

Annotated Bibliography, Fall 2025 CTL workshop, Effects of Smartphones for T&L

Barrick, Elyssa et. al. "The unexpected consequences of diverting attention to our phones." *Journal of Experimental Social Psychology*. 2022. Princeton University, USA.

Society is increasingly dependent on technology and media, especially via smart phones. Estimates of the average time (young) adults spend on their phones, from the range of articles referenced here: 3- 4.5 hours per day. This article explores implications of "phubbing" – to *snub* someone by using one's phone in the presence of another – for its effects on social interaction. Research data are presented on the detrimental effects of phone use in both experimental and naturalistic settings. Findings across the four different conditions explored indicate: a) phubbing evokes feelings of exclusion and negative affect in the person/s being snubbed, b) the concept of *fundamental attribution error* strongly applies (people explain their own phone use more positively by considering the contextual cues which prompt that use, but they do not extend this to others, instead assuming others are rude or disinterested in the conversation), c) people believe *others' phone use* affects the social experience more than their own phone use, and, d) overall, people report others' phone use results in significantly lower levels of social connection, enjoyment and engagement with the other.

Bellini, Diego et. al. "Smartphone overuse and distraction: Which relationship with general well-being across different generations?" *BMC Public Health*. 2025. Universities of Cagliari & Sassari.

This study explores relationships between problematic smartphone use, phone distraction, and wellbeing across four different generations of Italians (N=430 subjects). Framed as a, "powerful super-stimulus," phone use is explored using two instruments – the Mobile Phone Problematic Use Scale (MPPUS) and the Smartphone Distraction Scale (SDS) – for six forms of wellbeing: interpersonal, community, occupational, physical, psychological, and economic. Specific factors related to *smartphone overuse* are withdrawal, craving, stress, anxiety and sleep deprivation. Defined as, "the prevention of giving full attention to the nearest surroundings," the authors argue that, "rather than demonizing or idealizing these tools, [we should seek to understand] how they affect our daily routines, cognitive processes and overall wellbeing" (p. 3). Findings indicate an average of 4.33 hours of smartphone use daily on working days; 3.66 hours on holidays. Generation Z (young adult) users had the highest scores on indicators of withdrawal and craving for the phone as compared to those in older generations and they are also more likely to use their phones as a "dysfunctional coping strategy, seeking to divert attention from negative situations related to work and private life without resolving them" (p. 11). Interestingly, no generational differences in wellbeing were found. To conclude, the authors state, "increased

prevalence of smartphone overuse in recent years, especially among... young adults, [has led to] a normalization of high smartphone use... [and they call for] educational programs that will promote healthy digital habits" (p. 13).

Hartanto, Andree et. al. "The effect of mere presence of smartphone on cognitive functions: A four-level meta-analysis." *Technology, Mind and Behavior*. 2024. Singapore Management University; Stanford University, USA; National University of Singapore.

Conceptualizing smartphones as, "portable and immersive devices that afford social, informational and recreational conveniences unbounded by physical restrictions," this meta-analysis examines data from 53 samples (N= 4,368 subjects) across 33 published and unpublished papers to assess whether the mere presence of a smartphone significantly impairs cognition. The authors note the majority of adults consult their smartphone at least once every hour and many users worldwide engage in, "smartphone-related bedtime procrastination." Goals of the meta-analysis were to assess the following, in research reports from 12 countries: a) whether placement of the smartphone in the present condition (face up or face down) differs in effects as compared to the absent condition (phone kept or not kept by the participant), b) whether the smartphone mode matters for cognitive functioning (silent, sound on, or powered off), and, c) what are the effects of smartphone dependency (e.g., Fear of missing out/FOMO) as assessed in various cognitive tasks. This publication is strengthened by the inclusion of both published and unpublished studies; the analysis suggests evidence of significant publication bias: papers are more likely to reach publication if they offer results supporting the theory that the mere presence of a smartphone impairs cognitive functioning. "To reconcile mixed findings [across the 53 samples], we conducted the first meta-analysis to quantitatively examine the effect of smartphone presence on cognitive outcomes assessed by measures of executive functioning, intelligence, sustained attention, and decision-making. Overall, the meta-analytic effect of smartphone presence on cognitive outcomes... did not reach statistical significance" (pg. 9). This paper thus offers data strongly suggesting the mere presence of a phone does not necessarily mean the user's cognition will be affected. This team of nine authors concludes with a call for implementation of more "double-blind procedures" in future research, as the significant findings presented in earlier studies "could be driven by an expectancy effect that causes experimenter bias during data collection" (pg. 10).

Haughton, Noela et. al. "Digital Disturbances, Disorders and Pathologies: A discussion of some unintended consequences of technology in higher education." *Educational Technology*. 2013. University of Toledo, Canada, Pennsylvania State University, US, George Brown College, Canada.

Article addresses common "unintended misuse" patterns for mobile phone use in HE. Published before the emergence of ChatGPT, this publication discusses problematic behavior by students during class: checking email/text messages, browsing the internet, reduced cognitive ability due to FOMO, gaming, posting on social media and doing homework for other courses.

Recommendations for improving the learning experience/environment: a) employ cohesive institutional classroom policies and enforce them across courses, b) educate young adults on internet addiction (an impulse-control disorder) and its associated symptoms, c) extend psychological services to students for early identification and treatment of addictive use of technology, and, d) clearly define for students what constitutes plagiarism or irresponsible use of AI programs for submitted work. Authors argue students are, "more prone to cheat if they perceive they are anonymous and/or not members of an academic community and/or if they think that their educational experience is not of a high quality" (p.8; this is supported by other work cited in this annotated bibliography).

Kaminske, Althea et. al. "Cell phone notifications harm attention: An exploration of the factors that contribute to distraction." *European Journal of Educational Research*. 2022. St. Bonaventure University & University at Buffalo, USA.

This study examines effects of cell phone presence (or absence), notifications (on or off) and ownership (is source of potential distraction the participant's phone or researcher's phone) for attention as measured using a Stroop task (N=105) in five experimental conditions. Authors note we tend to call moving back and forth between tasks "multi-tasking" when in reality we are effectively *task switching* – and task switching comes at a cost: disruptions to attention and learning. Citing recent research (e.g., Rosen et. al 2013) which suggests *the average amount of time students stay on task before task switching is just six minutes*, the authors express concern as their data show most (high school & university) students indicate high levels of task switching behavior. Results from this study indicate phone *notifications* cause significant distraction - regardless of phone ownership or task difficulty - increasing the amount of time necessarily to complete the Stroop task. While the mere presence of a phone in view (off/no notifications) does not necessarily impair attention, the attentional ability of *all students* in hearing range of any phone receiving notifications is reduced. Future research should focus specifically on the effects of phone notifications for attention and learning *in natural settings* (in higher education classrooms, as teaching and learning are occurring).

Rosen, Larry D. "The distracted student mind – Enhancing its focus and attention."
Phi Delta Kappa International, JSTOR, October 2017, 99(2), p. 8-14. California State University.

While a bit older, this study is highly cited across the literature and so is included here. Author is former Chair of Psychology at CSU; Rosen has published on the effects of emerging technologies for faculty & students in higher education since the 1980s. Data cited to open the article: a) the typical college student unlocks their phone about every 15 minutes, b) teenagers often try to multi-task even though most know it is really "task-switching," c) some young adults become highly anxious when their phones are out of sight. These data are supported by recent informal free writes in my Social Psychology course at AAU (Hoekstra, spring 2025): many choose to study with their phones turned upside down in front of them, they claim placing the phone in another room results in too much anxiety for effective study. Data published in Gazzaley & Rosen's book *The Distracted Mind* (2016): students who were off-task the most while studying tended to have the greatest number of portable devices in their study area and the most open windows on their computers. The typical student has an active account on six of the top ten social media sites (e.g., *TikTok*, *Instagram*) and, "anxiety about keeping up and checking in with others in their social networks" often results in FOMO. This Fear of Missing Out is a, "major predictor of both poor performance in school and sleep deprivation... most electronic devices emit light in the blue part of the spectrum, which tells the pineal gland to show down melatonin [production]" (p. 11). Recommendations for alleviating problems caused by phone use: encourage students to take a few minutes to shut down any websites or apps that are irrelevant before they begin to study: "don't just minimize the apps since they might buzz with alerts and notifications, creating an anxious need to check in, then have the student set an alarm for 15 minutes, silence the phone, turn it upside down and put it within sight... when the alarm rings, allow her one minute to check her messages and social media, then repeat the process" (p. 13), increasing the amount of study time over time as the student becomes more comfortable doing so between phone checks. Additionally, suggest that students tell their friends they will be checking in less frequently, this way friends know not to keep texting if the student does not respond immediately. Finally, no phone use in the hour before bedtime. Other means to relax before sleep include: reading a paper book (paper reflects light in the warm spectrum), watching previously viewed episodes of a favorite TV show, or listening to a favorite music playlist. One other suggestion which may benefit both faculty & students during class: "suggest to students they move their apps into separate folders so that fewer icons will catch their eye when they unlock their phones – the fewer apps they can see on their home screens, the fewer of those rabbit holes they're likely to dive into" during class (p. 14).

Zhou, Yujie and Liping Deng. "Breaking free from the digital rabbit hole: A configurational analysis of in-class smartphone distraction among university students." *The Internet and Higher Education*. 2024. Hong Kong Baptist University, Hong Kong SAR, China.

Smartphone distraction has become ubiquitous: research shows students check smartphones an average of 80 times daily (Lascau, Wong, Brumby & Cox 2020). This mixed-methods study focuses on two research questions: "What are the primary predictors of university students' in-class smartphone distraction?" and, "Which combinations of these predictors increase the likelihood of smartphone distraction during class time?" Fifteen semi-structured interviews were conducted over Zoom with Chinese students to identify seven key motivators for in-class smartphone use: 1) phone use prompts fun, joy and satisfaction (e.g., "the world inside smartphones is so exciting"), 2) students use smartphones during class to alleviate feelings of unpleasantness and boredom, 3) many students are deeply attached to their smartphones, 4) when "perceived course value or appeal" is low undergraduates may turn to their phones, 5) students are more likely to use their phones when an instructor does not "demonstrate friendliness, humor and kindness," 6) students sometimes "switch to class-unrelated phone activities" when learning activities or course content are either too easy or too difficult, and, 7) smartphones simply offer many helpful resources. Building on these factors, the authors next conducted a qualitative factor comparative analysis (QCA) using a questionnaire with (N= 563) Chinese students. "The fundamental logic behind the QCA research model is [that] smartphone distraction behavior is more likely the outcome of the interaction of multiple factors from technological, personal and environmental distractions [rather than from a single factor]" (p. 4). Findings: a) boredom, quest for fun/joy ("hedonic value") and smartphone dependency are all predictors of smartphone distraction, b) the repetitive use of smartphones is shaped at a personal level by the bursts of dopamine associated with phone use, which drives additional "reward-driven seeking behavior" (p.4), and, c) even in courses which students deem valuable, engaging or appealing, they might still be distracted by smartphones due to personal factors (e.g., boredom with that day's content, smartphone addiction). This study contributes to the emerging literature by showing that even in cultures less associated with individualism, contemporary students need educators to, "reflect on their educational approach [to] enhance the relevance of learning activities, enrich the course content and deliver it in an engaging manner" (p.9). One possible solution is to introduce "technology breaks," setting aside five-minute segments of time regularly to permit students to check their phones so they are able to better focus during longer periods of class time. Most importantly, this multi-method data set confirms, "*students* are the key agents in getting out of the 'digital rabbit hole,' [they] need to be well informed of the perils of digital distractions [and] by facilitating open discussions among students, [we] can collectively explore and share insights on how to use smartphones" to establish more productive learning environments (p. 9).