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Forecasting errors in student media multitasking during homework completion

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ABSTRACT

Media multitasking during homework completion has reached epidemic proportions in the modern educational environment. There is a crucial need to resolve the paradox of why students engage in these behaviors, even though they are linked to self-control and performance decrements. We evaluate the proposition that student media multitasking decisions are made in the context of inaccurate forecasts regarding the influence of these behaviors on affect, self-control, and performance. After providing forecasts to estimate the effects of media availability and media removal on these outcomes, sixty college students ($N = 60$) were randomly assigned to alternative media availability conditions as they completed an actual homework assignment during an in-lab session. Students predicted media use to result in lower negative affect and diminished self-control. The direction of these forecasts was accurate, with media availability resulting in decreased negative affect and diminished self-control during the homework session. Nevertheless, students exhibited moderate to large forecasting errors in predicting the magnitude of these effects. Although no evidence was attained to demonstrate forecasting errors when predicting homework performance, exploratory analyses suggested the presence of individual differences in the nature of these predictions, with 53.3% of participants predicting a performance decrement, 23.3% of participants predicting no difference, and 23.4% of participants predicting a performance gain under conditions of media availability. We discuss the implications of these findings for students and educators.

1. Introduction

Imagine that your boss has assigned you to update your department's website, a task that promises to be time consuming and boring to you. You plan to get through it by taking periodic breaks to surf the Internet, check your e-mail, and use your smartphone. How might access to these technologies—or lack thereof—influence your mood, self-control, and performance of this task? How would these effects compare to your predictions, such as forecasting how positive or negative you would feel if forced to avoid these potential distractions?

Students frequently multitask with media while completing homework (Calderwood, Ackerman, & Conklin, 2014; Foehr, 2006), despite evidence that these behaviors are associated with reduced academic performance (Junco & Cotten, 2012) that

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may stem from diminished self-control (Panek, 2014). When considering *why* students multitask with media, investigators have linked these behaviors to indicators of affective experience, such as negative affect (NA) (Calderwood et al., 2014) and emotional need satisfaction (Wang & Tchernev, 2012). However, researchers have yet to investigate the nature and accuracy of predictions that students make about the influence of media multitasking on their affect, self-control, and performance. We evaluate the possibility that media multitasking decisions in the homework environment are being made in the context of inaccurate affective, self-control, and performance forecasts.

We begin by providing an overview of the homework environment as a context in which to study media multitasking and discuss the strong need to understand factors motivating media use in the current college student population. Next, we describe alternative explanations for student media multitasking and identify students' beliefs and expectations as an understudied but important potential factor that may contribute to these behaviors. Following this discussion, we detail and provide justification for a series of hypotheses targeted at explicating the nature and accuracy of student media multitasking forecasts in the homework environment. The remainder of this paper is spent describing an experimental study designed to test these predictions in a college student sample.

1.1. Media multitasking in the homework environment

In the last decade, researchers have increasingly recognized that students frequently multitask with media while engaged in a range of academic tasks (Calderwood et al., 2014; Foehr, 2006; Fried, 2008; Hembrooke & Gay, 2003). From a theoretical perspective, media multitasking that occurs in the homework environment is a particularly interesting phenomenon, as this relatively unconstrained context allows students the opportunity to engage in a variety of behaviors along the multitasking continuum, which is argued to range from *concurrent* (i.e., two tasks at essentially the same time) to *sequential* (i.e., one task after the other) multitasking behaviors (Salvucci, Taatgen, & Borst, 2009). For example, when students exhibit micro-level deviations of attention away from their homework task to quickly respond to text or instant messages, they are performing behaviors that lie closer to concurrent multitasking. In contrast, when students take a prolonged break from their homework task to watch a video on YouTube, their behavior is more indicative of sequential multitasking. The richness of the homework environment as a media multitasking context is further enhanced when considering that such behaviors may be *productive* (i.e., texting a classmate to ask a clarifying question) or *distractive* (i.e., scrolling through Facebook) (Kraushaar & Novak, 2010). Accordingly, the homework environment is an ideal context in which to study the correspondence between students' expectations and experiences in relation to media multitasking, as this context allows them to engage in a diverse range of multitasking behaviors.

At this time, there is a prevailing view that the contemporary college student population typically take advantage of the media multitasking opportunities that the unconstrained homework environment affords. Often identified as the Net generation (Tapscott, 1998) or as Digital Natives (Prensky, 2001), it has been argued that within this group "… there seems little doubt that for a majority of students digital media and technologies play a key role in their personal and learning lives" (Judd, 2013, p. 358). Although critics have correctly pointed out that technology usage patterns within this group of students may not be as homogenous as their identifying monikers imply (e.g., Kennedy, Judd, Churchwald, Gray, & Krause, 2008), evidence suggests that many of these students use technology in the homework environment for non-schoolwork purposes (Calderwood et al., 2014), despite the potential negative impact of these behaviors on academic performance (Junco & Cotten, 2012). Accordingly, unlocking the paradox of why students engage in these potentially detrimental behaviors is a particularly salient research need within the contemporary college student population.

Extant explanations for media multitasking behaviors have tended to focus on situational contingencies, individual preferences (e.g., Cotten, Shank, & Anderson, 2014; Rosen, Carrier, & Cheever, 2013), and student motives (e.g., Hwang, Kim, & Jeong, 2014; Wang & Tchernev, 2012; Zhang & Zhang, 2012). For example, in a recent cross-sectional survey of Internet users in the United States and Taiwan, Kononova and Chiang (2015) found greater media multitasking behaviors to be predicted by media ownership, polychronicity (a tendency to do multiple things simultaneously; König & Waller, 2010), and four specific motives (control, entertainment, connection, and addiction). Taking a more process-based view of multitasking, other investigators have drawn inspiration from ego depletion perspectives that argue self-control to represent a limited resource (see Baumeister, Vohs, & Tice, 2007), conceptualizing media multitasking as a lack of self-regulation (Zhang, 2015). Although these efforts have illustrated enduring characteristics and motives driving student media use, as well as processes that may underlie off-task distraction while completing homework, there has been substantially less emphasis on the potential contributions of students' beliefs and expectations to media usage behaviors in the homework environment. Such an oversight is significant, in light of the long-standing recognition that beliefs and expectations contribute to behavioral intentions and actions (Fishbein & Ajzen, 1975). In the following sections, we develop and justify specific hypotheses targeted at explicating the nature and accuracy of expectations that students hold about the influence of media multitasking on affect, performance, and self-control in the homework environment.

1.2. Media multitasking and affect

Negative and positive affect (NA and PA) respectively refer to the experience of negative and positive mood states (Watson, Clark, & Tellegen, 1988). There have been few efforts to explore the relationships linking student media multitasking to these affective experiences (Calderwood et al., 2014; Mauri, Cipresso, Balgera, Villamira, & Riva, 2011), and no studies to our