




Article

Teenagers' Smartphone Use during Homework: An Analysis of Beliefs and Behaviors around Digital Multitasking

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Abstract: Although research suggests that phone usage during academic activities is problematic for learning and performance, little is known about high school students' digital multitasking during homework. This exploratory descriptive study surveyed 135 students from four public U.S. high schools to investigate teenagers' attitudes towards digital distraction, smartphone use during homework, cell phone dependence, and motivations for digital multitasking. Our findings suggested that teens were distracted during homework about 38% of the time, and both mind-wandering and the use of digital devices contributed to this distraction. Of the students surveyed, 64% believed that they should focus more during homework than they currently did, and most were willing to try strategies such as silencing their phone or putting it out of sight. However, many were not currently using such strategies, and our data suggested that students may be spending approximately 204 h per year trying to complete homework but unintentionally distracted from it. We explored their current motivations and beliefs as a necessary first step for the creation of future interventions to help teens reduce their digital multitasking during homework.

Keywords: smartphone use; digital multitasking; high school; attention; focus



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1. Introduction

Smartphones are nearly ubiquitous among today's adolescents; 91% of adolescents report having access to a smartphone, while 84% have their own device [1]. The average U.S. teen consumes 9 h and 33 min of digital media per day—half of which is consumed on a smartphone [1]. Although the long-term implications of these trends remain uncertain, one concrete consequence has been the rise of *digital multitasking* among teens—a behavior characterized by using a digital device while simultaneously engaging in a separate activity [1,2]. In this paper, we focus primarily on the specific form of digital multitasking that occurs when students are doing homework while concurrently using a smartphone for off-task purposes.

Digital multitasking has been shown to interfere with several measures of academic performance [3]. For example, more frequent digital multitasking in class is associated with lower test scores, lower grades, and a lower overall GPA [4–6]. Moreover, experimental studies have demonstrated that digital multitasking during reading assignments hurts critical learning outcomes such as comprehension, recognition, and recall [7,8]. Remarkably, active engagement with one's device is not necessary for productivity to drop—the mere presence of a smartphone can be enough to hinder cognitive performance [9].

Several frameworks have sought to explain the detrimental effect of digital multitasking on academic performance. For instance, the *time-displacement hypothesis* suggests that time spent on digital devices *displaces* time put towards academic activities [3]. Alternatively, the *limited capacity model of mediated message processing* posits that engaging with multiple streams of information reduces the mental resources available for processing each stream, thereby impairing learning [10]. For example, if a student splits their focus between a social media feed and lecture, they have fewer mental resources to dedicate to the academic content, and learning is impaired. Finally, the *scattered-attention hypothesis* claims that poor performance is rooted in developed deficits of cognitive control that result from habitual digital multitasking [3]. According to this perspective, frequently dividing attention across tasks gradually degrades one's ability to focus on a single task over time, which in turn impedes school performance.

Despite their mechanistic differences, all three of these theories converge on the conclusion that digital multitasking poses a threat to learning. This threat may be especially detrimental for learning that takes place outside of the classroom (i.e., during homework), which has comparatively less supervision than during classwork. In fact, according to a report by Common Sense Media, 50% of teens say they "often" or "sometimes" use social media while doing homework, while nearly two-thirds say they "often" or "sometimes" text while doing homework [1]. Alarming, over half of these students believe that dividing their attention in this way makes no difference to the quality of their work [1].

One potential solution is to set restrictive policies that prohibit smartphone use during academic activities. When implemented effectively, restrictive device and internet policies are associated with better academic performance [11]. However, restrictive policies can also elicit reactance and concealment of digital media use [12–14]. Additionally, not all guardians are willing, able, or interested in setting such restrictions. All in all, restrictive policies may be an important part of the solution, but they are far from a silver bullet.

Another possible solution involves preparing students to adequately regulate their use of digital devices. Although there are a growing number of *digital citizenship* courses that aspire to teach students how to use technology safely, these tools generally do not address the issue of digital multitasking. It is worth noting that simply providing evidence of the downsides of digital multitasking is insufficient for changing student behavior; two published reports presented students with precisely this information and were unsuccessful in reducing levels of digital multitasking [15,16]. Evidence-based interventions that help students develop the mindsets and strategies to successfully mitigate their own digital multitasking are still needed.

The effective development of such interventions requires a clear understanding of digital multitasking in the home environment. Specifically, more research is needed to reveal the underlying motivations behind digital multitasking and to highlight which tactics for reducing it are most likely to appeal to adolescents. Accordingly, the goals of the present research were to characterize: (i) the *magnitude* of teen phone use during homework, (ii) the *motivations* behind this form of digital multitasking, (iii) teen *beliefs* about phone use during homework, (iv) distractibility of teens across internal and external distractions, and (v) teen *receptivity to strategies* for reducing digital multitasking.

2. Materials and Methods

2.1. Research Design

This study was an exploratory analysis of high school students' perceptions of digital multitasking and distractibility during homework. Students completed an anonymous 15 min online survey during class. The sample comprised students at four public high schools in the United States (three located in California and one located in Hawaii). The exploratory nature of the present study precluded the formulation of any specific hypotheses. The research was approved by the Human Subjects Committee at the host university (protocol #5-21-0350), and informed consent was obtained from all students and their guardians.

2.2. Participants

Across the four high schools, 159 students completed the survey. Of these, 24 students failed an attention check that was included to ensure that students were carefully reading survey items. These students were excluded from analyses, bringing the final sample to 135 students. The final sample consisted of 110 freshmen, 23 juniors, and 2 seniors. In terms of gender, 65 students identified as male, 67 identified as female, 2 identified as nonbinary, and 1 preferred not to say. Approximately 53% of the sample (72 students) identified as Hispanic. The number of students identifying with a specific race was as follows: no response—57; Caucasian—32; mix of two or more races—32; Asian—7; Native Hawaiian or Other Pacific Islander—3; African American/Black—3; American Indian/Alaskan Native—1.

2.3. Measures

Validated measures were used whenever possible. However, validated instruments did not exist to address several of the specific research questions of interest. In these cases, measures were developed using vocabulary appropriate for adolescents and were written to maximize face validity. To mitigate any order effects bias, randomization was employed within as well as across appropriate survey measures.

2.3.1. The Magnitude of Teen Digital Multitasking

Restrictions on phone use. Student beliefs and habits regarding phone use may be influenced by parental restrictions. To assess such influences, students were asked: “Does your family have any rules that restrict phone use during homework?” (yes; no). We then asked, “Do you follow your family’s rules that restrict phone use during homework?”, with students responding on a scale from 1 (never) to 5 (always).

Academic Distraction. Two items were used from a previous study regarding students’ tendencies to mind-wander and multitask with digital devices during homework [17]. The mind-wandering item asked, “While I’m doing homework, I mind-wander or daydream about things unrelated to my homework”. The multitasking item asked, “While I’m doing homework, I use my phone for things unrelated to my homework”. Students responded to both items on a scale from 1 (rarely) to 4 (very often).

Actual and Ideal Focus during Homework. This measure consisted of two items: (1) “When you are doing homework, how often do you keep your undivided attention focused on your homework?” and (2) “Okay, this next question is NOT about what other people think you should do. It’s about what you believe is best for yourself—When you are doing homework, how often would you ideally keep your undivided attention focused on your homework?”. These items were intended to capture *actual* and *ideal* levels of focus, respectively. Responses could range from 0% to 100% of the time [17,18].

Intention to minimize phone use. A one-item measure was included to assess whether students intentionally try to minimize their phone use during homework. Specifically, students rated the statement, “When I’m doing homework, I actively try to *not* use my phone” on a scale from 1 (strongly disagree) to 6 (strongly agree).

2.3.2. Motivations behind Digital Multitasking

Motivations for phone use. We presented five possible reasons one might use their phone while doing homework and asked students to rate how frequently each reason was the motivator for their phone use. For example, students were shown, “I use my phone while I’m doing homework because I get bored”, then indicated their response on a scale from 1 (never a reason) to 5 (very often a reason). The four other reasons given were: “to look up information for my homework”; “to stay connected to others”; “it’s a habit I do without thinking”; and “it makes homework more enjoyable”.

Smartphone Dependence. The Mobile Phone Involvement Questionnaire (MPIQ) is an 8-item measure for assessing respondents’ dependence on their phones [19]. Items such as “I often think about my phone when I am not using it” were rated on a scale from 1 (strongly disagree) to 6 (strongly agree).

2.3.3. Beliefs about Digital Multitasking

Growth mindset about focus. Beliefs about one's ability to focus were measured using the Mindsets About Focus Scale [17,18]. From this scale, we included only the *growth mindset subscale*, which consists of three items that evaluate whether students believe their ability to focus can improve through training. Items such as "My ability to focus is a skill that can get much better with practice" were rated on a scale from 1 (strongly disagree) to 6 (strongly agree).

Belief about focusing on two things at once. Although some cognitive research suggests it may be impossible to focus on two things simultaneously [20], many people still believe this can be done. Students rated the statement "It's possible to focus your attention on two things at the same time" on a scale from 1 (strongly disagree) to 6 (strongly agree).

Belief about teens' concentration. To assess students' general belief about the effect of smartphones on teen concentration levels, students were asked, "How do you think phones affect teens' ability to concentrate?" with three answer choices: Phones are improving teens' ability to concentrate, Phones are not changing teens' ability to concentrate, and Phones are hurting teens' ability to concentrate.

Beliefs about personal phone use and completing homework efficiently. Two items were used to assess students' beliefs about how phone use affects their own ability to complete their homework. Previous research suggests that multitasking with a smartphone impairs concentration and makes tasks take longer. However, many students may not believe this is true. Students rated the statements, "If I use my phone while I do homework, it makes it harder to concentrate on my work" and "If I use my phone while I do homework, it makes my work take longer to finish" on a scale from 1 (strongly disagree) to 6 (strongly agree).

2.3.4. Distractibility across External and Internal Distractions

Mind-wandering. The Mind-Wandering Questionnaire (MWQ) consists of 5 items that assess trait levels of mind-wandering on a scale of 1 (almost never) to 6 (almost always), for example, "I find myself listening with one ear, thinking about something else at the same time". The MWQ has been validated with both adults and adolescents [21].

Preference for Task Switching. Three items from the Media and Tech Usage and Attitudes Scale were combined into one composite variable and used to assess students' preferences for switching tasks midway through a project or at the end of a project [22]. Students responded to questions such as "When doing a number of assignments, I like to switch back and forth between them rather than do one at a time" on a scale from 1 (strongly disagree) to 6 (strongly agree).

2.3.5. Receptivity to Strategies for Reducing Digital Multitasking

Students were shown four strategies for shielding one's attention from smartphone-based distractions that might occur during homework and were then asked whether they would be willing to consistently employ each strategy. Specifically, students were told, "The following strategies could help reduce distraction during homework. Would you be willing to do these on a consistent basis? (Yes; No): (1) Turn your phone on silent so you don't get any notifications; (2) Put your phone somewhere nearby where you can't see it; (3) Put your phone in another room; (4) Turn your phone off."

3. Results

Given that most of the survey measures involved ordinal data, Spearman's rho coefficients (r_s) are reported for correlations. For ease of interpretation, students' responses are often described across multiple categories (e.g., students who said either "agree" or "strongly agree"). Other than the frequencies reported in Figures 1 and 2, frequencies for all specific response options are reported in Table 1.

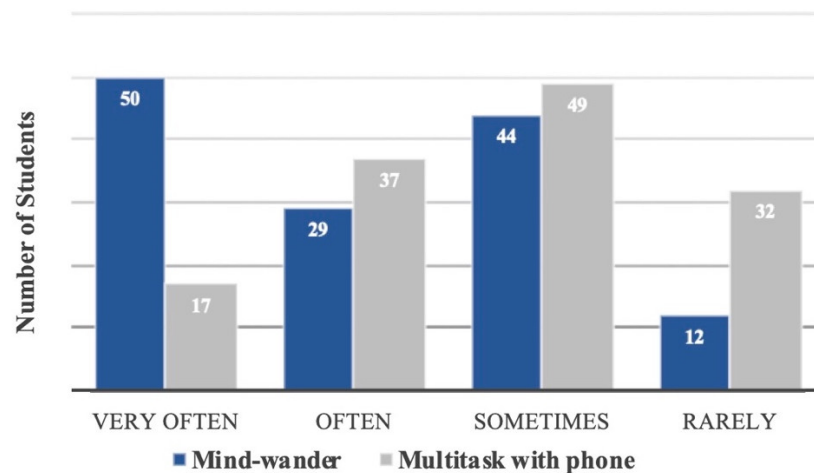


Figure 1. Frequency of mind-wandering and digital multitasking during homework.

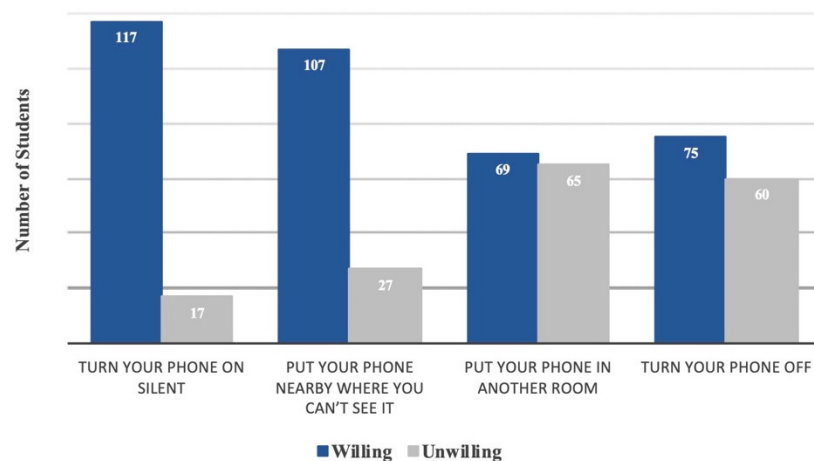


Figure 2. Receptivity to attentional shielding strategies.

3.1. The Magnitude of Teen Digital Multitasking

Of the students surveyed, 65.2% said their families had no rules that restrict phone use during homework. Of the remaining 34.8% whose families did have rules, only 29.8% reported always following family rules surrounding phone use during homework.

While completing their homework, students reported staying focused 62.2% of the time. The sources of distraction during homework were both internal and external. While 58.5% of students reported mind-wandering “often” or “very often”, 40.0% of students reported using their phone to multitask “often” or “very often” (Figure 1).

When asked about how much they wanted to focus, 63.7% of students reported that they ideally wanted to focus during homework more than they currently did. However, when asked whether they endorsed the statement that they tried to avoid using their phone during homework, less than half of students (47.4%) said they “agree” or “strongly agree”.

3.2. Motivations behind Digital Multitasking

Of the five motivations given, the most cited motivations for using one’s phone during homework were to look up information for their homework ($M = 3.23$, $SD = 1.23$) or because of boredom ($M = 3.13$, $SD = 1.33$). While 41.5% of students reported that they used their phone to look up information “often” or “very often”, 43.0% of students reported boredom as being “often” or “very often” a motivator for their phone use. Students also reported having other motivations for phone use during homework. These motivations included making homework more enjoyable ($M = 2.80$, $SD = 1.32$); staying connected with

others ($M = 2.59, SD = 1.34$); and doing it habitually without thinking ($M = 2.74, SD = 1.29$). Frequencies for these motivations are reported in Table 1. Unsurprisingly, habitual phone use was positively correlated with cell phone dependence ($r_s = 0.48, p < 0.001$). This dependency may be an implicit motivator for phone usage during homework. Students with higher dependencies were significantly more likely to digitally multitask during homework ($r_s = 0.45, p < 0.001$).

Table 1. Frequencies of responses in raw counts and percentage of sample.

Motivations (“I Use My Phone . . . ”)	Very Often	Often	Sometimes	Rarely	Never	
. . . to stay connected to others	15 (11.1%)	21 (15.6%)	30 (22.2%)	31 (23.0%)	38 (28.1%)	
. . . because it’s a habit I do without thinking	18 (13.3%)	16 (11.9%)	42 (31.1%)	31 (23.0%)	28 (20.7%)	
. . . because I get bored	24 (17.8%)	34 (25.2%)	35 (25.9%)	20 (14.8%)	22 (16.3%)	
. . . because it makes homework more enjoyable	15 (11.1%)	29 (21.5%)	36 (26.7%)	24 (17.8%)	31 (23%)	
. . . for looking up information for homework	25 (18.5%)	31 (23.0%)	43 (31.9%)	22 (16.3%)	14 (10.4%)	
Intention to Minimize Phone Use	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
When I’m doing homework, I actively try to not use my phone	4 (3.0%)	13 (9.6%)	14 (10.4%)	40 (29.6%)	49 (36.3%)	15 (11.1%)
Beliefs about Digital Multitasking	Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree
If I use my phone while I do homework, it makes it harder to concentrate on my work	10 (7.4%)	13 (9.6%)	25 (18.5%)	48 (35.6%)	27 (20.0%)	12 (8.9%)
If I use my phone while I do homework, it makes my work take longer to finish	7 (5.2%)	8 (5.9%)	18 (13.3%)	32 (23.7%)	50 (37.0%)	20 (14.8%)
It’s possible to focus your attention on two things at the same time	13 (9.6%)	16 (11.9%)	15 (11.1%)	46 (34.1%)	27 (20.0%)	18 (13.3%)
General Belief about the Effect of Phone Use on Concentration				Improving it	Not changing	Hurting it
How do you think phones affect teens’ ability to concentrate?				6 (4.4%)	39 (28.9%)	90 (66.7%)

3.3. Beliefs about Digital Multitasking

Students reported their growth mindsets about attention, which represent the degree to which they believed that one’s attention can improve with effort ($M = 4.74, SD = 0.83$). Growth mindset was positively correlated with actual focus during homework ($r_s = 0.21, p = 0.01$) and negatively correlated with task switching ($r_s = -0.27, p = 0.002$).

When students were asked whether they endorsed the statement that it is possible to focus attention on two things at the same time, 33.3% of students said “agree” or “strongly agree”. Endorsing this belief was positively correlated with a preference for task switching ($r_s = 0.36, p < 0.001$) and an increased denial that multitasking makes completing homework take longer ($r_s = -0.32, p < 0.001$).

Of the students surveyed, 66.7% believed that smartphones are hurting teenagers’ ability to concentrate. It appears that this recognition may be adaptive, because it was correlated with higher levels of ideal focus ($r_s = 0.267, p = 0.002$) as well as recognition that cell phone use during homework makes it harder to concentrate ($r_s = 0.334, p < 0.001$) and makes homework take longer ($r_s = 0.213, p = 0.013$).

3.4. Distractibility across External and Internal Distractions

Positive correlations were observed among multitasking during homework, mind-wandering during homework, and mind-wandering during daily life (Table 2). Preference for task switching was positively associated with mind-wandering in daily life, but not mind-wandering or digital multitasking during homework.

Table 2. Spearman correlation matrix for measures assessing distractibility.

Variable	1	2	3	4
1. Mind-wandering during homework	—			
2. Digital multitasking during homework	0.522 ***	—		
3. Mind-wandering during daily life	0.653 ***	0.411 ***	—	
4. Preference for task switching	0.153	0.147	0.257 **	—

Note. N = 135. ** $p < 0.01$; *** $p < 0.001$.

3.5. Receptivity to Strategies for Reducing Digital Multitasking

Students reported their willingness to *consistently* use specific strategies to shield their attention from their phones while they complete homework; 87.3% were open to consistently silencing their phone in order to prevent distracting notifications, and 79.9% were willing to put their phone somewhere nearby where they could not see it. However, students were much more reluctant to turn their phones off or put them in another room, with only 55.6% and 51.5% agreeing, respectively (Figure 2).

The degree of cell phone dependence was related to willingness to turn off one's phone during homework. As indicated by a one-way ANOVA [$F(1,33) = 7.827, p = 0.006$], students unwilling to turn off their phone ($M = 3.45, SD = 0.80$) had higher levels of cell phone dependence compared to students who were willing to turn off their phone ($M = 3.02, SD = 0.95$). Further one-way ANOVAs indicated no significant difference in cell phone dependence between students who were willing and unwilling to use the other three shielding strategies (all $ps > 0.633$).

4. Discussion

Throughout history, students have had to manage various forms of internal and external distractions. Mind-wandering during homework—which occurred either *frequently* or *very frequently* for more than half of students in the present study—is certainly not a new phenomenon. Yet only within recent years have students had to reckon with the unique distraction of smartphones. These modern devices accompany students everywhere, become exponentially more powerful each year, and provide instant access to not only one's entire social network but also an endless array of apps and entertainment. Smartphones provide ubiquitous distraction, and two-thirds of students in the present study believed that phones are hurting teenagers' ability to concentrate.

A recent national study surveying over 75,000 students from 86 high schools across the country found that students reported an average of three hours of homework per weeknight [23]. If the average high school student spends three hours per weeknight on homework, 5 days a week for 36 weeks each school year, then they are spending approximately 540 h on homework per year. However, in the present findings, students reported being distracted during homework 37.8% of the time. Taken together, this suggests that the average high school student may spend 204 h each school year trying to work on homework but actually distracted from it.

Most students indicated that they felt they should focus more than they did and endorsed a growth mindset in which their ability to focus could be improved through practice. However, not all students recognized the disruptive influence of phones. A third of students reported believing that it was possible to focus on more than one thing at a time, and this belief was correlated with a preference for task switching and increased denial that multitasking makes homework take longer. These findings support the limited capacity model of mediated message processing, which suggests that multiple streams of information may reduce the cognitive resources available to process each stream [10]. Helping students understand this competition for cognitive bandwidth may help inspire them to focus on one thing at a time.

Empowering students with self-regulatory strategies to minimize their own digital multitasking is critical given that the majority of students do not have family-imposed restrictions on their phone use at home. When there are family-imposed restrictions, the

majority of teens admit that they do not always follow these rules. Many students are reluctant to turn off their phones or leave them in another room. This unwillingness is somewhat problematic, given that previous research shows that even the mere presence of a smartphone can interfere with cognitive performance [9]. Nonetheless, a large majority of students are at least open to silencing their phone to prevent distracting notifications. A greater challenge lies in the fact that a willingness to consistently use a shielding strategy is different from consistently enacting the strategy during homework. Students therefore need support in learning how to put such simple strategies into practice.

Existing research has demonstrated that individuals who are more susceptible to external distractions tend to mind-wander more frequently [17,24]. The present study also found that higher levels of mind-wandering were positively correlated with levels of digital multitasking during homework. Collectively, these findings raise the possibility that there may be a domain-general capacity for focused attention that influences susceptibility to both internal and external distractions. Given research showing that attention training can help students reduce the internal distraction of mind-wandering [18,25], it may be possible to adapt such programs to also improve students' ability to minimize distractions from digital devices.

Although these findings provide a valuable window into the disruptive role of digital multitasking during homework, this study had several limitations. One limitation was the use of several researcher-generated survey items instead of validated self-report instruments. This was required to address the research questions of interest, because no validated questionnaires, to our knowledge, assess the specific beliefs, motivations, and tendencies of interest. Findings from these researcher-generated items should be interpreted as less definitive.

Another limitation is the generalizability of the findings. Although this study included a reasonably diverse sample of students from California and Hawaii, we cannot assume that these findings generalize to students throughout the world at large or even throughout the United States. Larger studies that use sophisticated recruiting procedures to ensure a representative sample are needed to not only replicate the present findings but also examine differences in digital multitasking among various subsets of students.

Finally, because this was a descriptive study, no causal claims can be made. Our hope is that future work can build off these initial insights to experimentally test some of the findings from the present research. For example, these results suggest that students who multitask with their phone more often are also more likely to mind-wander. Future work could examine whether manipulating digital multitasking behavior during an academic task affects students' academic mind-wandering tendencies.

Zooming out, smartphones are already proving to be an excellent tool for students to broaden their education across a wide range of disciplines, from improving their mental health to learning another language [26,27]. Therefore, it is overly simplistic to view smartphones as a problem in education. Smartphones themselves are tools that can be used for learning or used for distraction. We suggest that the current challenge entails equipping students with the tool and teaching them how to use it to their educational advantage rather than their detriment.

Digital multitasking has been shown to interfere with several measures of academic performance, including test scores, reading comprehension, and overall GPA. Although educators can set restrictive smartphone policies to minimize external distractions during class, it may be particularly challenging to prevent digital multitasking outside of the classroom. Accordingly, it is imperative to teach students how to autonomously shield their own attention to complete their homework effectively and efficiently. In a sense, the development of powerful smartphones is putting the world in students' hands. Perhaps it is also important that we teach them how to set it aside.

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References

1. Rideout, V.; Robb, M.B. *The Common Sense Census: Media Use by Tweens and Teens*; Common Sense Media: San Francisco, CA, USA, 2019.
2. Rideout, V. *The Common Sense Census: Media Use by Tweens and Teens*; Common Sense Media: San Francisco, CA, USA, 2015.
3. van der Schuur, W.A.; Baumgartner, S.E.; Sumter, S.R.; Valkenburg, P.M. The Consequences of Media Multitasking for Youth: A Review. *Comput. Hum. Behav.* **2015**, *53*, 204–215. [[CrossRef](#)]
4. Clayson, D.E.; Haley, D.A. An Introduction to Multitasking and Texting: Prevalence and Impact on Grades and GPA in Marketing Classes. *J. Mark. Educ.* **2013**, *35*, 26–40. [[CrossRef](#)]
5. Ellis, Y.; Daniels, B.; Jauregui, A. The Effect of Multitasking on the Grade Performance of Business Students. *Res. High. Educ. J.* **2010**, *8*, 1–10.
6. Junco, R. In-Class Multitasking and Academic Performance. *Comput. Hum. Behav.* **2012**, *28*, 2236–2243. [[CrossRef](#)]
7. Lee, J.; Lin, L.; Robertson, T. The Impact of Media Multitasking on Learning. *Learn. Media Technol.* **2012**, *37*, 94–104. [[CrossRef](#)]
8. Srivastava, J. Media Multitasking Performance: Role of Message Relevance and Formatting Cues in Online Environments. *Comput. Hum. Behav.* **2013**, *29*, 888–895. [[CrossRef](#)]
9. Ward, A.F.; Duke, K.; Gneezy, A.; Bos, M.W. Brain Drain: The Mere Presence of One’s Own Smartphone Reduces Available Cognitive Capacity. *J. Assoc. Consum. Res.* **2017**, *2*, 140–154. [[CrossRef](#)]
10. Lang, A. The Limited Capacity Model of Mediated Message Processing. *J. Commun.* **2000**, *50*, 46–70. [[CrossRef](#)]
11. Beland, L.-P.; Murphy, R.J. *Ill Communication: Mobile Phones & Student Performance*; London School of Economics and Political Science: London, UK, 2014; pp. 1–19.
12. Cheever, N.A.; Rosen, L.D.; Carrier, L.M.; Chavez, A. Out of Sight Is Not out of Mind: The Impact of Restricting Wireless Mobile Device Use on Anxiety Levels among Low, Moderate and High Users. *Comput. Hum. Behav.* **2014**, *37*, 290–297. [[CrossRef](#)]
13. Jiang, J. *How Teens and Parents Navigate Screen Time and Device Distractions*; Pew Research Center: Washington, DC, USA, 2018.
14. Weinstein, N.; Przybylski, A.K. The Impacts of Motivational Framing of Technology Restrictions on Adolescent Concealment: Evidence from a Preregistered Experimental Study. *Comput. Hum. Behav.* **2019**, *90*, 170–180. [[CrossRef](#)]
15. Tassone, A.; Liu, J.J.; Reed, M.J.; Vickers, K. Multitasking in the Classroom: Testing an Educational Intervention as a Method of Reducing Multitasking. *Act. Learn. High. Educ.* **2020**, *21*(2), 128–141. [[CrossRef](#)]
16. Terry, C.A.; Mishra, P.; Roseth, C.J. Preference for Multitasking, Technological Dependency, Student Metacognition, & Pervasive Technology Use: An Experimental Intervention. *Comput. Hum. Behav.* **2016**, *65*, 241–251. [[CrossRef](#)]
17. Mrazek, A.J.; Mrazek, M.D.; Carr, P.C.; Delegard, A.M.; Ding, M.G.; Garcia, D.I.; Greenstein, J.E.; Kirk, A.C.; Kodama, E.E.; Krauss, M.J.; et al. The Feasibility of Attention Training for Reducing Mind-Wandering and Digital Multitasking in High Schools. *Educ. Sci.* **2020**, *10*, 201. [[CrossRef](#)]
18. Mrazek, A.J.; Mrazek, M.D.; Reese, J.V.; Kirk, A.C.; Gougis, L.J.; Delegard, A.M.; Cynman, D.J.; Cherolini, C.M.; Carr, P.C.; Schooler, J.W. Mindfulness-Based Attention Training: Feasibility and Preliminary Outcomes of a Digital Course for High School Students. *Educ. Sci.* **2019**, *9*, 230. [[CrossRef](#)]
19. Walsh, S.P.; White, K.M.; McD Young, R. Needing to Connect: The Effect of Self and Others on Young People’s Involvement with Their Mobile Phones. *Aust. J. Psychol.* **2010**, *62*, 194–203. [[CrossRef](#)]
20. Gladstones, W.H.; Regan, M.A.; Lee, R.B. Division of Attention: The Single-Channel Hypothesis Revisited. *Q. J. Exp. Psychol.* **1989**, *41*, 1–17. [[CrossRef](#)]
21. Mrazek, M.D.; Phillips, D.T.; Franklin, M.S.; Broadway, J.M.; Schooler, J.W. Young and Restless: Validation of the Mind-Wandering Questionnaire (MWQ) Reveals Disruptive Impact of Mind-Wandering for Youth. *Front. Psychol.* **2013**, *4*, 560. [[CrossRef](#)]
22. Rosen, L.D.; Whaling, K.; Carrier, L.M.; Cheever, N.A.; Rökkum, J. The Media and Technology Usage and Attitudes Scale: An Empirical Investigation. *Comput. Hum. Behav.* **2013**, *29*, 2501–2511. [[CrossRef](#)] [[PubMed](#)]
23. Challenge Success. *Kids under Pressure*; Stanford Graduate School of Education: Stanford, CA, USA, 2021; pp. 1–12.
24. Forster, S.; Lavie, N. Distracted by Your Mind? Individual Differences in Distractibility Predict Mind Wandering. *J. Exp. Psychol. Learn. Mem. Cogn.* **2014**, *40*, 251–260. [[CrossRef](#)]

-
25. Mrazek, M.D.; Franklin, M.S.; Phillips, D.T.; Baird, B.; Schooler, J.W. Mindfulness Training Improves Working Memory Capacity and GRE Performance While Reducing Mind Wandering. *Psychol. Sci.* **2013**, *24*, 776–781. [[CrossRef](#)]
 26. Francis, J.; Vella-Brodrick, D.; Chyuan-Chin, T. Effectiveness of online, school-based Positive Psychology Interventions to improve mental health and wellbeing: A systematic review. *Int. J. Wellbeing* **2021**, *11*, 44–67. [[CrossRef](#)]
 27. Baleghizadeh, S.; Oladrostam, E. The effect of mobile assisted language learning (MALL) on grammatical accuracy of EFL students. *Mextesol. J.* **2010**, *34*, 1–10.