**Chapter 2**

Literature Review

Only recently has media multitasking been recognized as a factor worth investigating (Brown & Cantor, 2000; Roberts & Foehr, 2004; Roberts, Foehr, & Rideout, 2005; Roberts, Foehr, Rideout, & Brodie, 1999; The Media Center at the American Press Institute, 2004a; Yahoo! & Carat Interactive, 2003). Often, studies of the use of media such as computers and television are surveys that do not naturally capture simultaneous media use. Roberts and colleagues (1999, 2004, 2005) were the first to use multiple measures to estimate both exposure to multiple media and media use (media exposure reduced by the proportion of time spent doubling up on media).This report analyzes those data in greater detail.

Media multitasking is a condition of being involved in more than one media-related activity at a time (Foehr, 2006; Vega, 2009; Wallis, 2010). People are engaged in media multitasking when they concurrently use different media (for example, reading news online and watching television simultaneously; Foehr, 2006; Roberts & Foehr, 2008), as well as when only one activity is media related (for example, exercising and watching TV simultaneously; Foehr, 2006; Jeong & Fishbein, 2007). This study focuses on behaviors associated with media pairing.

The available evidence suggests that media use is been on the rise. Rideout, Feohr and Roberts (2010) reported that in 2004, about 18 % of 8- to 18-year olds owned mp3 players and 39 % owned cell phones, whereas in 2009, approximately 76 % of these youths were reported to own mp3 players and 66 % reported owning cell phones. Moreover, between 1999 and 2009, the proportion of time spent using more than one medium concurrently increased from 16 to 29 %, respectively. With the increased availability and technological sophistication of media devices, it is reasonable to expect that such trends will continue in the coming years. In addition, the ubiquity of electronic media consumption has given rise to an increase in research aimed at the potential behavioral/cognitive consequences of such frequent consumption. Although past research focused on media use in general has linked the frequency of media consumption with boredom, depression, and scholastic performance (Rideout et al., 2010), more

Recently, research has begun to focus on understanding the ways in which the simultaneous consumption of multiple forms of media impacts cognition and behavior.

To empirically investigate media multitasking, Ophir, Nass, and Wagner (2009) have developed the aptly named media multitasking index (MMI) to evaluate self-reported media multitasking across a variety of different mediums(e.g., print media, texting, music, social sites). In their initial work using the MMI, Ophir et al. (2009) reported some interesting, yet counter-intuitive findings. Namely, heavy media multitaskers (HMMs; i.e., individuals scoring over one standard deviation above the mean on the MMI) showed greater switch-costs in a task-switching paradigm than light media multitaskers (LMMs; i.e., individuals scoring over one standard deviation below the mean on the MMI), and were less able to ignore irrelevant distracting information. Ophir et al. suggested that HMMs might have a greater tendency for bottom-up attentional control and focus their attention more broadly, at the expense of detail, than their LMM counterparts, who in turn, gravitate towards top-down attentional control and have a more narrow focus of attention. This view was supported in a study reported by Cain and Mitroff (2011), who used an attention capture task to show similar differences between individuals scoring low and high on the MMI. More recently, Sanbonmatsu Strayer, Medeiros-Ward, and Watson (2013) demonstrated that contrary to intuition, compared to LMMs, HMMs also show greater performance detriments while dual-tasking. Taken together, this research seems to suggest that HMMs deploy their attention more broadly than LMMs and that the focus of their attention might be driven in a largely ‘bottom-up’ or stimulus-driven manner, which ultimately leads them to process a greater amount of distracting information.

However, not all research on media multitasking converges on the foregoing conclusion. For example, Alzahabi and Becker (2013) recently observed that HMMs were actually better able to switch between tasks than LMMs, and that the two groups did not differ in their ability to dual-task. Meanwhile, Minear Brasher, McCurdy, Lewis, and Younggren (2013) found no differences in switch-costs between heavy and light media multitaskers. Collectively, these studies demonstrate that the relation between media multitasking and laboratory measures of attention is not as clear as one might hope.

In the present study, we wanted to take a step away from behavioral laboratory measures of attention and instead, focus on the association between media multitasking ands elf-reported attentional functioning in everyday life. Although there have been a few studies examining the association between media multitasking and various self report measures, these studies have primarily focused on affective well-being (Pea et al., 2012; Rideout et al.,

2010;Shih, 2013), personality traits (Minear et al., 2013;Ophir et al., 2009; Sanbonmatsu et al., 2013) or beliefs about/reasons for multitasking behavior (Sanbonmatsu et al., 2013; Wang and Tchernev, 2012). In general, these studies have indicated that media multitasking is associated with negative well-being (Pea et al., 2012; Rideout et al., 2010), as well as greater impulsivity (Minear et al., 2013; Sanbonmatsu et al., 2013) and sensation seeking (Sanbonmatsu et al., 2013). Moreover, people seem to engage in media multitasking under the belief that they are well equipped to do so (Sanbonmatsu et al., 2013), or because it satisfies certain affective needs (Wang and Tchernev, 2012). Here, we address the possible relation between media multitasking (indexed by MMI scores) and self reported attentional experiences in everyday life, namely:

(1) Lapses of attention and attention-related cognitive errors (2) spontaneous and deliberate mind wandering, and (3) attentional control with a focus on attentional switching

And distractibility.

Ulla Foehr, who also worked on the 2005 KFF survey, reviewed some of its findings: Eighty percent of young people engage in media multitasking. And, whereas television is the least multitasked medium—only 17 percent of TV time is paired with another medium—computers, predictably, are the most multitasked medium. In fact, two-thirds of the time kids are on computers, they are engaged with other media, and those who have a computer and

can see a TV from that computer do more media multitasking. Foehr noted that it will be interesting to see if this distinction is maintained as TV and computer converge. Finally, a significant minority of youth—15 to 20 percent—do not engage in media multitasking.

Participants in a seminar carried out have also shown that dividing attention takes a toll on learning and meta cognition, or the awareness of one’s learning. Lori Bergen, for example, demonstrated that people retain less information from a CNN broadcast that includes a news crawl at the bottom of the screen than from one that doesn’t. Multitasking while learning appears to affect both the quality of learning and where we later process the lesson in the brain, according to research by psychologist Karin Foerde of Columbia University. fMRI scans indicated that subjects who learned a weather prediction task while performing another task did more processing in the striatum and less in the medial temporal lobes compared with subjects who were not forced to multitask. The single-task learners also had a deeper, more flexible understanding of the weather prediction task.

One of the major factor that predicts level of multitasking in the 21st century—the information age—is the diffusion of information and communication technologies (ICTs). Countries around the world have adopted new technologies to varying degrees, creating a “digital divide” (Norris, 2001, p. 3). Norris (2001) argues that, when analyzing cross-national differences in technology use, comparisons should go beyond technology distribution. The socioeconomic and democratic development of each country must be taken into account. Warschauer (2003) also moves beyond the focus on the traditional interpretation of access to technology, a divide between the haves and have-nots, suggesting that issues of conduits (e.g., whether a person has a working Internet connection) and literacy (e.g., whether a person knows how to use technology) as well as other physical, digital, human, and social factors should be included in the mix. Building on this argument, the present study describes three national media markets with regard to not only new technology diffusion and growth but each country’s socioeconomic and democratic developments.