

Misperceptions and Misalignments: How Young Adults Overestimate Mobile Phone Use in Everyday Life

Sarita Yardi-Schoenebeck

University of Michigan
Ann Arbor, MI 48103
yardi@umich.edu

Erin Krupka

University of Michigan
Ann Arbor, MI 48103
ekrupka@umich.edu

ABSTRACT

Young people use their mobile phones actively throughout the day. While many people (e.g. parents and educators) worry about the frequency and appropriateness of their technology use, little is known about how appropriate they perceive their own behaviors to be. We conducted a survey of college students' norms regarding mobile phone use in three settings: meal times, sleeping routines, and class environments. We find that they overestimate other students' frequency of mobile phone use, especially in class. They also overestimate how appropriate other students think mobile phone use is, especially in class and during meals. Bedtime is a distinct phenomenon: they use mobile phones heavily when they go to bed and wake up, but they underestimate each other's frequency of use. Finally, they report using their mobile phones for working more than for socializing during an instructor's lecture, but think other students do the opposite. Beyond these results, we also contribute a novel technique for measuring norms that could be adopted in other contexts.

INTRODUCTION

In 1999, Thomas Friedman wrote an op-ed for the New York Times (NYT) lamenting the state of cell phone use and overconnectedness (Friedman, 1999). He described being stuck between two men talking loudly on their phones while he was trying to enjoy dinner with his daughter, declaring: "I can't wait for the day when they have soundproof, glass-enclosed cell-phone sections in restaurants. 'Cell phone or no cell phone?' the maitre d' will ask." Friedman's article foreshadowed a rapidly growing genre of news articles lamenting mobile phone use in social spaces. From 2009-2013, the NYT alone published articles titled: "Play With Your Food, Just Don't Text", "Texting May Be Taking a Toll", "Should You Google at Dinner?", "Do You Text at the Dinner Table?", "Step Away From the Phone!", and "Smartphones: The New Post-Coital Cigarette?" Numerous other mass media articles have portrayed similar concerns about mobile technology use in social settings taking what Rainie and Wellman colloquially call an "Oy Vey" lens on technology use in everyday life (Rainie & Wellman, 2012).

Adolescents and young adults are often at the center of these debates: as heavy technology and social media users, they are both lauded for their technological savvy while denounced for their overconnectedness and naiveté (Bennett, Maton, & Kervin, 2008; Hargittai, 2010; Palfrey & Gasser, 2008). Though extensive research has investigated the impact of technology use on wellbeing (e.g. social capital (Burke, Marlow, & Lento, 2010; Ellison, Steinfield, & Lampe, 2011), loneliness (Ryan & Xenos, 2011), and grades (Pasek, More, & Hargittai, 2009)), little research has explored norms about how young adults think they should behave in these contexts.

Social norms refer to beliefs about how people should behave in a given context (Bicchieri, 2005; Cialdini, 2001; Jackson, J., 1965). A large body of literature has demonstrated the impact of norms among college students for health and sexual behavior (e.g. (LaBrie, Hummer, Neighbors, & Larimer, 2010; Perkins, Meilman, Leichliter, Cashin, & Presley, 1999; *The social norms approach to preventing school and college age substance abuse*, 2003; Wechsler et al., 2003)). These studies show that norms are sometimes *misperceived* (ie respondents think the norm is one thing when it is another) and their misperception can result in negative outcomes such as binge drinking, sexual aggression, and eating disorders (*The social norms approach to preventing school and college age substance abuse*, 2003). A different body of literature shows that people's personal norms may not align with the group's norms (ie the respondent knows that the group norm is one thing, but personally does not believe in that norm) and their *misalignment* can result in behavior that is harmful to the group or simply disconnected with the groups' behavior (Burks & Krupka, 2012; Krupka & Weber, 2009). However, though technology use is wide-spread, frequent, and cuts across social and work activities, little is known about the social norms that govern technology use.

This study investigates mobile phone norms and perceptions about those norms among college students. Using social norms survey design techniques (Labovitz & Hagedorn, 1973), we conducted a survey with 182 college students about their mobile phone norms. We study mobile phones because college students own and use these frequently (Smith, A., Rainie, L., & Zickuhr, K., n.d.). Survey questions focus on three settings that are central to college student life and that directly impact college students' health, social and academic well-being: meal times, sleeping routines, and class environments.

This work contributes new knowledge about college students' use and personal norms around technology use in meal, classroom, and sleep settings for social and work purposes. Further, we are able to identify college students' perceptions and misperceptions about technology norms for these settings. Finally, we are able to measure how well their own norms align with actual norms held by their peers.

In addition, this work makes several methodological contributions. The survey questions draw on three norm constructs: personal, descriptive and social norms (to be defined below) (Bicchieri, 2005; Cialdini, 2001; Deutsch & Gerard, 1955). Second, this work proposes a simple study design that allows researchers to measure these three different types of norms and distinguishing them from *beliefs* about those norms. By doing so, we are able to leverage aspects of the survey design to introduce misperception and misalignment into the discussion about norms; these are two new concepts previously developed in economics that have been shown to be antecedents to behavior (Burks & Krupka, 2012). Our design and analysis reflect a novel approach that could be translated to a number of CSCW contexts where understanding norms (and their misperceptions and misalignments) about technology use could be critical. The knowledge gained from this work can help researchers and practitioners better design sociotechnical systems that take into account people's expectations about how such systems should fit into the contours of everyday life.

PRIOR WORK AND RESEARCH QUESTIONS

Norms are essential for governing how people decide to behave in everyday social settings. Norms can emerge at all levels of society, from small group behaviors (e.g. laptop use from classroom to classroom) to international customs (e.g. drinking a glass of wine with lunch). Norms maintain order and socialize newcomers about appropriate language, behaviors, and interactions (Nelson & Quick, 2007). In this paper, we focus on three kinds of norms: *descriptive norms*, *social norms*, and *personal norms*. Table 1 describes the three norms and related concepts for measuring these norms. A descriptive norm is a custom or action that people regularly take (Bicchieri, 2005; Deutsch & Gerard, 1955). *Descriptive norms* are a measure of frequency of other people's behavior. As such the descriptive norm is different from my own *personal frequency* of use because the descriptive norm describes everyone's use and not just mine. My *belief about the descriptive norm* may differ from the descriptive norm for a number of reasons. Specifically, I may not observe the actions of others and may therefore misperceive the descriptive norm. As an example, I usually don't see how others use their mobile phones around bedtime and I may therefore have an inaccurate perception of that use. Or my observations may be biased because I only observe my roommate's mobile phone use at bedtime and she is

Construct	Intuitive Explanation
My Personal Frequency	Frequency with which I engage in an action or activity.
My Belief about Descriptive Norms	Frequency with which I think that a typical other person engages in an action or activity.
The Descriptive Norm	Frequency with which other people engage in an action or activity.
My Personal Norm	My judgment of how appropriate I think an action is according to my own internalized values.
My Belief about Social Norms	My belief about the shared view among group members about how appropriate an action is.
The Social Norm	A shared view among group members about how appropriate an action is.

Table 1. Definitions of two types of norms measured in this paper (light gray) and related concepts about personal behaviors and beliefs (white). First three rows describe norms about frequency of a behavior; last three rows describe norms about appropriateness of a behavior.

different than other college students. We will call any difference between my belief about the descriptive norm and the descriptive norm a *misperception*.

A *social norm* is a social construct that involves joint recognition by group members that a particular behavioral rule exists and is to be applied to the relevant situation (Bicchieri, 2005; Cialdini, 2001; Jackson, J., 1965). A social norm distinguishes itself from a descriptive norm in that social norms describe prescriptions or proscriptions for what one ought to do, whereas descriptive norms describe what is regularly done (Cialdini, 2001; Deutsch & Gerard, 1955; Schwartz & Fleishman, 1978). Thus, social norms “have no reality other than our beliefs that others behave according to them and expect us to behave according to them” (Bicchieri, 2005) whereas descriptive norms are what people do and do not require beliefs or expectations to define them. Both kinds of norms influence how people behave (Burks & Krupka, 2012; Cialdini, 2001; Deutsch & Gerard, 1955).

A *personal norm* is a “self expectation for behavior constructed in specific situations on the basis of generalized internalized values” (Schwartz & Fleishman, 1978). A key distinction is that while personal norms are internalized expectations that the actor holds for himself, social norms need not be internalized for them to influence behavior—the actor only needs to be aware of them and acknowledge that they apply to a particular situation. For example, an actor may have a personal norm that it is acceptable to use a cell phone at dinner with guests, he may also know that most others in his community do not think this is appropriate (thus, his personal norm does not align with the social norm). We will call any difference between my personal norm and the social norm a *misalignment* while any difference between my belief about the social norm and the social norm will be labeled a *misperception*.

This paper focuses on four sets of research questions that investigate norms among young adult mobile phone users. As described in the next four subsections, each set of questions is drawn from prior work on mobile phone use in classroom and home contexts, and contextualized in norms literature.

Technology use in Class Environments

Extensive prior work has explored the impact of mobile phone and laptop use in classrooms on learning and student engagement (e.g. (Junco, 2012; Lee, 2014; Smith, A. et al., n.d.; Warschauer, 2006)). Research suggests that one-third of students feel that a laptop helps them stay engaged during lecture but almost half feel that other students’ laptop use is distracting (Zhu, E., Kaplan, M., Dershimer, R.C., & Bergom, I., 2011). Similarly, students find ringing cell phones in class distracting (Campbell, 2006). Increased laptop use correlates with lower class performance, less attention paid to lectures, and less comprehension of course material (Fried, 2008; Gay, Stefanone, Grace-Martin, & Hembrooke, 2001) (Hembrooke & Gay, 2003).

Whether students use technology in class to socialize versus to work also matters. Research about technology use for work purposes tends to focus on students’ ability to multi-task during class time. Some research suggests that students who are heavy multi-taskers are more susceptible to distractions than light multi-taskers (Ophir, Nass, & Wagner, 2009). Worse, self-described multi-taskers perform far worse on cognitive and memory tasks than people who prefer to single-task (Ophir et al., 2009). Research about class technology use for social purposes has tried to associate social media site use with performance. For example, overall time spent on Facebook correlates with a lower grade point average, but kinds of behaviors impact grades. Specifically, sharing links or passive viewing are associated with higher grades whereas posting status updates is associated with lower grades (Junco, 2012; Lee, 2014; Walsh, Fielder, Carey, & Carey, 2013).

To address concerns about technology use in class, instructors have suggested banning laptops (Yamamoto, 2007), identifying a laptop-free zone in the classroom (McCreary, 2008), or trying to incorporate laptops into lecture content (Zhu, E. et al., 2011). Identifying how frequently college students report using their devices in classroom contexts and the social norms around use can aid instructors to design classroom experiences that better integrate (or not) student technology use and motivations. We focus on three common activities in college classrooms: an instructor’s lecture, class discussions, and group presentations. We focus on these because they capture activities where norms about mobile phone use can vary depending on the purpose of the use (work or social) and the in class setting (while the instructor is lecturing, during class discussions, and during group presentations). Thus, the first set of research questions are:

RQ 1a [Descriptive Norms across settings]: Do college students report personal use of mobile phones more frequently in class environments where the instructor is lecturing, during class discussions, or during group presentations?

RQ 1b [Descriptive Norms across purposes]: For a given class environment, do college students report personal use of mobile phones more frequently for work or social purposes?

RQ 1c [Beliefs about Descriptive Norms across settings]: Do college students think a typical college student uses mobile phones in class more frequently in settings where the instructor is lecturing, during class discussions, or during group presentations?

RQ 1d [Beliefs about Descriptive Norms across purposes]: For a given setting, do college students think a typical college student uses mobile phones more frequently for work or social purposes?

Technology Use in Sleep Routine settings

Social norms are widespread in families and homes, dictating everyday behaviors such as how to discipline children and how to divide household labor (Coltrane, 2000). As families integrate technology into their home life, they also must adopt new social norms around its use. Often these social norms are created to curtail an undesirable behavior. Research suggests that frequent Internet use can become habitual and can disrupt other activities (LaRose, Lin, & Eastin, 2003). For example, 91% of American adults have a cell phone and 55% of them have a smartphone (Aaron Smith, 2013), but mobile phones can be disruptive of routines: 67% of cell phone owners report checking their phones for alerts even if the phone has not been ringing or vibrating. Schools have responded by banning mobile phones (a very strong embodiment of a social norm). Yet, even in schools that ban mobile phones, 65% of high school students bring their mobile phone to school, and 43% of text in class one or more times a day (CommonSenseMedia, 2009).

Similarly disruptive behaviors may be observed around technology use at night. By 2010, over 80% of teens (ages 13-17) reported sleeping with their cell phone or near their bed (Lenhart, Ling, Campbell, & Purcell, 2010). Research suggests that getting a good night of sleep is important, especially for youth and young adults, and that interruptions and distractions can negatively impact sleep behaviors (Pilcher & Ott, 1998). Many parents respond with creative approaches such as collecting phones before bed (Yardi & Bruckman, 2011). These approaches carry with them normative information about the “appropriate” use of technology around sleep and bedtime routines.

When a child leaves the home and transitions to college, the norms of the household may be carried forward or the young adult may adopt new personal norms for himself. On a college campus, these personal norms may be strongly influenced by the student’s beliefs about what other students do (the descriptive norm) and other students’ social norms (Tognoli, 2003). Understanding the nuances of how often college students use their mobile phones when they go to bed, when they wake up in the middle of the night (where “middle of the night” is left open-ended since bedtimes vary heavily), and when they wake up in the morning can help them to better gauge and adjust their own behaviors and help researchers understand how college students are integrating technology into their lives. Thus, the second set of research questions are:

RQ 2a [Descriptive Norms across settings]: Do college students report personal use of mobile phones more frequently during sleeping routines before going to sleep, when waking up in the middle of the night, or when waking up in the morning?

RQ 2b [Descriptive Norms across purposes]: For a given sleep routine, do college students report personal use of mobile phones more frequently for work or social purposes?

RQ 2c [Beliefs about Descriptive Norms across settings]: Do college students think a typical college student uses mobile phones more frequently in bed before going to sleep, when waking up in the middle of the night, or when waking up in the morning?

RQ 2d [Beliefs about Descriptive Norms across purposes]: For a given setting, do college students think a typical college student uses mobile phones more frequently for work or social purposes?

Descriptive Norm Misperceptions about Technology

Recall that norm misperception occurs when my belief about the descriptive norm differs from the descriptive norm (Perkins et al., 1999). Theory suggests that overestimating other people’s behavior may lead to an increase in behavior for oneself. A well-documented example of norm misperceptions is alcohol consumption on college campuses. Studies have shown that college students believe that other students consume alcohol at a greater amount and frequency than is actually the case (LaBrie et al., 2010; Perkins et al., 1999). Surfacing misperceptions about other college students’ behaviors can help us understand how to help them to better manage their own technology use in everyday settings. Thus, the third set of research questions are:

RQ 3a [Descriptive Norm Misperception across settings]: Do college students overestimate other college students’ frequency of mobile phone use during meal times, sleeping routines, and class environments?

RQ 3b [Descriptive Norm Misperception across purposes]: Do college students overestimate frequency of use differently when considering mobile phone use for work purposes versus social purposes?

Social Norm Misalignments about Technology

The presence of norms can help individuals and societies to codify beliefs and socialize newcomers into a community. Public health campaigns employ social norms approaches to minimize problematic behaviors like excessive drinking as well as to promote positive behaviors like using the campus recreation center (Lewis & Neighbors, 2006; *The social norms approach to preventing school and college age substance abuse*, 2003; Wechsler et al., 2003). Theory predicts that when personal norms and social norms converge, there is increased consensus and stability in society (Jackson, J., 1965; White, Smith, Terry, Greenslade, & McKimmie, 2009). Conversely, when these diverge, problems can emerge in people’s expectations about how they should behave with one another, a phenomenon that is frequently observed with technological changes in society (e.g. talking loudly on mobile phones in public spaces) (Jackson, J., 1965; White et al., 2009). Norm misalignments occur when a person’s personal norm is different from the group’s norm—their personal norm is not aligned with the group’s. Identifying these misalignments can help promote more effective teaching and learning in classrooms, community-building and healthful behaviors during meals, and better sleep habits. Thus, the last set of research questions are:

RQ 4a [Social Norm Misalignment]: Do college students think it is more appropriate for them to use their mobile phones during meal times, sleeping routines, and class environments than the social norm?

Taken together, eight different contexts were presented for each of the survey questions presented (see Table 4). . These are of course not a comprehensive set of contexts in college students’ lives, but they capture breadth and depth in their everyday experiences.

METHODS

Norms are difficult to infer from behavioral observations and are typically measured using surveys and self-reports that are carefully designed to elicit participants’ perceptions of other people’s behaviors and attitudes (Labovitz & Hagedorn, 1973). Critically, a norms survey must also capture participants’ reports of their own behaviors and attitudes for comparison. To measure mobile phone norms, we designed and administered an online survey on Qualtrics (see flow in Figure 1).

If they consented to participate by clicking through the page, they were taken directly to the survey. A warm-up and branching question asked participants what technologies they had (focusing on desktops, laptops, and mobile phones with or without Internet access).

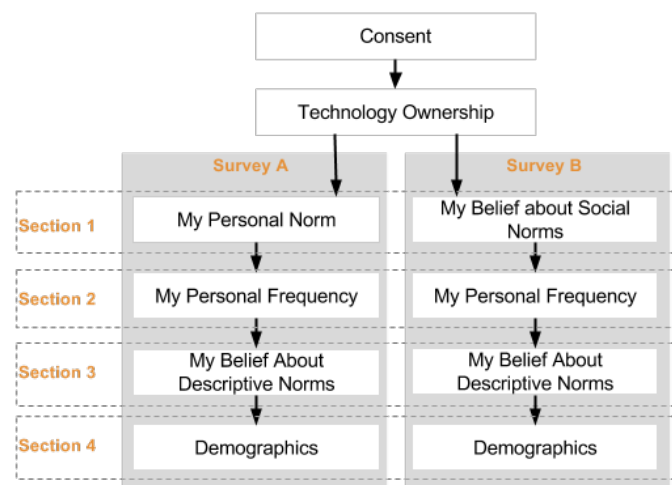


Figure 1. Survey design flow.

The first section of questions (Section 1) asked participants to rate their approval of technology use in various settings. Section 1 was between subjects to reduce participant fatigue and to create a between-subject measure of personal and social norms (which we exploit in our analysis). In survey A, participants were randomly directed to receive questions that asked about their own approval (My Personal Norms). If they received survey B, they were asked how much they thought a typical college student would approve (My Belief about Social Norms). Each of the subsequent sections 2-4 was within subjects and all participants completed all sections. Section 2 asked participants how often they used their mobile phones in various settings (My Personal Frequency). Section 3 asked participants how often they thought a typical college student used technology in various settings (My Belief about Descriptive Norms). Section 4 contained demographic questions. For each question, participants rated their responses for eight different settings (shown in Table 2).

Setting	Description of the Setting
Lecture	in class while the instructor is lecturing
Discussion	in class during class discussions
Group	in class during group presentations
Bedtime	in bed before going to sleep
Night	in bed when waking up in the middle of the night
Morning	in bed when waking up in the morning
Breakfast	while eating breakfast with other people
Dinner	while eating dinner with other people

Table 2. Setting items presented to participants for each question. Labels in left column used for analysis only.

Below are examples of questions. The first measures personal frequency of use for work purposes (survey A and B, Section 2). The second measures a student’s belief about the social norm (survey B, Section 1):

How often do **YOU** use a **MOBILE PHONE** for **WORK PURPOSES** (e.g. checking a class assignment, responding to a project email) in the following settings?

How would a **TYPICAL COLLEGE STUDENT** respond if they saw someone using a **MOBILE PHONE** for **WORK PURPOSES** (e.g. checking a class assignment, responding to a project email) in the following settings?

Each “My Personal Norm” and “My Belief about Social Norms” survey question was presented in a matrix table format with a slider bar anchored by a 5-point Likert scale from “Strongly Disapprove” to “Strongly Approve” with markers every 5 points on the y-axis from 0 to 100.

Each “My Personal Frequency” and “My Belief about Descriptive Norms” question was also shown in matrix table format anchored by a 5-point Likert Scale showing “Never”, “Rarely”, “Sometimes”, “Often”, “Always”. For each question, the scale was shown at the top of the matrix on the x-axis and the settings were listed on the y-axis, each with its own slider bar. By converting the Likert scale to a continuous number scale, we are able to minimize noise in the data, make more robust statistical analyses, and minimize clustering on middle values (Treiblmaier, H. & Filzmoser, P., 2011), without compromising results compared to Likert scale ordinal values (Arnau, Thompson, & Cook, 2001). Thus, responses are coded on a 0-100 scale, where higher numbers are interpreted as “more frequently” (in the case of frequency and descriptive norms questions) or “more appropriate” (in the case of personal and social norms questions).

Participant Demographics

A total of 182 undergraduate students at a large university in the United States participated in the survey. They were recruited through undergraduate courses (not taught by the research team) and offered extra credit. 86 identified as female and 105 as male. Their ages ranged from 18 to 29 (mean=19; median=19). They identified primarily as White (n=138) and Asian or Pacific Islander (n=41) with others identifying as Black or African American (n=6), Hispanic or Latino/a (n=1), American Indian, Alaskan Native, or Native Hawaiian (n=1), and Biracial or Multiracial (n=2). They were mostly 1st year undergrads (n=104) and 2nd year undergrads (n=62). The remaining 25 were 3rd

and 4th year undergrads. Many had not declared majors yet; those who had declared a wide range of majors: the most common were Economics, English, Business, Computer Science, Engineering, and Psychology.

Most participants were not in a relationship at the time of the survey (n=145); the others were either in a relationship that was not serious (n=11), in a relationship and not sure if it was serious (n=12), or in a serious relationship (n=24). Their living situations varied: 56 slept in a room alone most nights (4 or more) a week; 124 shared a room with a roommate, and 10 shared with a romantic partner. The modal number of days a week they typically ate breakfast with other people was 0, (followed closely by 2) and for dinner was 5.

RESULTS

Descriptive Norms in Classroom settings

This analysis explored how frequently college students use mobile phones in three classroom environments: during an instructor’s lecture, class discussion, and group presentations and whether these descriptive norms differ by purpose (RQ 1a, 1b). In addition we test how college students’ beliefs about the descriptive norm vary by setting and purpose (RQ 1c, 1d). In a later section we test for misperception and misalignment and here restrict attention to describing usage and beliefs. To measure the descriptive norm, we take the mean of “My Personal Frequency.” Intuitively, descriptive norms describe the frequency with which other people engage in an action or activity (see Table 1); therefore, taking the mean of students’ self-reported frequency of engaging in an activity will, by definition, measure the descriptive norm. Table 3a shows the descriptive norms of mobile phone use across classroom settings (columns 1-3) and across purposes (rows 1-2).

The Descriptive Norm: Classroom

	Avg. Freq. of Use			T-value between cols.		
	Lecture	Discuss	Group	1 v. 2	2 v. 3	1 v. 3
Work	48.72 (25.22)	33.09 (23.46)	24.23 (23.29)	t(180)= 10.18*	t(179)= 7.38*	t(179)= 12.77*
Social	57.87 (25.61)	38.31 (26.81)	26.59 (26.58)	t(180)= 11.28*	t(180)= 8.57*	t(180)= 14.51*
Test stat.	t(180)= -4.68*	t(180)= -3.14*	t(179)= -1.72 ⁺			

Table 3a. Classroom setting for work or social purposes. Pairwise comparisons between classroom activities: lecture (col.1), discussion (col. 2), and presentations (col. 3) shown in columns 4-6. Pairwise comparisons for work and social purposes across rows 1-2 shown in row 3. *p<0.01; ⁺p<0.05.

Using paired t-tests we find a similar pattern across all pair-wise comparisons: regardless of whether mobile phones are being used for work or social purposes, we see that students use their mobile devices the most during an instructor’s lecture, followed by class discussions, then group presentations. Column 4 reports the pair-wise comparison between lecture (M=48.72) and discussion (M=33.09); column 5 reports the pairwise comparison between discussion (33.09) and presentations (M=24.23); column 6 reports the pairwise comparison between lecture (M=48.72) and presentations (M=24.23). In all cases p<.01. Row 3 reports the pair-wise comparison of the mean frequency of personal use in each setting across work or social purposes. We see that students report using their mobile phone more frequently for social purposes than for work purposes regardless of whether they are in an instructor’s lecture (M=57.87 vs. 48.72; p<0.01), class discussion (M=38.31 vs. 33.09; p<0.01), or group presentations (M=26.59 vs. 24.23; p<0.05).

The same pattern is observed for students’ belief about the descriptive norms (p<0.01 for all pair-wise comparisons, Table 3b). In other words, college students think a typical college student also uses mobile phones more frequently for social purposes than for work purposes and they think a typical college student does this during an instructor’s lecture more than during class discussion or group presentations.

Descriptive Norms in Sleep Routine Settings

This analysis investigated how often college students use mobile phones in bed before going to sleep, when waking up in the middle of the night, or when they wake up in the morning (RQ 2a, 2b). Using the same approach as in RQ 1, descriptive norms are compared across work and social purposes. Table 4a tests for differences in the descriptive norm across settings and purposes.

Comparing across columns, we find that for work related activities students use their mobile devices before going to bed (M=63.63) and when getting up in the morning (M=62.31) significantly more than in the middle of the night (M=33.66; $p < 0.01$ in all pair-wise comparisons). Comparing across rows, we find that they also use their phone significantly more frequently for social purposes before going to bed (M=84.16-8 v. M=63.63) and when waking up in the morning (M=81.98 v. M=62.31) than in the middle of the night (M=51.63 v. M=33.66; $p < 0.01$ in all pair-wise comparisons). They do not frequently use their mobile devices for either work or social purposes in the

The Descriptive Norm: Sleep Routines

	Avg. Freq. of Use		
	Bed	Night	Morn
Work	63.63 (27.13)	33.66 (31.60)	62.31 (30.54)
Social	84.18 (25.61)	51.63 (26.81)	81.98 (26.58)
Test stat.	$t(180) = -10.15^*$	$t(178) = -8.26^*$	$t(180) = -9.67^*$

Table 4a. Sleep routine setting for work or social purposes. Pairwise comparisons for work and social purposes across rows 1-2 shown in columns 4-6. Pairwise comparisons for work and social purposes across rows 1-2 shown in row 3. * $p < 0.01$; $p < 0.5$

middle of the night. When we measure their beliefs about the descriptive norm, we see similar patterns (Table 4b).

Again, students also believe other students use their mobile phones more for social purposes than for work purposes at bedtime, in the middle of the night, and when they wake up in the morning ($p < 0.01$ for each pair-wise comparison).

Misperceptions about Descriptive Norms

RQ1 and RQ2 showed how often students reported using mobile phones in class and bed contexts and their beliefs about the descriptive norm. In this section, we explore whether their beliefs about the descriptive norm differ from the actual frequency with which students are engaging in these activities – that is, whether their *beliefs* about the descriptive norm differ from the actual descriptive norm (RQ 3a, 3b).

Figure 2 graphs the descriptive norms (dashed line) and students’ beliefs about the descriptive norm (solid line) for mobile use in classroom settings. Along the x-axis, higher numbers indicate higher frequency of use. The pictures tell a clear story. Students’ beliefs about the frequency with which other students are using mobile phones in classroom settings are always to the right of how frequently students report that they are actually using phones. That is, students are misperceiving the descriptive norm and are overestimating use.

Figure 3 tells a different story. As with Figure 2, the descriptive norms for mobile use in sleep routine settings are depicted with the dashed line and students’ beliefs about the descriptive norm are shown with a solid line. Along the x-axis, higher numbers indicate higher frequency of use. We see that students’ beliefs about the frequency with which other students are using mobile phones in sleep settings are no different from the descriptive norms. That is, students do not misperceive the descriptive norm.

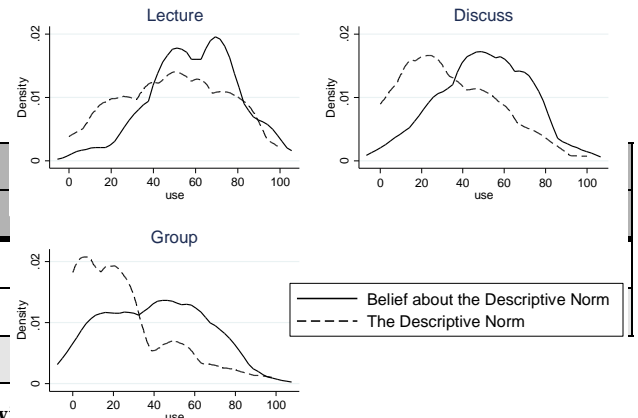


Figure 2. Descriptive norms vs. beliefs about the descriptive norm for work purposes in class settings. x-axis is kernel density estimation. y-axis is slider bar values from 0 to 100. We see that students’ beliefs about the descriptive norm are inaccurate; they believe others use mobile phones in the classroom more than they are really used.

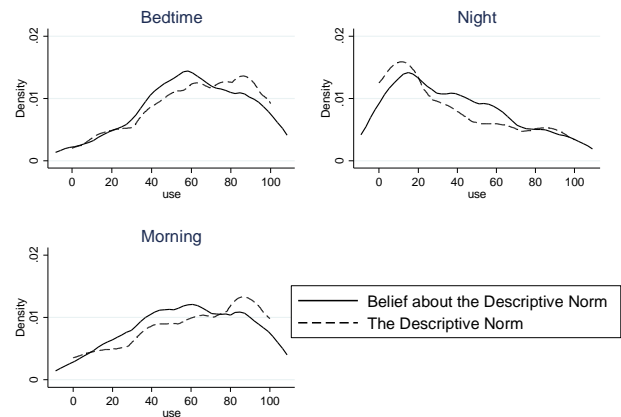


Figure 3. Descriptive norms vs. beliefs about the descriptive norm for sleep routines. x-axis is kernel density estimation. y-axis is slider bar values from 0 to 100. We see that students’ beliefs about the descriptive norm are accurate.

To formally test whether differences are significant, we will construct a measure of the misperception. To measure misperceptions, we take the difference between “My Belief about the Descriptive Norm” and “The Descriptive Norm” we have to exploit a unique feature of our survey design.

Recall that regardless of whether respondents took survey A or B, the second section asked them to tell us their personal frequency of use and the third section to tell us their beliefs about the descriptive norms. We are interested in obtaining a measure of whether beliefs about the descriptive norm are different from the actual descriptive norm. However, because a respondent’s answer to questions about personal frequency and to beliefs about the descriptive norm are correlated (within-subject correlation of $r=0.11$), we need to exploit a feature of the survey design to break this (with-in subject) correlation. We will exploit the fact that our respondents participated in either survey A or B, but answered identical questions in sections 2-4. This feature will allow us to break the correlation between students’ responses *within* a survey by using responses *between* the two surveys.

To measure the actual descriptive norm we take the mean of the response to “My Personal Frequency” using only the responses from survey A. Then we use only responses to survey B and subtract the mean from each student’s belief about the descriptive norm as it was measured in survey B. Thus, we have a measure of how much a respondent in survey B’s belief differs from the descriptive norm (which was measured using only survey A responses). Because the descriptive norm is measured using survey A responses, we break the correlation between beliefs and the actual descriptive norm. Similarly, for those students whose belief about the descriptive norm was measured in survey A, we measure the descriptive norm using responses from students in survey B and perform the same subtraction. The reason we can use half the sample to create two measures of the descriptive norm is because the descriptive norms measured in survey A are not statistically different from those measured in survey B. A t-test finds no significant difference in means for descriptive norms for survey A ($M=56.7$, $SD=2.2$) and survey B ($M=60.4$, $SD=1.9$); $t(190)=-1.1656$, $p=0.2452$.

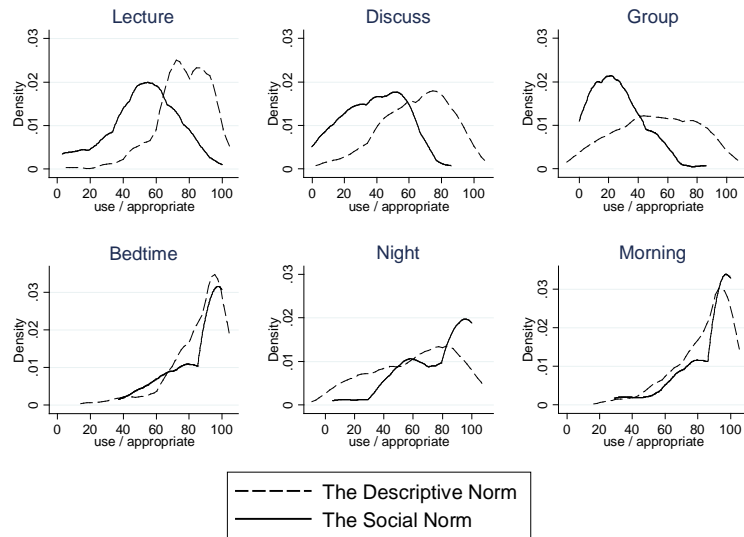


Figure 4. Descriptive norms versus social norms across classroom and sleep settings for social purposes. x-axis is kernel density estimation. y-axis is slider bar values from 0 to 100. We see that social norms diverge from descriptive norms for classroom settings but not for nighttime settings.

Thus, we have a measure of how much each student misperceives the descriptive norm. When the difference between beliefs about the descriptive norm and the actual descriptive norm is positive, then a respondent is overestimating the descriptive norm. When the difference is negative, then the respondent is underestimating the descriptive norm and when the difference is zero than a respondent’s belief about the descriptive norm is accurate.

Table 5 shows our main finding: all significant differences are positive. This reflects a clear pattern in which students overestimate descriptive norms for mobile phone use in multiple settings and purposes. The mean difference between beliefs and descriptive norms for work purposes in lecture ($M=7.70$), discussion ($M=11.60$), group presentation ($M=6.80$) and middle of the night ($M=6.96$) are all positive and significantly different from zero (using one-sample t-tests, all comparisons $p<0.05$). This means that they assume other students use mobile phones more than other students actually report doing so. We see an even larger overestimation of the descriptive norm when the purpose is social in lecture ($M=14.20$), discussion ($M=17.50$), group presentation ($M=15.85$), middle of the night ($M=6.97$), and eating dinner ($M=6.55$).

Misalignments and Social Norms

In this analysis we describe the social norms and compare them to the descriptive norms. To measure the social

Setting	Purpose		Test statistic	
	Work	Social	Work	Social
Lecture	7.70 (18.98)	14.20 (18.84)	t(73)=3.48 ⁺	t(73)=6.49 ⁺
Discussion	11.60 (21.00)	17.50 (21.98)	t(73)=4.75 ⁺	t(73)=6.86 ⁺
Group	6.80 (22.49)	15.85 (25.39)	t(73)=2.56 ⁺	t(73)=5.37 ⁺
Bedtime	2.93 (24.02)	2.61 (17.31)	t(73)=-1.05	t(73)=1.29
Night	6.96 (29.94)	6.97 (28.85)	t(73)=2.00 ⁺	t(73)=3.29 ⁺
Morning	-2.74 (27.94)	3.16 (18.74)	t(73)=-0.84	t(73)=1.45
Breakfast	1.30 (23.79)	3.09 (23.65)	t(26)=0.48	t(73)=1.12
Dinner	0.85 (25.34)	6.55 (25.36)	t(26)=0.29	t(73)=2.22 ⁺

Table 5. Difference between belief about descriptive norm and the descriptive norm. Negative values indicate belief about frequency of mobile phone use underestimates actual mobile phone use. ⁺p<.05.

norm, we take the mean of “My Belief about Social Norms”. Intuitively, social norms are a shared view among group members about how appropriate an action is (see Table 1); therefore taking the mean of students’ belief about the social norm for an activity will, by definition, measure the social norm.

Figure 4 graphs the descriptive norm (dashed line) and the social norm (solid line) for mobile phone use for social purposes. The x-axis is interpreted as a frequency of use when reading the descriptive norm and as an appropriateness measure (larger numbers being more appropriate) when reading the solid line. When we compare social norms to descriptive norms for social purposes we find two interesting patterns that can be readily observed in Figure 4. First, we see that for classroom settings, the modal response for the social norms question is less than 50. This indicates that it is considered somewhat inappropriate to use mobile phones in classrooms for social purposes. However, the graph shows that the distribution for the descriptive norm is always to the right of the social norm for classroom settings. This means that students are using mobile phones but believe there is a norm against such use. This is not the case for sleep routines; here we see that students view mobile phone use to be very appropriate and their behavior—the descriptive norm—closely matches this social norm.

While the previous analysis focused on comparing descriptive and social norms, we now turn to comparing personal and social norms. This is important because previous work has found that feeling like one’s personal norms are different from, or misaligned with, group norms negatively affects behaviors like retention at work and sharing behavior [8].

We measure misalignment (RQ 4a) between students’ personal norms and the social norms by taking the difference between “My Personal Norm” and “The Social Norm”. Because we used a between-subjects design for this question, respondents either told us their “Personal Norms” (in survey A) or their “Belief about the Social Norm” (in survey B). We only have to take the mean of the beliefs about the social norm and subtract that from respondent’s personal norms. If this difference is 0, then an individual’s personal norms are no different from the social norms among students. If this difference is negative, then a person’s personal norms are less permissive than the social norm (they personally think it is less appropriate to take action X than the social norm for that action). If it is positive, then a person’s personal norms are more permissive than the social norm.

Table 6 reports our findings on misalignment: personal norms and social norms are often not significantly different from each other and when there are differences, they are negative. As we look over the table, we note that only in a handful of settings are personal norms significantly different from social norms. Unlike in Table 5, where the

differences in perception were clustered around classroom settings, significant differences are distributed throughout settings with no clear pattern.

Setting	Purpose		Test statistic	
	Work	Social	Work	Social
Lecture	-2.31 (23.55)	-7.46 (21.63)	t(73)=-0.84	t(73)=-2.97 ⁺
Discussion	-0.43 (26.05)	-4.18 (41.46)	t(73)=-0.14	t(73)=-1.67 ⁺
Group	3.36 (24.38)	1.34 (21.53)	t(73)=1.18	t(73)=0.53
Bedtime	-5.08 (18.60)	-2.04 (15.92)	t(73)=-2.35 ⁺	t(73)=-1.10
Night	-5.08 (26.96)	-4.61 (27.01)	t(73)=-1.62	t(73)=-1.47
Morning	-4.28 (18.42)	-3.49 (16.61)	t(73)=-2.00 ⁺	t(73)=0.36 ⁺
Breakfast	-5.53 (23.09)	-8.03 (23.78)	t(26)=-1.25	t(73)=1.37 ⁺
Dinner	-3.32 (25.85)	-5.36 (25.29)	t(26)=-0.67	t(73)=-1.10

Table 6. Difference between my personal norm and the social norm. Negative values indicate a personal norm that mobile phone use is less appropriate than the social norm. ⁺p<.05.

However, we when do so differences that are significant, then they are largely negative. We see that students' personal norms for appropriate mobile phone use are less permissive than the social norms in some contexts. For work purposes, we see that students' personal norms are less permissive for working at bedtime (M=-5.80) and in the morning (M=-4.28). That is, students think that a typical college student approves of using a mobile phone for work at bedtime and in the morning more than they themselves do. These observations are even stronger when using mobile phones for social purposes. Students believe that they personally find using a mobile phone for social purposes in lecture (M=-7.46) and discussion (M=-4.18) to be less appropriate than the social norm. Students also believe that a typical college student approves of morning and breakfast mobile phone use for social purposes more than they do (M=-3.49 and M=-8.03, respectively).

DISCUSSION

Discussion of Misperceptions and Misalignments

We find that students use their phones more frequently for social than work purposes across every class and sleep setting. Further, we find that they correctly believe that other students also use their phones more for social purposes. However, they *misperceive* the extent to which other students use their phones in all settings and consistently overestimate other students' use.

In classroom settings they are most likely to use their phones (and expect others to use their phones) during lecture. In sleep settings they are more likely to use their phones when they go to bed and when they wake up. Contrary to popular narratives about phone use in the middle of the night, we find that they are much less (about ½) likely to use phones in the middle of the night and they don't believe other students do so either.

We also find that there are clear social norms and that these norms closely match descriptive norms in sleep settings but do not do so in classroom settings. Interestingly, students are quite tuned into the social norms for sleep settings even though evening and morning routines tend to happen in the privacy of one's home (Shapiro, 1998). This result might be counterintuitive, given that students can observe one another in the classroom (especially students sitting in the back of the room) whereas they cannot observe one another in bed in the privacy of their dorm rooms or other kinds of housing (recall most of our participants reported spending most nights of the week alone). It is possible that their evening and morning social media use creates a shared co-presence online (Lampinen, Tamminen, & Oulasvirta, 2009; Zhao, 2003) and thus, a social norm, that mobile phone use at those times is both common and appropriate, but future work would need to investigate this relationship.

Finally, we find that there are few clear patterns to when personal and social norms are not in alignment. State differently, there appears to be alignment between personal and social norms and, when there are misalignments, these are relatively small.

These kinds of misperceptions and misalignments are particularly salient in the context of technology use, where devices and behaviors are constantly changing, forcing norms to evolve in rapid and non-deterministic ways. They may further be magnified by media effects—the “oy vey” quality described by Rainie and Wellman—that tend to lament the social effects of technology progression (Rainie & Wellman, 2012).

Surfacing misperceptions and misalignments can have a powerful impact on future behavior. Norms have been shown to influence behavior in a number of contexts among college students, such as sexual activity and hooking up, as well as healthy behaviors like exercising (LaBrie et al., 2010, 2010; Perkins et al., 1999; *The social norms approach to preventing school and college age substance abuse*, 2003; Wechsler et al., 2003). Identifying where and in what context technology norms are misperceived can help us to promote shared expectations about uses; an outcome that could be especially important for positively impacting sleep behaviors at night and learning outcomes in the classroom.

Implications for Mobile Phone Use in Everyday Life

Norms in classrooms uphold hierarchy and power (between faculty and students), conversational turn-taking (students raise hands to speak), salutations (how faculty are addressed), and pedagogy (faculty delivers learning material to students) (e.g. (Anderson, 1970)). Norms are also widespread in families and homes, dictating everyday behaviors such as how to discipline children, how to divide household labor, or whether to keep the front lawn maintained (Coltrane, 2000). Though norms are always changing in these contexts, technology may magnify and speed up the change of norms flux. Tensions can emerge when social norms are vaguely defined or poorly enforced, or are well-defined but community members are nonconforming or noncompliant (Ridder & Tripathi, 1992). Indeed, mobile phone users are exposed to a growing blitz of media campaigns about putting down the cell phone, looking up, and paying attention to people, that can promote feelings of guilt, shame, or withdrawal (Doherty, Elissa, 2013; Gray Turk, n.d.). Our results can help college students—and their parents, educators, and community members—better understand their own expectations about mobile phone use in their daily lives. This knowledge might be leveraged to promote desired norms, like incorporating mobile phone use for work purposes into classroom pedagogy, and to limit undesirable norms, like waking up in the middle of the night and responding to work emails on the mobile phone.

Implications for CSCW

Identifying norms is important; identifying where and in what contexts there is norm misalignment could help us to promote discussion, respect, and compromise among various social groups and how they use technology (e.g. parents and children, instructors and students). Both descriptive norms and social norms (“The Descriptive Norm” and “The Social Norm”) have been shown to predict future behavior in a variety of contexts (Bicchieri, 2005; Cialdini, 2001). Thus, we might expect that technology norms will be a similarly strong predictor of future behavior. Though CSCW research typically evaluates technology behaviors and attitudes; it has often overlooked technology norms. Norms can shed light on why a social system is adopted heavily or not, or whether a technology meets particular groups’ expectations. This knowledge should impact a variety of CSCW trajectories, such as designing supportive social platforms for new elderly users or for users with disabilities, both groups that might harbor worries about adopting new technologies. Understanding misperceptions and misalignments can also help us to reduce tension and conflict over technology use in everyday life, such as at the gym, in the airplane, or at the dinner table, and design sociotechnical systems to support these uses.

LIMITATIONS AND FUTURE WORK

The survey was conducted with students in select courses at a residential university; it is unlikely results are generalizable to non-traditional college students, a large and often understudied demographic. The norms measurement techniques rely on self-report data. Though norms are by definition self-reports, we did not capture actual mobile phone usage based on phone logs. In future work, we would like to measure technology norms among other demographics and in other contexts where expectations about technology use are in flux (e.g. parents and teenagers’ use of technology in the home). Future research could investigate family norms, such as parent and teen

mobile phone use at the dinner table. We would also like to develop scalable and sustainable techniques for measuring technology norms. A public database of technology norms could be a powerful tool for helping technology researchers, designers, and users to access shared expectations about technology use in everyday life.

REFERENCES

1. Aaron Smith, Lee Rainie, and Kathryn Zickuhr. *College Students and Technology*. Pew Internet, 2011.
2. Aaron Smith. *Smartphone Ownership 2013*. Pew Internet, 2013.
3. Anderson, G.J. Effects of Classroom Social Climate on Individual Learning. *American Educational Research Journal* 7, 2 (1970), 135–152.
4. Arnau, R.C., Thompson, R.L., and Cook, C. Do Different Response Formats Change the Latent Structure of Responses? an Empirical Investigation Using Taxometric Analysis. *Educational and Psychological Measurement* 61, 1 (2001), 23–44.
5. Bennett, S., Maton, K., and Kervin, L. The ‘digital natives’ debate: A critical review of the evidence. *British Journal of Educational Technology* 39, 5 (2008).
6. Bicchieri, C. *The Grammar of Society: The Nature and Dynamics of Social Norms*. Cambridge University Press, 2005.
7. Burke, M., Marlow, C., and Lento, T. Social network activity and social well-being. In *Proc. CHI*, ACM (2010), 1909–1912.
8. Burks, S.V. and Krupka, E.L. A Multimethod Approach to Identifying Norms and Normative Expectations Within a Corporate Hierarchy: Evidence from the Financial Services Industry. *Manage. Sci.* 58, 1 (2012), 203–217.
9. Campbell, S.W. Perceptions of Mobile Phones in College Classrooms: Ringing, Cheating, and Classroom Policies. *Communication Education* 55, 3 (2006), 280–294.
10. Cialdini, R. *Influence: Science and Practice*. Allyn and Bacon, Needham, MA, 2001.
11. Coltrane, S. Research on Household Labor: Modeling and Measuring the Social Embeddedness of Routine Family Work. *Journal of Marriage and Family* 62, 4 (2000), 1208–1233.
12. Common Sense Media. *Hi-Tech Cheating: Cell Phones and Cheating in Schools*. 2009.
13. Deutsch, M. and Gerard, H.B. A study of normative and informational social influences upon individual judgment. *The Journal of Abnormal and Social Psychology* 51, 3 (1955), 629–636.
14. Doherty, Elissa. Campaign aims to shame people over rude mobile phone use. *Herald Sun*, 2013. <http://www.heraldsun.com.au/news/victoria/campaign-aims-to-shame-people-over-rude-mobile-phone-use/story-fni0fit3-1226682495280>.
15. Ellison, N.B., Steinfield, C., and Lampe, C. Connection strategies: Social capital implications of Facebook-enabled communication practices. *New Media & Society* 13, 6 (2011), 873–892.
16. Erping Zhu, Matthew Kaplan, R. Charles Dershimer, and Inger Bergom. *Use of Laptops in the Classroom: Research and Best Practices*.
17. Fried, C.B. In-class laptop use and its effects on student learning. *Computers & Education* 50, 3 (2008), 906–914.
18. Friedman, T.L. Foreign Affairs; The Y2K Social Disease. *The New York Times*, 1999. <http://www.nytimes.com/1999/08/10/opinion/foreign-affairs-the-y2k-social-disease.html>.
19. Gay, G., Stefanone, M., Grace-Martin, M., and Hembrooke, H. The Effects of Wireless Computing in Collaborative Learning Environments. *Int’l. Journal of Human-Computer Interaction* 13, 2 (2001), 257–276.
20. Gary Turk. *Look Up*. <https://www.youtube.com/watch?v=Z7dLU6fk9QY>.
21. Hargittai, E. Digital Na(t)ives? Variation in Internet Skills and Uses among Members of the “Net Generation.” *Soc. Inq.* 80, 1 (2010), 92–113.
22. Hembrooke, H. and Gay, G. The laptop and the lecture: The effects of multitasking in learning environments. *Journal of Computing in Higher Education* 15, 1 (2003).
23. Jackson, J. Structural characteristics of norms. *Current studies in social psychology*, (1965), 301–309.
24. Junco, R. Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Computers in Human Behavior* 28, 1 (2012), 187–198.
25. Krupka, E. and Weber, R.A. The focusing and informational effects of norms on pro-social behavior. *J. of Economic Psychology* 30, 3 (2009), 307–320.

26. Labovitz, S. and Hagedorn, R. Measuring Social Norms. *The Pacific Soc. Rev.* 16, 3 (1973), 283–303.
27. LaBrie, J.W., Hummer, J.F., Neighbors, C., and Larimer, M.E. Whose opinion matters? The relationship between injunctive norms and alcohol consequences in college students. *Addictive behaviors* 35, 4 (2010), 343–349.
28. Lampinen, A., Tamminen, S., and Oulasvirta, A. “All my people right here, right now”: Management of group co-presence on a social networking site. In *Proc. GROUP’09*, (2009), 281–290.
29. LaRose, R., Lin, C.A., and Eastin, M.S. Unregulated Internet Usage: Addiction, Habit, or Deficient Self-Regulation? *Media Psychology* 5, 3 (2003), 225–253.
30. Lee, E.B. Facebook Use and Texting Among African American and Hispanic Teenagers: An Implication for Academic Performance. *Journal of Black Studies*, (2014), 0021934713519819.
31. Lenhart, A., Ling, R., Campbell, S., and Purcell, K. *Teens and Mobile Phones*. Pew Internet & American Life Project, 2010.
32. Lewis, M.A. and Neighbors, C. Social Norms Approaches Using Descriptive Drinking Norms Education: A Review of the Research on Personalized Normative Feedback. *Journal of American College Health* 54, 4 (2006), 213–218.
33. McCreary, J.R. Laptop-Free Zone, The. *Valparaiso University Law Review* 43, (2008), 989.
34. Nelson, D.L. and Quick, J.C. *Understanding Organizational Behavior*. Thomson/South-Western, 2007.
35. Ophir, E., Nass, C., and Wagner, A.D. Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences of the United States of America* 106, 37 (2009), 15583–15587.
36. Palfrey, J. and Gasser, U. *Born digital: understanding the first generation of digital natives*. Basic Books, 2008.
37. Pasek, J., More, E., and Hargittai, E. Facebook and academic performance: Reconciling a media sensation with data. *First Monday* 14, 5 (2009).
38. Perkins, H.W., Meilman, P.W., Leichliter, J.S., Cashin, J.R., and Presley, C.A. Misperceptions of the Norms for the Frequency of Alcohol and Other Drug Use on College Campuses. *Journal of American College Health* 47, 6 (1999), 253–258.
39. Pilcher, J.J. and Ott, E.S. The Relationships Between Sleep and Measures of Health and Well-Being in College Students: A Repeated Measures Approach. *Behavioral Medicine* 23, 4 (1998), 170–178.
40. Rainie, L. and Wellman, B. *Networked: The New Social Operating System*. MIT Press, 2012.
41. Ridder, R.D. and Tripathi, R.C. *Norm violation and intergroup relations*. Clarendon Press, 1992.
42. Ryan, T. and Xenos, S. Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior* 27, 5 (2011), 1658–1664.
43. Schwartz, S.H. and Fleishman, J.A. Personal norms and the mediation of legitimacy effects on helping. *Social Psychology* 41, 4 (1978), 306–315.
44. Shapiro, S. Places and Spaces: The Historical Interaction of Technology, Home, and Privacy. *The Information Society* 14, 4 (1998), 275–284.
45. Tognoli, J. Leaving Home. *Journal of College Student Psychotherapy* 18, 1 (2003), 35–48.
46. Treiblmaier, H. and Filzmoser, P. Benefits from Using Continuous Rating Scales in Online Survey Research. *ICIS*, (2011).
47. Walsh, J.L., Fielder, R.L., Carey, K.B., and Carey, M.P. Female College Students’ Media Use and Academic Outcomes Results From a Longitudinal Cohort Study. *Emerging Adulthood* 1, 3 (2013), 219–232.
48. Warschauer, M. *Laptops and Literacy: Learning in the Wireless Classroom*. Teachers College Press, New York, 2006.
49. Wechsler, H., Nelson, T.F., Lee, J.E., Seibring, M., Lewis, C., and Keeling, R.P. Perception and Reality: A National Evaluation of Social Norms Marketing Interventions to Reduce College Students’ Heavy Alcohol Use. *Journal of Studies on Alcohol and Drugs* 64, 4 (2003), 484.
50. White, K.M., Smith, J.R., Terry, D.J., Greenslade, J.H., and McKimmie, B.M. Social influence in the theory of planned behaviour: the role of descriptive, injunctive, and in-group norms. *The British journal of social psychology / the British Psychological Society* 48, Pt 1 (2009), 135–58.
51. Yamamoto, K. Banning Laptops in the Classroom: Is It Worth the Hassles. *Journal of Legal Education* 57, (2007), 477.

52. Yardi, S. and Bruckman, A. Social and Technical Challenges in Parenting Teens' Social Media Use. In *Proc. CHI '11*, ACM Press, (2011), 3237–3246.
53. Zhao, S. Toward a Taxonomy of Copresence. *Presence: Teleoperators and Virtual Environments* 12, 5 (2003), 445–455.
54. *The social norms approach to preventing school and college age substance abuse: A handbook for educators, counselors, and clinicians*. Jossey-Bass, San Francisco, CA, US, 2003.