health. Limitations of the current study suggest directions for future research, which should use more objective measures of social media use, avoid common method variance, include experimental studies, and investigate different time lags.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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References

- [1]. Anderson M, Jiang J. Teens, social media & technology. Pew Research Center. 2018:1–19. <https://www.pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/>
- [2]. Odgers CL, Jensen MR. Annual research review: Adolescent mental health in the digital age: Facts, fears, and future directions. *J Child Psychol Psychiatry*. 2020;61(3):336–348. Doi:10.1111/jcpp.13190 [PubMed: 31951670]
- [3]. Steele RG, Hall JA, Christofferson JL. Conceptualizing digital stress in adolescents and young adults: Towards the development of an empirically based model. *Clin Child Fam Psychol Rev*. 2020;23(1):15–26. Doi:10.1007/s10567-019-00300-5 [PubMed: 31392451]

- [4]. Weinstein EC, Selman RL. Digital stress: Adolescents' personal accounts. *New Media Soc.* 2016;18(3):391–409. Doi:10.1177/1461444814543989
- [5]. Somerville LH. The teenage brain. *Curr Dir Psychol Sci.* 2013;22(2):121–127. Doi:10.1177/0963721413476512 [PubMed: 24761055]
- [6]. Orben A Teenagers, screens and social media: A narrative review of reviews and key studies. *Soc Psychiatry Psychiatr Epidemiol.* 2020;55:407–414. Doi:10.1007/s00127-019-01825-4 [PubMed: 31925481]
- [7]. Hammen C Stress and depression. *Annu Rev Clin Psychol.* 2005;1(1):293–319. Doi:10.1146/annurev.clinpsy.1.102803.143938 [PubMed: 17716090]
- [8]. Rudolph KD, Conley CS. The socioemotional costs and benefits of social- evaluative concerns: Do girls care too much? *J Pers.* 2005;73:115–138. Doi:10.1111/j.1467-6494.2004.00306.x [PubMed: 15660675]
- [9]. Rose AJ, Rudolph KD. A review of sex differences in peer relationship processes: Potential trade-offs for the emotional and behavioral development of girls and boys. *Psychol Bull.* 2006;132:98–131. Doi:10.1037/0033-2909.132.1.98 [PubMed: 16435959]
- [10]. Rideout V, Robb MB. *Social media, social life: Teens reveal their experiences.* Common Sense Media; 2018.
- [11]. Rideout V, Fox S. *Digital health practices, social media use, and mental wellbeing among teens and young adults in the U.S.* Hopelab; 2018.
- [12]. Prinstein MJ, Cillessen AHN. Forms and functions of adolescent peer aggression associated with high levels of peer status. *Merril Palmer Q.* 2003;49(3):310–342. Doi: <https://www.jstor.org/stable/23096058>
- [13]. Beyens I, Frison E., Eggermont S “I don't want to miss a thing”: Adolescents' fear of missing out and its relationship to adolescents' social needs, Facebook use, and Facebook related stress. *Comput. Hum. Behav.* 2016;64:1–8. Doi:10.1016/j.chb.2016.05.083
- [14]. Mai LM, Freudenthaler R, Schneider FM, Vorderer P. “I know you've seen it!” Individual and social factors for users' chatting behavior on Facebook. *Comput Hum Behav.* 2015;49:296–302. Doi:10.1015/j.chb.2015.01.074.
- [15]. Hall JA, Steele RG, Christofferson JL, Mahailova T. Development and initial evaluation of a multidimensional digital stress scale. *Psychol. Assess.* 2021;33(3):230–242. Doi:10.1037/pas0000979 [PubMed: 33507798]
- [16]. Reinecke L, Aufenanger S, Beutel ME, Drier M, Quiring O, Stark B, et al. Digital stress over the life span: The effects of communication load and internet multitasking on perceived stress and psychological health impairments in a German probability sample. *Media Psychol.* 2017;20:90–115. Doi:10.1080/15213269.2015.1121832.

Implications and Contribution

Some individuals experience “digital stress” due to social media demands (e.g., pressure to be available to peers; worrying about peer approval). This preliminary study showed many adolescents experience this type of stress, largely regardless of sex, race, or ethnicity; digital stress was also associated with later increases in depressive symptoms.

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Table 1
Means, Standard Deviations, and Bivariate Correlations among Study Variables

| Variable | α | M(SD)/n(%) | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. |
|----------------------------|----------|-----------------|--------|-------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|------|
| 1. Female | | 335 (49.2) | 1.00 | | | | | | | | | | | | |
| 2. Age | | 14.27 (0.62) | -.09* | 1.00 | | | | | | | | | | | |
| 3. Digital Stress | .86 | 1.91 (0.97) | .09* | .04 | 1.00 | | | | | | | | | | |
| 4. SM Use Frequency | | 7.07 (2.37) | .09* | .10** | .18*** | 1.00 | | | | | | | | | |
| 5. SM Importance | | 2.76 (1.06) | .12** | .04 | .27*** | .49*** | 1.00 | | | | | | | | |
| 6. Sociometric Likeability | | 0.05 (.87) | .05 | .06 | .04 | .17*** | .02 | 1.00 | | | | | | | |
| 7. Sociometric Popularity | | 0.04 (.81) | .03 | .07 | .13** | .34*** | .15*** | .33*** | 1.00 | | | | | | |
| 8. Peer Importance | .86 | 2.09 (0.94) | -.10* | .01 | .37*** | .14*** | .27*** | .01 | .06 | 1.00 | | | | | |
| 9. Depressive Symptoms | .93 | 0.38 (0.49) | .21*** | -.00 | .22*** | -.01 | .06 | -.00 | -.05 | .07 | 1.00 | | | | |
| 10. Social Anxiety | .96 | 2.05 (1.03) | .19*** | .01 | .46*** | -.01 | .09* | -.03 | -.12** | .39*** | .37*** | 1.00 | | | |
| 11. Rejection Sensitivity | .70 | 9.26 (4.67) | .21*** | .00 | .18*** | -.10 | .05 | -.07 | -.16*** | .18*** | .25*** | .55*** | 1.00 | | |
| 12. Loneliness | .93 | 2.09 (1.08) | .22*** | .05 | .22*** | -.01 | .06 | .00 | -.11** | .14** | .75*** | .44*** | .33*** | 1.00 | |
| 13. T2 Depressive Symptoms | .92 | 0.36 (0.47) | .20*** | -.01 | .17*** | .00 | .06 | -.00 | -.10* | .06 | .41*** | .26*** | .22*** | .40*** | 1.00 |

Note.

* p .05

** p .01

*** p .001

.001. α = coefficient alpha (internal consistency). SM=social media. All variables measured at Time 1 except where noted with "T2." Zero-order Pearson correlations are reported for all continuous variables. Zero-order Spearman correlations are reported for sex. Sex coded 1=male, 2=female.

Table 2

Models of Regression of Time 2 Depressive Symptoms onto Time 1 Digital Stress

| Model | Predictor | β | SE | Std. β | <i>p</i> |
|-------|---|---------|-----|--------------|-----------|
| 1 | Depressive Symptoms | .39 | .04 | .40 | < .001*** |
| | Digital Stress | .04 | .02 | .08 | .04* |
| 2 | Depressive Symptoms | .39 | .04 | .40 | < .001*** |
| | Digital Stress | .04 | .02 | .08 | .04* |
| | SM Use Frequency | -.001 | .01 | -.01 | .86 |
| 3 | Depressive Symptoms | .39 | .04 | .40 | < .001*** |
| | Digital Stress | .13 | .05 | .26 | .01** |
| | Peer Importance | .07 | .04 | .14 | .10 |
| | Digital Stress \times Peer Importance | -.04 | .02 | -.28 | .04* |

Note.

p .001**
p .01*
p .05. Std. = standardized. In all models, predictors are all measured at Time 1.