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Gender, technology use and ownership, and media-based multitasking among middle school students

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ABSTRACT

We propose and test a new explanation for why more girls than boys multitask with media. We argue that gender differences in technology use and ownership function as the proximal cause for these gender differences in media multitasking. Prior literature suggests different patterns of technology ownership, such as more girls owning MP3 players and cell phones and more boys owning gaming systems. Further, on average, girls spend more time listening to music and communicating over media, while boys spend more time playing games. Those with the highest levels of ownership and use of a specific type of media may be the most likely to multitask with that media. We test our argument with a sample of middle school students, a group underrepresented in multitasking studies. The data support our arguments with ownership and use partially explaining the greater percentage of girls that multitask with music and communication media. Contrary to our predictions, the percentage of boys and girls who multitask while gaming did not significantly differ. We discuss potential explanations and conclude with implications for future research on gender differences in multitasking, youth and multitasking, and technology and media multitasking.

1. Introduction

Increasingly youth engage with a variety of media platforms and applications at the same time. Whereas multitasking itself is not new, the proliferation of multitasking among children and young adults aided by new technology is fairly recent (Foehr, 2006; Jeong & Fishbein, 2007; Rideout, Foehr, & Roberts, 2010; Roberts & Foehr, 2008). This prevalence has sparked new research into understanding the forms, antecedents, and consequences of multitasking and whether, how, and why they differ by gender. We ask: how does the relationship between media-based multitasking and technology use and ownership differ for middle school girls and boys?

We make two primary contributions to the gender and media-multitasking literature. First, in spite of the youth culture associated with ubiquitous technology use, much of the previous research that considers specific technology use and multitasking has focused on college-students or adults (Carrier, Cheever, Rosen, Benitez, & Chang, 2009; Junco & Cotten, 2011, 2012; Karpinski, Kirschner, Ozer, Mellott, & Ochwo, 2012; see Brasel & Gips, 2011 for a comparison; and see Pea et al., 2012 for an exception), not on adolescents who are rapidly embracing these technologies. We focus on middle school youth because they are expanding their technology use (Rideout et al., 2010) and their multitasking (Foehr, 2006), as well as negotiating their gender identities (Arnett, 2009). Second, most research on media-based multitasking and gender simply reports differences in time spent multitasking or measures of multitasking ability. This study investigates use and ownership patterns of technology platforms as a potential explanation for gender differences in media-based multitasking.

1.1. Media-based multitasking and youth

Multitasking involves switching between tasks, alternating attention from one task to the next (Jackson, 2008; see also Judd, 2013). Being able to respond to new, more time sensitive tasks and interruptions and then returning to prior tasks can be valuable in school, work, and social arenas (Klingberg, 2008). However, cognitive research suggests that constantly shifting one's attention can tax one's capacity for processing, remembering, and thinking deeply about content (Chun, Golomb, & Turk-Brown, 2011; Lee, Lin, & Robertson, 2011; Mayer & Moreno, 2003; Ren, Zhou, & Fu, 2009).

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Due to this cognitive drain, many have found that some types of multitasking can have a negative influence on academic (Junco & Cotten, 2011; Junco & Cotten, 2012; Lee et al., 2011; Sana, Weston, & Cepeda, 2013; Wood et al., 2012; but see Bowman, Levine, Waite, & Gendron, 2010 for an exception) and socioemotional outcomes (Pea et al., 2012).

Increased engagement with media technologies (Lenhart, Purcell, Smith, & Zickuhn, 2010; Rideout et al., 2010; Roberts & Foehr, 2008) has facilitated increased multitasking among youth. Rideout et al. (2010) found that 11- to 14-year old US children are exposed daily to 12 h of media in less than 9 h of time, indicating the use of multiple medias simultaneously. Similarly, Jeong and Fishbein (2007) found that 76% of total time spent on media (digital and otherwise) is spent multitasking (about 28 h per week). As one is exposed to more types of media and as one spends more time using media, media multitasking increases (Rideout et al., 2010; Roberts, Foehr, & Rideout, 2005).

Generally, younger people spend more time multitasking than older generations (Carrier et al., 2009), although some evidence suggests that both youth and older adults multitask more that young and middle aged adults (Voorveld & van der Goot, 2013). Youth, however, tend to have the highest levels of multitasking with certain types of media, including websites, social media, and music (Voorveld & van der Goot, 2013). Furthermore, youth switch between media more frequently and faster than older adults (Brasel & Gips, 2011). In spite of the relationship of youth to both technology and technology-based multitasking, most studies of multitasking are limited to college students and older adults (Adler & Benbunan-Fich, 2013; Brasel & Gips, 2011; Carrier et al., 2009; Judd, 2013; Judd & Kennedy, 2011; Junco & Cotten, 2011, 2012; Sana et al., 2013; Wood et al., 2012). Research on multitasking among children and teenagers is limited to multitasking's role in other outcomes (Collins, 2008; Rosen, Carrier, & Cheever, 2013; Zhang, Jeong, & Fishbein, 2010), or multitasking's prevalence based on demographics (Rideout et al., 2010) and psychological factors (Jeong & Fishbein, 2007).

1.2. Media-based multitasking and gender

Gender, historically an important factor in the digital divide (Bain & Rice, 2006; Jackson, Ervin, Gardner, & Schmitt, 2001; Schumacher & Morahan-Martin, 2001), no longer plays a significant role in *overall* technology access and use. However, gender differences still exist in the use of particular types of technology. For example, Cotten, Anderson, and Tufekci (2009) found that there were few gender differences in communication uses of mobile phones, but males still exhibited greater use of mobile phones for recreational uses such as gaming, photos, and video. Hargittai and Walejko (2008) discovered that although there was gender parity regarding access to information and communication technologies, certain activities, such as sharing creative digital content online, still show marked gender differences. Moreover, these differences disappeared when the web user's ability was taken into account.

Although older teen girls are more likely to create and maintain blogs compared to older teen boys, boys are more likely to share and upload videos using websites such as YouTube (Lenhart, 2007). Among 8 to 18 year olds, boys spend more time using computers than do girls, but much of this time is spent gaming. Girls, however, report spending more time on social networking sites, listening to music, and online reading than boys (Rideout et al., 2010).

Many studies suggest mechanisms by which boys and girls differently engage with media technology. Within western society, for example, different gaming markets and cultures have developed for boys and girls (Cassell & Jenkins, 2000; Eden, Maloney, & Bowman, 2010). One mechanism would be the influence of game marketers and producers as they create media targeted for one gender: as more boys or girls engage with that media, gendered norms influence who uses what. Another mechanism could be the documented psychological differences between boys and girls related to their engagement with technology. Neural and hormonal differences between boys and girls lead to cognitive preferences (Kimura, 2000) which at some level influence technology use. Boys and girls also differ on interpersonal needs such as control, affection, and inclusion, suggesting media and technology that better address those needs would be adopted at a higher rate (Lucas & Sherry, 2004). And, numerous social and behavioral studies have focused on the importance of gender socialization for youth from parents, peers, schools, and the media (Dietz, 1998; Eccles, Jacobs, & Harold, 1990; Schumacher & Morahan-Martin, 2001; Vekiri & Chronaki, 2008).

Regardless of the mechanisms at play, technology differences should correspond to differences in particular types of media-based multitasking. Limited research has shown that gender influences multitasking behavior among middle school students. Rideout et al. (2010) report that among 7th to 12th grade students girls are more likely to report multitasking than boys. In a sample of 14- to 16-year olds, girls spend more time multitasking than boys (Foehr, 2006), yet teenage girls tend to multitask with different types of media than boys (Foehr, 2006; Jeong & Fishbein, 2007).

Foehr (2006) connects these findings by suggesting the gender differences in multitasking are due in part to the types of media that girls use: instant messaging, email, websites, and music. These types of activities may lend themselves to multitasking because one can either pay less attention to them if something else is more pressing (e.g., music) or switch back and forth because they do not require continuous attention (e.g., instant messaging, email, and websites). Video and computer games, on the other hand, require a great deal of attention and concentration. This paper addresses a proximate cause of gender differences by exploring how inequality in use and ownership of technology platforms alter both overall and specific-media patterns of multitasking.

2. Hypotheses

We examine whether gender differences exist in multitasking, but also *how* they differ. No study of this age group has explored in detail the relationship between gender, technology use and ownership, and media-based multitasking. In order to discriminate between different relationships we include three types of variables on different aspects of technology and media. First, we consider the ownership of different platforms such as desktop computers and cell phones. Second, we also consider time spent using these platforms. Third, we classify the activities involved in media multitasking, such as surfing the web and talking on the phone, without reference to the platform on which these occur. We start with a set of baseline hypotheses about the relationship of gender to technology ownership and usage before considering the effects of multitasking. First, based on the prior research on technology ownership and use among boys and girls,

Hypothesis 1. More girls will own and use communication and music platforms compared to boys.

Hypothesis 2. More boys will own and use gaming platforms compared to girls.

Note that we make no hypotheses about gender difference in use or ownership of the most general platforms, laptops and desktops. Next, the research on engagement with technologies and multitasking leads us to propose,