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RESEARCH ARTICLE

The mnemonic consequences associated with sharing personal photographs on social media

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Abstract

Social media provides an easy and ubiquitous means by which individuals can curate and share their personal experiences while also interacting with their friends, family, and the world at large. One means by which individuals can craft their personal past via social media is through their personal photographs. However, psychologists are only beginning to appreciate the mnemonic consequences associated with sharing personal photographs on social media. The aim of this manuscript is to distil the relevant, psychological research examining the mnemonic consequences associated with photography and sharing personal photographs on social media. To this end, we discuss how a psychological approach to memory has evolved from an individualist perspective to one that is beginning to appreciate the importance of a memory ecology. We then turn to photographs as an important component of one's memory ecology and how the act of photography and sharing photos on social media may have important consequences for how individuals remember their personal past. We then end with a discussion surrounding pertinent avenues for future research. We advocate that, moving forward, psychologists should better appreciate (1) the collective nature of social media, (2) an individual's memory ecology, and (3) the mnemonic consequences associated with social media *silence*. In addressing these issues, we believe that psychologists and memory researchers, more generally, will gain a fuller understanding of how, and in what way, personal photographs, and the act of sharing them via social media may shape the way individuals remember their personal past.

Keywords: Memory; Memory ecology; Photographs; Social media

Sharing personal photographs on social media is a popular means by which individuals share their personal experiences while also interacting with their friends, family, and the world at large. Indeed, adults and youths alike frequently use social media apps (eg, *Instagram*) designed to easily share both personal and public (eg, news related) photographs (Auxier and Anderson 2021; Hu et al 2014). The proliferation of misinformation (eg, through photographs) has captured academics' and the public's attention, alike (eg, Fenn et al 2019; Lewandowsky et al 2012; Mitchell et al 2019; Sacchi et al 2007; Valenzuela et al 2019; Wang et al 2019) and rightfully so: approximately 3.2 billion images are shared online each day (Thomson et al 2020) and, as Lewandowsky et al (2017) argue, we are entering a post-truth world where reality may depend on the whims and fancies of, for example, social consensus as opposed to the truth (Zubiaga and Ji 2014). Here, however,

we are interested in two less explored areas at the nexus of social media and remembering: personal experiences and photographs (see Schacter 2022 for a review of the burgeoning research). Researchers have begun examining the former in terms of how and why (ie, their motives) individuals may share their personal experiences on social media (eg, Luchman et al 2014; Stone et al 2022; Wang 2020; Wang et al 2016; see Stone and Wang 2019 for a review) and why individuals may take photographs more generally (Soares and Storm, 2022). We are principally interested in the mnemonic consequences associated with sharing personal photographs via social media on how individuals remember their personal past. Much like the psychological research examining social influences (more specifically, conversational remembering), the answer is complex (Hirst and Echterhoff 2012; Stone et al 2012). The simple act of sharing personal photographs on social media does not necessarily imply subsequent, veridical recollections through rehearsal effects. What will ultimately matter are the socio-cognitive processes undertaken on the part of the social media producer, their audience and how the producer and audience interact with and shape the memory ecology (ie, memory environment; Hoskins 2016, see also Hoskins 2011; Hutchins 2010) to understand when sharing personal photographs on social media will lead to remembering and/or forgetting. Aside from the simple act of sharing, two related factors will likely prove critical: (1) perceptions of the audience on the part of the producer and (2) the actual interactions with the photograph on behalf of the audience. In terms of the former, research has shown that a stimulus is more 'psychologically and behaviourally prominent' when believed (but not necessarily correct) to be experienced with similar others (eg, Shteynberg 2010), a phenomenon that may occur both at the act of photography (eg, with, perhaps, a potential audience in mind, Fawns 2014) as well as when shared on their social media platform knowing their friends and family will view the shared photograph.

As for the latter, sharing personal photographs commences a set of cascading interactions, both, at some level out of and in others within, the control of the producer (eg, likes, comments, responses, etc.). Thus, to truly appreciate this memory ecology and the subsequent mnemonic consequences, researchers will need to appreciate: (1) the goals/motivations/perceptions in the moment of photography, (2) the capturing and sharing of the photograph on social media and (3) the interactive nature of social media with others surrounding the photograph. For the purposes of this paper, we focus on (2) and will return to the more social aspects of social media (eg, 1 and 3) in the discussion.

Thus, the aim of the present work is to succinctly discuss[1] the emerging research that has examined the act of photography and how its evolution in the digital age shapes the way individuals remember their personal past. We then turn to the nascent research examining how sharing these photographs via social media may facilitate (or not) the recollection of their personal past. To this end, we will first briefly discuss the (Western) history of the psychological science of memory with a focus on how researchers have moved from a more individualistic to a more ecological (ie, environmental) approach to human memory, with an emphasis on photography as an important component of one's memory ecology. Second, we discuss how digital photography and the act of sharing photographs via social media may shape the way individuals remember their personal past. Last, we end with some avenues for future research and concluding thoughts.

Before moving on, however, it is worth highlighting an important distinction Schacter (2022) raises when we talk about 'memory' or 'remembering' as it pertains to media and

[1] Given the spirit of the journal, we do our best to avoid disciplinary-specific terms (though, if we do, we will define them) as well as attempt to avoid the 'weeds' of individual studies. The focus will be on conveying the gist and primary take-aways from each study, which will also have the secondary benefit of brevity.

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technology. That is, whether such mnemonic effects are task-specific (ie, to that specific task), domain-specific (ie, to that specific task as well as related tasks within that domain), and domain-general (ie, they apply to memory and/or cognitive processes more broadly). We agree with Schacter's assessment that, at the moment, the mnemonic consequences associated with sharing photographs on social media are likely task-specific. Given the confluence of socio-cognitive processes that occur when sharing personal photographs on social media, the mnemonic consequences are likely limited to those personal experiences shared on social media and do not influence non-photographed and non-shared personal experiences, but future research is needed to test the boundaries of such an assertion. Thus, moving forward, any discussion of the mnemonic consequences associated with photographs and sharing them on social media are assumed to be task-specific.

From the individual to a memory ecology

A scientific, psychological approach to studying human memory emerged in the late 19th century, with Hermann Ebbinghaus (1850–1909) using meaningless material consisting of three and four strings of letters as the to-be-remembered material (Ebbinghaus 1885; Hoffman et al 1997; see also Danziger 2008). The use of meaningless material is clear: An attempt to understand how the brain remembers the past independent of any prior learning, social context, and/or environmental factors – the brain in isolation. However, over the course of the 20th century, psychologists began to appreciate the inherently social nature of, not only the 'to-be-remembered' material, but also humans themselves (Hirst and Stone 2015). Notably, for example, Bartlett's seminal work helped draw psychologists' attention to the importance of culture in how we appraise and remember the past – humans are not blank slates when they attempt to remember material. Rather, their experiences, biases, and expectations influence and shape how they remember the past (Gutchess and Indeck 2009). Later in the 20th century, renowned psychologist Ulric Neisser called for memory researchers to examine more meaningful materials (eg, personal memories) and in more meaningful contexts (eg, conversations among friends and family). Since then, there has been an explosion of research examining how social influences shape the way individuals and groups remember the past (see, eg, Hirst and Echterhoff 2012; Hirst and Stone 2015; Stone and Jay 2019). For example, psychologists have examined how conversations among family and friends shape how they remember both personal and public memories (eg, Stone et al 2013, 2014).

However, missing from the above narrative is a critical figure whose influence helped transition psychological research to a more ecologically valid approach to human memory: Lev Vygotsky (1896–1934). Vygotsky was a Soviet psychologist, largely unknown to most Western psychologists until late in the 20th century. Principally focused on child development, Vygotsky's work has had a profound and long-lasting impact on the field of memory research. Notably, Vygotsky emphasised the inherent connection between the individual and their environment (Vygotsky and Luria 1994; see also Stetsenko 2004). That is, to appreciate how individuals think and behave, one must also appreciate their environment. Such work has subsequently helped lead philosophers and psychologists alike to question where the mind begins and where the mind ends (eg, our tools? the environment? Clark and Chalmers 1998). More critically, this has led researchers to better appreciate the interconnectedness between the individual and their environment in understanding how humans, and groups alike, cognitively process the world around them, what, for example, Hutchins (2010) refers to as cognitive ecology (see also Sutton 2010). Humans, as social creatures, are intimately intertwined with other humans, resources, tools, and the environment more generally (Hirst and Stone 2015). Only by

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incorporating these into our understanding of what it means to remember, will we have a more holistic understanding of how and when individuals and groups remember both their personal and collective pasts, respectively.

With this ecological approach in mind, we focus here on personal photography as an external resource or tool by which individuals can use to craft their own 'memory ecology' (again, see Hoskins 2016; 2011). We focus on the ability to extend these photographs onto the internet and share them worldwide and the implications for how individuals remember their personal past. We focus on photographs for several reasons: first, photographs seemingly represent an 'uncorrupt' representation of the past, but more on this later (see, eg, Fawns 2014); second, and especially with the advent of digital cameras and cameras on smart phones, photographs are an easy and ubiquitous means by which individuals are able to externalise their personal past and craft their own memory ecology; third, photographs are a popular means by which individuals share their personal experiences on social media (eg, *Instagram*, Lee et al 2015); and, last, humans are extremely good at recognising photographs (Standing et al 1970).

Photography and memory

In the modern and digital age, individuals can easily and frequently record their personal experiences through photography (see, eg, Sarvas and Frohlich 2011). According to Fawns (2020; see also Keightley and Pickering 2014 for a similar distinction), the act of photography includes four distinct components: capturing (ie, taking a photograph), organising, viewing, and sharing (eg, distributing to others). Given the current state of the world, we have added an additional and, we believe, important component between capturing and organising: manipulating (see Sarvas and Frohlich). To understand how photographs shape the way humans remember their personal past, an understanding of each component is paramount. We will discuss each in turn. Notably, in what follows, we focus on research that has been or is applicable to digital photography and, in turn, sharing photographs on social media (see Keightley and Pickering 2014).

Capturing

Until recently, the mnemonic consequences associated with capturing a photograph have largely gone unexamined. But recent research suggests capturing a moment with a camera may have deleterious consequences for how individuals remember the aforementioned 'moment'. Henkel (2014) conducted a study whereby participants toured a museum and captured photographs of half of the objects. Henkel found that participants had inferior recognition of the objects photographed than those not. As Henkel suggests, this result may reflect an assumption that the photograph is acting as an externalised memory device. As such, there was no necessary reason for individuals to biologically encode the information (see also Sparrow et al 2011; see Henkel et al 2021; Storm and Soares in press for reviews). However, such impairment persisted when individuals were made aware that the photos would be deleted (Soares and Storm 2018; see also Barasch et al 2017). Furthermore, Henkel found an exception to her results: when individuals zoomed-in and took a photograph, their memory was better for the photographed object. Together, this suggests that it may not simply be the act of capturing a photograph that affected participants' memories. Rather, it is the cognitive process (or lack thereof) individuals undertake during the act of taking photographs that ultimately shapes one's memory for the captured moment.

However, all of this is independent of the ways in which pictures, themselves, limit moments (Fawns 2014). As Fawns highlights, photographs are both physically (ie, only

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a portion of the scene viewed) and temporally (ie, what comes before or after is not represented) constrained. Additionally, photographs are also both cognitively and emotionally void. That is, photographs (often) fail to capture the thoughts one has at the moment and the culturally prescribed necessity to smile in photos often drain them of any emotional veracity. This is likely the reason why some photographers prefer to capture 'natural' settings whereby individuals are captured candidly and not aware that they are being photographed. However, doing so likely proves difficult when one is attempting to capture their own personal experiences, especially with the advent of 'selfies'. Together, the nascent research suggests that capturing photographs may not, in of themselves, facilitate recall for the captured moment and that the photograph itself is limited in what it conveys surrounding the captured individual, object and/or event (more on this below, Vasquez et al 2022).

Manipulating

The digitalisation of photography helped facilitate the ease by which individuals can manipulate their own, personal photographs (van Dijck 2008). The motives for such manipulation likely span from attempts to make pictures look more attractive (eg, the app *Facetune*) to increasing the extent to which others may find the pictures more interesting (be it making them more comical or more dramatic) or to remove individuals they wish to forget (eg, an ex-lover). Either way, the fact that individuals can and are manipulating their own photographs may figure heavily in how such pictures come to shape the way they remember their personal past (eg, false recollections, Strange et al 2005) as well as influence their well-being at the moment of revising the manipulated picture (eg, 'I was so thin back then!'; see, eg, Brooks 2015; but see Beyens et al 2020). Additional research is needed to further explore these possibilities.

Organising

Prior to the digitalisation of photographs, individuals largely organised their personal pictures using photo albums, scrapbooks, etc. (Fawns 2020; van Dijck 2008). With the digitalisation of photograph, the organisation of photographs have been helped with online programmes (eg, Google photos) which can automatically organise uploaded pictures (eg, temporally). While this may be a more passive means by which individuals organise their photographs, individuals can take a more active stance and create digital photo albums and/or post their photographs online via social media. How such active organisation of the photographs shapes the way individuals remember their own personal past remains to be seen. However, research has shown that the idiosyncratic ways in which individuals mentally organise information has important implications for how easily, if at all, they can successfully recall the to-be-remembered information. If, for example, an individual's idiosyncratic organisation is disrupted, individuals tend to recall less information (eg, Congleton and Rajaram 2011). The selective nature by which individuals may curate and organise their photographs via social media may have important implications for how they remember those photographs and/or their personal past more generally (see, eg, Gozali et al 2012; Stone and Wang 2019).

Viewing

Most psychological research examining photographs and memory have focused on the extent to which viewing photographs improves memory of said photo (eg, Koutstaal et al 1999), their ability to facilitate other memories/knowledge/emotions surrounding the photograph (eg, Bietti 2011; Cienki et al 2014; Fawns 2020) and/or implant false

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memories (eg, Sacchi et al 2007; Strange et al 2005; see also Schacter 2022 for a review). For example, research by Koutstaal et al found revisiting photographs led to improved memory for said photographs. This is probably not surprising given the mnemonic benefits associated with rehearsal more generally (Dark and Loftus 1976; Greene 1987). Additionally, manipulated photographs are also quite effective at implanting false memories (Sacchi et al 2007; Strange et al 2005). This is particularly relevant given the ease by which individuals can manipulate their own personal photographs, as mentioned above. Thus, for example, how might revisiting an edited, personal photograph whereby they have been made to look more attractive and/or athletic influence their memory in the present? Whatever the answer to this question is, it will no doubt have important implications for the role manipulating and viewing photos plays in shaping how individuals remember their personal past and, likely, their psychological well-being (see, eg, Brooks 2015; but see Beyens et al 2020).

Sharing

Photographs provide an easy means by which individuals can share their past experiences with others. However, prior to social media, the principal ways in which individuals shared their photographs was in person, via mail and, more recently, via e-email. Social media has expedited and grown the pace and ease by which individuals share photographs. Indeed, 3.2 billion images are shared online daily (Thomson et al 2020). While the motivations for sharing personal photographs on social media may vary (eg, Bell 2019; Oeldorf-Hirsch and Sundar 2016; Seyfi and Soydaş 2017; Stone et al 2022), the rate in which individuals are using photograph specific social media platforms continues to increase as well (eg, *Instagram*, see Auxier and Anderson 2021; Perrin 2015).

What are the mnemonic consequences associated with sharing personal photographs via social media? The research is mixed and complex. For example, Wang et al (2016) found that sharing personal information on social media led to better recall of the shared information. However, it is not clear whether the information shared was photographs rather than typed responses. Alternatively, Jiang et al (2016) and Tamir et al (2018) found that, when individuals share or believed that their personal experiences would be shared via social media, they ended up having poorer recall of these experiences. Again, though, neither of these studies examined photographs.

However, there is evidence suggesting that sharing photographs via social media may facilitate the recall of the shared events (eg, Johnson and Morley 2021; Vasquez et al 2022). Johnson and Morley found that using Snapchat (an automatic deleting, photo-sharing app) led individuals to recall more details surrounding their personal experiences (at least in terms of words). Similarly, our lab found that individuals more accurately recalled details surrounding what was captured in the photograph (relatively to uncaptured details surrounding the personal experience) when those photographs were shared via Facebook (vs just taking a photograph; Vasquez et al 2022). Thus, these results suggest a mnemonic difference between 'capturing' a photograph (ie, poor recall, Henkel 2014; Henkel et al 2021; even when it is known it will be deleted, Soares and Storm 2018) and sharing a photograph via social media (ie, more accurate recall of the captured details; Vasquez et al 2022; even when it is known it will be deleted, Johnson and Morley 2021). While the present results suggest a mnemonic benefit when sharing photographs on social media, the truth is likely more complex. Indeed, perhaps part of the explanation for the contradictory results across the aforementioned research may be because of the limited means by which researchers have appreciated the social nature of social media. As mentioned in the introduction, any holistic understanding of the mnemonic consequences associated with social media use will likely depend on the socio-cognitive processes

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undertaken on the part of the photographer/sharer (eg, motives, perceptions of audience, etc.) and the interactive and iterative actions on behalf of the producer and audience (eg, likes, comments, etc.; more on this below).

Discussion and avenues for future research

As the psychological research above makes clear, the various components associated with the act of photography (eg, capturing, sharing, etc.) influence how individuals remember their personal past in complex and dynamic ways. What is clear, though, is that digital photography has become a ubiquitous means by which individuals record, document, and curate their personal past, and it provides an efficient means for users to share these personal experiences with their friends, families, and the world at large. As such, it is paramount that psychologists continue this line of research to better understand how the memory ecology of digital photographs and social media shape the way individuals remember their personal past. To this end, we highlight three avenues that we think will prove critical for psychologists to gain a more holistic understanding of the mnemonic consequences associated with digital photography and sharing them via social media: The collective nature of social media, embracing an individual's memory ecology, and social media silence. We will briefly discuss each in turn.

Collective nature of social media

When sharing a picture on social media, individuals initiate a cascading set of collective and interactive processes. Sharing photos on social media is never an individual act. Indeed, the motives for why individuals share personal stories on social media often stem from the desire to engage in social interactions (Stone et al 2022; Wang 2020) and the role individuals' perceptions of similar audiences viewing their photographs will likely shape how the producer comes to remember the shared experience (eg, Shteynberg 2010). Additionally, once shared on social media, others then have the capability to interact with the photograph (eg, via likes, comments, etc.). How this influences the way the 'producer' of the photograph appraises and comes to remember the photograph and associated event (s) is one thing, but we also know little about how this might impact those who 'consume' (eg, friends) the shared photograph, especially if it is a photograph of a mutually experienced, personal event (see Stone and Wang 2019). Thus, sharing photographs surrounding personal experiences on social media is not simply a human-technology process. Rather, it is a human-technology–human interactive and iterative process which will have numerous mnemonic consequences for both those producing the pictures on social media as well as those consuming them (Stone and Wang 2019). Thus, a fuller appreciation of this dynamic, technology-mediated human interaction will help inform and flesh out a better understanding of one's memory ecology.

Embracing a memory ecology

In this paper, we have argued that photographs and the act of sharing them on social media represent a component of an individual's memory ecology. Put another way, understanding how an individual remembers their personal past is at the intersection of their selves and their access to technology (ie, photographs on social media). That is, without allowing individuals access to technology, a true understanding of how individuals remember the past is elusive. Despite this, many studies examining the impact of, for example, social media, tend to focus on how social media shapes the way individuals remember in 'isolation' (eg, Vasquez et al 2022; Wang et al 2016; see Stone and Wang 2019 for a review). Generally, researchers

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have individuals interact with social media and then examine how this interaction subsequently shapes the individual's memory. Ironically, on the one hand, researchers have embraced the influence of one's ecology on remembering, but, on the other, they tend to study remembering only *after* removing the individual or group from that same ecology. This is particularly relevant when researchers find deficits in participants' recollections and attribute said deficit to the participants' reliance on technology to 'store' their memories (eg, Henkel 2014; Sparrow et al 2011). While we believe that there is great value in this line of research, more research needs to incorporate technology and others into the recall phase of memory studies to make them more ecologically valid and, in turn, better reflect how individuals are remembering their personal pasts outside of the lab. That is, psychologists and memory researchers more generally, need a greater appreciation of our cyborg-ness (Clark 2001; Sutton 2010) to better understand how individuals remember their own personal past and how it intersects and is modulated by technology and others 'in the wild' (Barnier and Hoskins 2018; Wagoner et al 2020).

Social media silence

When memory researchers have examined how social media use influences memory, psychologists have largely focused on how *sharing* information on social media shapes how individuals remember the shared information (see Eliseev and Marsh 2021; Stone and Wang 2019; Storm and Soares in press for reviews). However, following Stone et al (2012), we also argue that there is value in also examining what goes unshared. That is, the information, in this case photographs, that individuals remain 'social media silent' about. Stone et al (2012) outlined and summarised research showing how conversational silences do not necessarily equate with forgetting. The mnemonic consequences associated with conversation silence are nuanced, complex and depend on the process undertaken by the individuals within the conversation. Similarly, while much of the aforementioned research suggests that individuals may have poor recall of the pictures they do not share on social media (eg, Johnson and Morley 2021; Vasquez et al 2022), the mnemonic trajectory of social media silence will likely depend upon a number of, non-exhaustive factors: for example, the motives associated with why the individual chose not to share the photograph, the extent to which the original event was encoded, whether the individual revisits the photograph on their own, the proclivity with which the individual shares their life on social media more generally, etc. Whatever the process, researchers will need to appreciate what remains as 'social media silent' and its mnemonic consequences to gain a fuller understanding of the intersection between human memory and social media.

Conclusion

Photography has provided a powerful means by which individuals are able to record their own personal experiences and, in turn, craft their own memory ecology. The advent of digital cameras and social media accelerated this process. As such, psychologists have begun to examine how the expediency of digital photographs and sharing them via social media shape the way individuals remember their own personal past. Here, we have briefly summarised the dynamic and complex results of the nascent research examining both the act of photography and sharing personal photographs on social media. Critically, we have argued, moving forward, that psychologists need to appreciate the collective nature (ie, technology and others) of social media, embrace the totality of one's memory ecology and begin to examine social media silence to better understand the nexus between human memory and social media to provide a more holistic picture of how one's memory ecology shapes the way individuals remember their own personal past.

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