



Adolescent health brief

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

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Article history: Received June 1, 2021; Accepted August 25, 2021

Keywords: Digital stress; Social media; Adolescents; Depression; Peer relations



A B S T R A C T

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.

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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.

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 [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,

Conflicts of interest: We have no conflicts of interest.

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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 that 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 that 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 ($M_{\text{age}} = 14.27$, standard deviation [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 those that 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 ($F(676) = .90$, $p = .48$ [One-way analysis of variance]) or ethnic ($t(678) = .46$, $p = .65$ [Independent samples t -test]) groups did not report different levels of digital stress. Girls reported more frequent digital stress than boys ($t(678) = -1.98$, $p = .048$ [Independent samples t -test]). Though statistically significant, this mean difference was small ($M_{\text{girls}} = 1.99$, $SD = .97$; $M_{\text{boys}} = 1.84$, $SD = .96$; Cohen's $d = .15$).

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 (.62)	-.09*	1.00											
3. Digital stress	.86	1.91 (.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		.05 (.87)	.05	.06	.04	.17***	.02	1.00							
7. Sociometric popularity		.04 (.81)	.03	.07	.13**	.34***	.15***	.33***	1.00						
8. Peer importance	.86	2.09 (.94)	-.10*	.01	.37***	.14***	.27***	.01	.06	1.00					
9. Depressive symptoms	.93	.38 (.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	.36 (.47)	.20***	-.01	.17***	.00	.06	-.00	-.10*	.06	.41***	.26***	.22***	.40***	1.00

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.

α = coefficient alpha (internal consistency); SD = standard deviation; SM = social media.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 2
Models of regression of Time 2 depressive symptoms onto Time 1 digital stress

Model	Predictor	β	SE	Standardized β	<i>p</i> value
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*
3	SM use frequency	-.001	.01	-.01	.86
	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*

In all models, predictors are all measured at Time 1.

SM = social media.

*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$.

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 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 interaction, however, suggested that 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 toward 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 1-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.

Funding Sources

This work was supported in part by the Winston Family Initiative for the Study of Technology and Adolescent Development, co-directed by E.H.T and M.J.P. J.N. was supported by the National Institute of Mental Health (NIMH; K23MH122669) and American Foundation for Suicide Prevention (AFSP; PDF-010517). Any opinions, findings, and conclusions or recommendations expressed in this material are solely the responsibility of the authors and do not necessarily represent the views of these funding sources.

Supplementary Data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.jadohealth.2021.08.025>.

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