



Media usage diminishes memory for experiences

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ABSTRACT

People increasingly use social media to record and share their experiences, but it is unclear whether or how social media use changes those experiences. Here we present both naturalistic and controlled studies in which participants engage in an experience while using media to *record* or *share* their experiences with others, or not engaging with media. We collected objective measures of participants' experiences (scores on a surprise memory test) as well as subjective measures of participants' experiences (self-reports about their engagement and enjoyment). Across three studies, participants without media consistently remembered their experience more precisely than participants who used media. There is no conclusive evidence that media use impacted subjective measures of experience. Together, these findings suggest that using media may prevent people from remembering the very events they are attempting to preserve.

1. Introduction

Each day, people share almost 5 billion posts to Facebook, 500 million tweets to Twitter, 70 million pictures on Instagram, and 12 years worth of video to YouTube (Krikorian, 2013; LePage, 2015; Zephoria, 2016). Mobile devices have allowed media to permeate our experiences—we take Facebook, Twitter, Instagram, and other social media services with us everywhere. The ubiquity of these practices belies their novelty; never before have people been able to use media to record and share their experiences so easily. This sea change in people's interaction with technology highlights a key question: does using media to record and share events change the way people experience those events?

People use media in myriad ways. Here, we examine how experiences change when people are experimentally induced to *not* use media, use media to *record* their experiences, or use media to *share* their experiences with others. In each study, we assess *memory* using a performance measure of how well participants retain the details of an experience. In addition, we measure self-reported feelings of *enjoyment* – the affective value of an experience – and *engagement* – how present and mentally focused participants felt during an experience. Previous research has investigated the consequences of media use on each of these factors largely independently. Here, we aim to provide a comprehensive assessment of the consequences of media using multiple measures concurrently.

Media use might impact experience for multiple reasons. First, using media can *interrupt* an experience by inducing multitasking (Bowman, Levine, Waite, & Gendron, 2010). Second, media allow people to *externalize* their experience by giving them a way to capture aspects of experience. Third, media allow people to *save* experiences in the form of photographs or posts. Fourth, social media allow people to *share* their experiences—to record and save experiences not just for themselves, but also for others. Study 1 explicitly tests how these four independent features of media use might impact memory, engagement, and enjoyment of an experience using a controlled computer-based experience; Studies 2 and 3 then tests how media use impacts a real-world experience.

1.1. Memory

To date, most research on media use suggests that both recording and sharing experiences should diminish the extent to which a person retains detailed memories of that experience, for at least two reasons. First, media use requires multitasking (e.g., recording and posting about an event while it occurs). Multitasking has been shown to decrease concentration (Fried, 2008) and reduce absorption in experiences (Ross, 2011). In academic environments, media multitasking (e.g., laptop use in classrooms) has been linked to decreases in academic success, presumably because multitasking impairs memory for

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lecture content (Dietz & Henrich, 2014; Gaudreau, Miranda, & Gareau, 2014; Hembrooke & Gay, 2003; Sana, Weston, & Cepeda, 2013). Together, these studies suggest that the broader impact of using media is that it should impair memory for that experience.

Second, people sometimes use such devices as a mnemonic “crutch,” offloading information onto them and then forgetting that information (Soares & Storm, 2017; Sparrow, Liu, & Wegner, 2011; Ward, 2013). Indeed, recent work provides direct evidence that taking photographs impairs memory (Henkel, 2014; Zauberman, Silverman, Diehl, & Barasch, 2015). In one study, participants who took photos of objects in a museum remembered fewer objects and fewer details about these objects (Henkel, 2014). Media use may further impair memory for the features of an experience one does not record. For example, in a study that allowed participants to freely take photographs, participants showed enhanced visual memory but impaired auditory memory for photographed events (Zauberman et al., 2015). This research provides converging support for our prediction that media use will impair memory for experiences.

1.2. Enjoyment and engagement

Media usage might also affect subjective experiences of an event, for example, how much a person enjoys or is engaged in an experience. However, previous research on how media might impact these aspects of experience provides a mixed picture.

For example, previous research suggests that media might both enhance and detract from *enjoyment* of an experience. A recent series of studies found evidence that taking pictures may bolster participants' enjoyment of the experiences they are photographing (Diehl, Zauberman, & Barasch, 2016). Social media may further boost enjoyment of an experience if people receive and enjoy positive social feedback on their posts (Lambert et al., 2016; Reis et al., 2010). However, media has also been shown to decrease enjoyment. To the extent that using media creates distraction and/or induces mind wandering (Ralph, Thomson, Allan, & Daniel, 2014), it could also decrease enjoyment (Killingsworth & Gilbert, 2010). Social media may be especially likely to decrease enjoyment when people use it as a forum for social comparison (Kross et al., 2013; Shakya & Christakis, 2017; Verdun et al., 2015). Individuals might worry about how to present themselves to audiences when posting to social media. Indeed, a recent study found that participants who took pictures with the intention of sharing them reported being concerned with how to present themselves, which in turn reduced their enjoyment of the experience (Barasch, Zauberman, & Diehl, 2016).

The effects of media usage on *engagement* with an experience are similarly unclear. On the one hand, using media can help direct attention toward an experience. Taking a picture may encourage the photographer to notice details she wouldn't have noticed otherwise. Participants assigned to take pictures during an experience report more engagement with that experience than participants who do not take pictures (Diehl et al., 2016). However, this effect disappears when taking a large number of photographs (Barasch, Zauberman, & Diehl, 2013) or when the photography interferes with the experience, for instance by obscuring one's view with a camera (Diehl et al., 2016). Multitasking, another feature of media usage, also reliably impairs engagement (Bowman et al., 2010; Fried, 2008; Hembrooke & Gay, 2003; Ross, 2011) and increases mind-wandering (Ralph et al., 2014).

Prior research does not paint a clear picture of how media use might impact more subjective aspects of people's experience, such as engagement and enjoyment. Indeed, people are notoriously ill-equipped to introspect (Nisbett & Wilson, 1977) and accurately forecast (Wilson & Gilbert, 2003) about their own experiences. As such, self-reports about how much a person enjoys or is engaged in an experience may be tenuous, especially in the noisy, naturalistic contexts within which people most often use media. While social media seem most likely to impair subjective experience, the research to date provides a mixed

picture, at best, for how these effects might apply to media use more generally.

1.3. Overview

Here, we examine the effects of media use on both memory and subjective experience, using two complementary approaches. First, we assessed the effects of media use in a controlled context by distilling “media use” into multiple components. In Study 1, participants watched a TED Talk on their computers. While watching the talk, some participants were asked to complete a task that either required media use (i.e., recording or sharing the experience) or elicited only one feature of media use (i.e., interrupting the experience or externalizing the experience); other participants simply watched the talk without completing any additional tasks. Next, we assessed the effects of media use during a naturalistic experience. In Studies 2 and 3, participants used media to record or share their experience of a self-guided tour of a landmark. As in Study 1, these participants were compared to those who experienced the tour without using any media. Participants in Study 2 completed the tour by themselves whereas participants in Study 3 completed the tour in pairs.

In all studies, participants reported on their experiences using comparable self-report and memory performance measures. This allowed us to compare the effects of media use across multiple contexts: controlled vs. naturalistic, and individual vs. social. Based on the existing literature, we predicted that media use would consistently impair memory across all contexts. It was less clear how media use would impact subjective measures of engagement and enjoyment.

2. Study 1

Across a variety of media platforms, people can record text, photos, or videos. These recordings can be kept personal or they can be shared with others. For our initial investigation of how media use impacts experiences, we attempted to isolate facets of media use that are common across a range of media platforms. Specifically, in Study 1, we test how four independent features of media use might impact experiences: interrupting, externalizing, saving, and sharing. We tested the impact of each media feature on participants' memory, engagement, and enjoyment of an experience.

In a pilot study, we found that media use disrupts memory specifically when people *externalize* an experience, and not simply due to other features of media such as saving experiences or sharing them with others (see Supplementary materials for details; data for this pilot study are posted on OSF). We sought to replicate these findings in Study 1 using a design preregistered on the Open Science Framework (osf.io/uwbwt).

2.1. Methods

2.1.1. Participants

Participants ($N = 382$, 239 female, $M_{age} = 37.47$) were randomly selected to watch one of two TED talks (video one $N = 191$; video two $N = 191$). A total sample size of 396 participants was set a priori to match the sample size from the pilot study (see Supplement); data collection stopped once this target was reached. The automatic randomization procedure used by the online survey platform, Qualtrics, to assign participants to conditions resulted in slightly unequal sample sizes across conditions. The Institutional Review Board at Stanford University, the University of Texas at Austin, or Princeton University approved this study and all following studies. All participants in all studies provided informed consent.

2.1.2. Procedure

Participants were recruited through Amazon Mechanical Turk and completed the study using their personal computers for \$0.75.

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