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The Mnemonic Consequences of Posting “Self” and “Other” Pictures on Social Media

A Thesis Presented to the Faculty of the
Department of Psychology at
CUNY John Jay College of Criminal Justice

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Forensic Psychology

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Abstract

The use of the internet and social media is ubiquitous. Research has shown that 90% of young Americans are active social media users, as well as 35% of American adults over the age of 65 (Perrin, 2015). When individuals use social media, they may selectively remember the information they post while simultaneously forgetting the information they did not post, but is related to the posted information (Anderson et al., 1994). The present study is an adaption of Anderson and colleagues' retrieval-induced forgetting paradigm (RIF), consisting of personal and non-personal information. This study will specifically focus on the relationship between posting photos ("self" and "other") on *Instagram* and how posting on *Instagram* can influence recognition of the photos not posted in relation to accuracy and confidence levels. Sixteen participants were recruited to post photos on *Instagram* over a two-day period. The photos consisted of personal photos the participants took themselves and non-personal photos the participants did not take themselves. At the end of the 6-8 day study, participants completed a recognition test which tested participants on the photos they had either taken themselves, viewed, posted, or not posted on *Instagram*. Results suggest higher confidence for photos that were taken by participants ("self" photos) compared to photos not taken by participants ("other" photos) regardless of posting or not posting the photo. This is inconsistent with mnemonic consequences related to the RIF paradigm. These results are discussed in terms of the importance of understanding how social media use may shape the way individuals remember their personal past.

Keywords: *Instagram*, Remembering, Retrieval-Induced Forgetting, Social Media

The Mnemonic Consequences of Posting “Self” and “Other” Pictures on Social Media

Social media is a ubiquitous means which individuals share their personal lives with their friends and family. Indeed, research indicates that social media usage has grown exponentially since it started. Focusing specifically on *Instagram*, usage increased from 60 million users in 2013 to 900 million users in 2016 (Perrin, 2015). The majority of individuals who use social media fall within the age range of 18-29 years old (90%; Perrin, 2015). However, there has even been social media usage growth among older individuals: thirty-five percent of individuals 65 and older use social media in 2015 compared to 2% back in 2005 (Perrin, 2015). Despite the substantial increase of social media usage, there is limited research examining how social media may shape the way individuals remember their personal past.

While some research has focused on the mnemonic consequences of posting on social media (Sparrow et al. (2011); Jiang et al. (2016); Wang et al. (2016); Tamir et al. (2018)), this study focuses on how social media may induce forgetting. The present study will attempt to examine the counterintuitive possibility that social media usage may induce forgetting and reduced confidence in recollection of related but not posted pictures. To this end, I will first discuss the relevant social media and memory research as it relates to personal and non-personal information, I will then discuss the relevant retrieval-induced forgetting research before moving on to the present study.

Social Media and Memory

Psychologists are only beginning to understand the ways in which social media may shape the way individuals and groups remember the past (see, e.g., Fenn et al., 2014; Wang et al., 2016). Through this research it has become clear that individuals tend to post or interact with

either non-personal or personal information on social media. The relevant research examining each will be discussed in turn.

Non-Personal Information

Non-personal information is information in which a person does not have a personal connection to, such as sports game or information learned from the morning news. The research that has examined the use of the internet or social media with posting non-personal information suggests that it may impair the ability of individuals to recall the posted information in the absence of said internet and social media (Sparrow et. al., 2011; Ward, 2013; Wegner & Ward, 2013).

Sparrow et al. (2011), for example, conducted a series of studies that focused on recall of non-personal trivia statements across two conditions (i.e., participants were informed that the information will be available on the internet or will not be available on the internet). Overall, the results showed that when individuals knew the information would be available online, they had poorer recall of the information than when participants were informed that the information would not be available online. This led Sparrow et al. (2011) to then focus on how participants would remember information if they believed the information would be able to be retrieved later (i.e., the participants were told the information was saved on the computer, was not saved on the computer, or that their results were erased from the computer). Results indicated that individuals who thought their information would be saved and accessible later, recalled less than those who thought their information would not be accessible later (Sparrow et al., 2011). Overall, through the series of experiments, Sparrow and colleagues concluded that non-personal information

shared socially is easily forgettable when individuals believe they can use an external source to access the information later.

While Sparrow et al. (2011) study examined non-personal information in the context of the internet as an external device, Jiang et al. (2016) focused on posting non-personal information on social media. Jiang and colleagues asked participants to post information about political debates from the news. Half of the participants were given the option to repost the information; the other half were not given the option to repost. Results showed that when a person thinks the information will remain continuously available (i.e., look the information up online at any point), they are more likely to recall the item. This shows that selectively sharing non-personal public information may lead to better recall (Jiang et al., 2016; Stone & Wang, 2018). Thus, the results of studies examining the mnemonic consequences associated with posting or re-posting non-personal information on social media are contradictory. Interestingly, the research examining posting *personal* information on social media revealed a similar pattern of results.

Personal Information

Personal information is information that is directly relevant to the individual posting the information, such as pictures or birthday announcements. In posting personal pictures, the information we post is curated and thus selective in nature. When individuals selectively post personal information on social media, the nascent results suggest it can shape how we come to remember this personal information.

For example, a study conducted by Wang and colleagues (2016) focused on examining whether posting personal information on social media and rating importance of this information

could lead to better recall. To test this, Wang et al. (2016) asked participants to write some memories in a diary and to post some memories on social media. Researchers recorded short unique events and rated the importance. When asked to recall the information, the information that was posted on social media was frequently remembered more than the information simply written in the diary and not posted. However, Wang and colleagues allowed participants to self-select which information to post. Thus, the participants may have posted information that was already more memorable rather than the act of posting leading to said memorability. One explanation as to the decreased recall for the information not posted on social media could be explained through the retrieval-induced forgetting paradigm. Remembering the information posted on social media could have induced forgetting of the related, but not posted information. Despite the limitations of Wang et al. (2016) study, the researchers concluded that when information is posted to social media it enhances the memorability of the information because the posted information was perceived as more important to the poster.

Although Wang et al. (2016) found that posting online correlated with better recall of memories for personal information, Tamir et al. (2018) found contradictory results. In a series of studies researchers measured recall of personal memories after posting on social media by measuring self-reported feelings of enjoyment and engagement. Specifically focusing on their experiments two and three, researchers investigated the impact of media use on experiences (i.e., participants took a tour through Stanford's Memorial Church; Tamir et al.; experiment two). Participants took a self-guided tour and took photos of their tour. Some participants were able to post the photos on social media after the tour while others were not. Results show that for a personal experience, participants who posted their memories on social media were less accurate during the final recognition phase than the participants who did not post. Lastly, for experiment

three, researchers replicated experiment two with a web-based personal experience (i.e., watching TED talks) and found similar results. Between the three studies, researchers found that when participants experienced an event and then either posted the details on social media or did not, the individuals who posted the information had worse recall than the ones that did not post and just experienced the event. Overall, the researchers found that posting on social media impairs the recall of web-based (i.e., Ted talks) and physical experiences (i.e., Church Tours: Tamir et. al.).

Overall, the current research on posting personal information on social media reflects contradictory results finding both facilitative and inhibitive effects when a memory is posted on social media (Wang et. al., 2016; Tamir et. al., respectively). However, each of these studies highlights the selective nature of posting on social media. Individuals do not post all their pictures on social media, let alone all of their experiences. The selective nature of posting on social media may lead to induced forgetting of related, but not posted information (see Stone & Wang, 2019 for a review).

Retrieval-Induced Forgetting

Anderson et al. (1994) found that selectively retrieving memories can lead to induced forgetting of related but not retrieved memories. Anderson and colleagues examined the mnemonic consequences associated with selective retrieval by developing the retrieval practice paradigm (Anderson et. al., 1994). In this paradigm, there are three sequential phases. The three phases comprised of a: (1) study phase, (2) retrieval practice phase and (3) final recall phase. First, in the study phase, individuals studied a series of paired associates such that they included a category and exemplars from that category (e.g., *fruits-apple, fruits-banana, professions-*

police, and *professions-nurse*). Immediately after the study phase, participants then moved onto the retrieval practice phase where they were provided selective retrieval for half of the items from half of the categories. For example, they may have received selective retrieval for fruit-apple (i.e., they were provided with fruit-a___), but not the other fruits and none of the professions. This selective retrieval, in turn, created three types of memories: (Rp+) practiced items from a practice category (e.g., fruit-apple), (Rp-) unpracticed items from a practice category (e.g., fruits-bananas) and (Nrp) unpracticed items from an unpracticed category (e.g., professions-police, professions-nurse). After the selective retrieval phase, participants then completed a distractor task before completing the final recall phase. During the final recall, participants were provided the categories and instructed to recall all the exemplars associated with each category provided during the study phase.

Not surprisingly, the results revealed that participants recalled the Rp+ items more than the Nrp and Rp- items. More surprisingly, they found that participants recalled the Nrp items better than the Rp- items. That is, by selectively retrieving apple, it induced forgetting of the other related items, (e.g., banana) relative to unrelated items (e.g., all the professions), which is known as the retrieval-induced forgetting effect (i.e., RIF: $Rp+ > Nrp > Rp-$). In context of the present study, this line of research has been extended to more ecologically valid materials (e.g., autobiographical memories) and contexts (e.g., social interactions). We will discuss each line of research in turn.

Autobiographical Memory

More recently, researchers have extended the RIF paradigm to autobiographical memories, that is, personally relevant memories and their association with emotional categories

(Barnier et al., 2004; Stone et al., 2013). Autobiographical memories are memories that shape an individual's identity (Barnier et al., 2004). Barnier and colleagues (2004) extended the RIF paradigm by providing participants with positive, negative, and neutral word cues and had participants elicit their own personal, autobiographical memories associated with each. During the retrieval practice stage, participants studied half of the memories from half of the categories. Lastly, during the final recall phase, participants were presented with emotional cues and were asked to recall all the memories associated with each category word cue (Barnier et al., 2004). Results showed that retrieval-induced forgetting occurred for autobiographical memories across all emotional valences.

A study conducted by Stone et al. (2013b) found similar results when examining the mnemonic consequences associated with selectively retrieving positive and negative autobiographical memories. These researchers also introduced confidence ratings and found that the confidence ratings for positive autobiographical memories mirrored the standard RIF effect. That is, participants have the highest confidence for the Rp+ items followed by the Nrp items and then the Rp- items (Stone et. al., 2013b). In both of these studies, results indicated that RIF can occur for autobiographical memories. Research has also found that the RIF effect can also occur in the context of a social interaction.

Social Interactions

A study conducted by Cuc et al. (2007) extended Anderson's original retrieval-induced forgetting paradigm by testing the paradigm in a social setting by introducing a "listener" who paid attention to the reported memories and "speakers" who overtly recall the memory out loud, while another participant merely listened (i.e., the "listener"). The researchers were interested in

whether within-individual retrieval-induced forgetting (WI-RIF; RIF for the speaker) and socially-shared retrieval-induced forgetting (SS-RIF; RIF for the listener) might occur in the context of a social interaction. In study one, all participants were presented paired-words to study; the speaker selectively recalled aloud half of the items from half the categories while the listener monitored for accuracy. Then participants were distracted for five minutes before they were asked to recall all the exemplars. The results of this study suggested that when listening to someone else (the speaker) remember, forgetting can be induced in the listener. For experiment two, researchers aimed to extend the findings from study one into free-flowing conversation. The procedure replicated study one, except that the researchers used short fragments of a story as the stimulus instead of the category exemplars. For experiment three, the researchers extended this line of research to a free flowing conversation between listener and speaker. The results of their study found that the selective retrieving on the part of the speaker, even in the course of a conversation, induced forgetting in both the speaker and the listener. These results suggest that when an individual discusses information in the context of a social interaction, both speaker and listener may exhibit similar RIF.

RIF of autobiographical or personal memories have also been studied in the context of social interactions. Stone et al. (2013a) found that RIF occurred when individuals recalled their own or another's personal memories in the course of a conversation (WI-RIF; Barnier et al., 2004) as well as when someone was listening to their own or another person's personal memories being recalled (SS-RIF). The results of this study showed that regardless of personal connection to the content, WI-WIF and SS-RIF occurred when both stranger and intimate partners discussed personal and non-personal autobiographical memories.

Thus, the extant research has shown that selectively retrieving personal memories can induce forgetting in the course of a social interaction. However, it remains unclear whether similar mnemonic consequences occur when the social interaction occurs online via social media. We might hypothesize that the poster is the “speaker” while those who receive (e.g., friends and family) the posted information may be seen as the “listener”. If social media communication is analogous to in-person social interactions, we might expect similar RIF effects for both the “poster” and the “receiver” if they both actively retrieve the selectively posted information. Here, we will begin to examine these possibilities by examining the mnemonic consequences for the “poster” when selectively posting personal and non-personal information on social media.

Current Study

The present study will extrapolate the robust RIF paradigm to the context of posting pictures on social media. To this end, participants were recruited and instructed to take (and receive pictures) and then selectively post photos on *Instagram*. The present study specifically used *Instagram* due to the increase of usage from 2015-2019 in age groups 18-29 (See Perrin, 2015; Perrin, 2019) and its ability to post both pictures and captions. This study will specifically focus on the relationship between posting photos (“self” or “other”) on social media and how posting on social media can influence recall of the photos relative to personal (self) and non-personal (other) pictures not posted. This was tested by measuring the recognition accuracy for photos that were posted on *Instagram*, whether they were from self or other, and how confident they are in whether a.) it is their picture or not and b.) whether it was a picture posted on *Instagram* or not.

The current study has three hypotheses. The first hypothesis is that photos taken by participants (self) and posted on Instagram (posted) will have the highest rate of accuracy and confidence. The second hypothesis is that photos not taken by participants (other) and not posted on Instagram (not posted), and photos not taken by the participant (other) and posted on Instagram (posted), would exhibit less accuracy and confidence than “self” pictures posted on social media. Lastly, the third hypothesis is that photos taken by participants (self) but not posted on social media (not posted) will have the lowest rate of accuracy and confidence.

Methods

Participants

A power analysis, with a low to medium effect size ($f = 0.30$), indicated a sample size of 39 participants for the present study (Faul, et al., 2009; Faul et al., 2007). However, due to constraints as a result of the Covid-19 pandemic (e.g., an inability to recruit student participants), only 17 participants from Suffolk County, Long Island were recruited through personal connections to the experimenter (i.e., friends and family) participated in the present study. Additionally, all aspects of the study were run online for each participant. An IRB amendment was approved to address these changes in recruitment of participants and procedure. These issues are revisited in the discussion as limitations of the present study.

Of the 17 participants recruited, 16 completed the study (one participant withdrew consent after day one of the study). The average age of participants who completed the study was 23 years old ($M = 23.437$, $SD = 8.254$). Of these 16 participants, 11.76% had a high school degree, 35.29% have some college but no degree, 17.65% had an associate degree, 23.53% had bachelor's degree and 11.76% had a master's degree. 94.12% of participants reported white as

their ethnicity and 5.88% reported Hispanic. 94.12% of participants reported their sex as female and 5.88% reported their sex as male.

Design

This present study is a within-subject 2 (Social media: posted vs. not posted) x 2 (Photo: self vs. other) within-subjects experimental design. The participants were instructed to take a photo and post it, take a photo and not post it, post a photo they had not taken or look at a photo they had not taken and not post it. The dependent variables were accuracy in terms of recognition and confidence levels. Accuracy was measured by participant's ability to correctly identify the photo shown in the final recognition test as a photo they either did or did not take and posted or not posted. Confidence was measured on a 1-10 scale based on how confidently participants were that the photo shown in the final recognition test were theirs or not and if it was posted or not. Due to a miscommunication during the design of the study, the current study deviates from the standard RIF paradigm because of the lack of a Nrp items, which will be addressed in the discussion. The current study examines, in general, the mnemonic consequences associated with posting or not posting on social media.

Procedures and Materials

The present study took place over the course of 6-8 days and comprised of three phases: Information, Picture/Social Media, and Final Recognition.

Day 1: Information Phase

Participants signed up to participate on a volunteer basis. Due to the Covid-19 pandemic (spring, 2020), the experimenter recruited friends and family members who were blind to the

purpose of the study to participate as it proved impossible to recruit student participants once campus was closed (schools and colleges were closed and studies were cancelled due to inability to run participants because of state declared social distancing requirements. Using the experimenter's friends and family allowed for the study to continue). All participants were sent a Qualtrics link to a survey that contained a consent form. They also consented to acknowledging the fact that they were *not* doing this study for John Jay College of Criminal Justice SONA credit; rather they were participating voluntarily and would not be compensated for their time. They were informed they could withdraw their consent from the study at any time. They first read and completed the informed consent by clicking "Yes, I consent to the study."

Additionally, participants were informed that in order to volunteer for this research study they would have to have an open and active profile on *Instagram*. This means all of the participants' profiles were on a public setting and self-identified themselves as using *Instagram* daily. They were not allowed to post on social media for other reasons except for the study. They acknowledged these requirements and consented to them through a Qualtrics survey. Once all the participants acknowledged that they understood the purpose and requirements of the study, participants then filled out a basic contact information sheet. The contact information sheet had participants provide their Instagram account username, email, and phone number. Participants were then told they would be contacted on two random days over the course of the next 5 days to continue the next phases on the study.

Day 2-5: Pictures/ Social Media Phase

After the Information Phase, participants were randomly texted through *Textedly* during the next four-day period. *Textedly* is a marketing tool that allows researchers to send texts

through an anonymous number to participants at the same time. The participants were texted a total of 12 messages over the course of two random days within the 4 day-span (i.e. for 6 messages per day for the two randomly assigned days). Three of the texts provided instructions for the participants to take a photo and post it on Instagram; three of the texts provided instructions for the participant to take a photo and not post it but send it to the researchers; three of the texts provided a photo to participants and instructed them to post the photo on social media and lastly, three of the texts provided a picture and instructed participants to examine the picture, but not post it on *Instagram*. For those pictures the participants took themselves, the only instructions were that they could not take selfies and/or pictures of their friends and family. Outside of these restraints, the content of the pictures varied across participants and from the experimentally provided pictures. This will be discussed further in the discussion.

All participants were sent the texts in the same order and at the same time to ensure internal consistency. The order of the texts was determined by a random generator (i.e., the instructions were to take and post, take and not post, sent a photo and told to post, or sent a photo and told not to post). Participants were also reminded of the requirements for the study, such that participants were not to include people, pets or selfies in their photos in each text. If participants did not post the photo after one hour (when the text instructed them to), a reminder text was sent. Once the participants completed all 12 of the instructions over the course of two days, they were informed that they would be contacted in the next few days with instructions on how to complete the final phase of the study.

Day 6-8: Recognition Phase

Given that participants were forbidden to use social media the duration of the study, the length of the study was only long enough to remove any confounds of the recency effect (i.e., better recall/recognition for those items most recently experienced). Thus, on days 6-8 (multiple days were provided for scheduling participants to complete the final phase) and two days after completing the Picture/Social Media phase, participants were sent a final Qualtrics link. This link contained the final recognition survey and demographics questionnaire. The survey took on average 6 minutes and 10 seconds for participants to complete. At the beginning of the survey, participants were instructed to not consult social media until they completed the survey. Participants were then presented with fifteen photos. Twelve of the photos participants took or were sent during the course of the experiment (three photos were taken and posted by participant, three were taken and not posted by participant, three were not taken by participant and posted, and three were not taken by participant and were not posted). Three additional photos were lure photos that were taken by the researcher that the participant had never seen before. For each photo, participants were asked four questions. These questions were 1) Is the picture above a photo you took yourself? (Yes/No), 2) How confident are you that the photo above is a photo you took yourself on a scale of 1-10? (1 = *not confident*; 10 = *extremely confident*, 3) Did you post this photo on *Instagram*? (Yes/No), and 4) How confident are you that the photo above was posted or not posted on *Instagram* on a scale from 1-10? (1 = *not confident*; 10 = *extremely confident*).

After the recognition test, participants filled out a demographic questionnaire. The demographic sheet included questions about their age, sex, race, and educational year, as well as contact information. To ensure the data was recorded under the right participant number for the demographics, the survey included contact information (name, *Instagram* username, and email)

because demographic survey was a separate link from the recognition survey. Once the participant completed the Qualtrics recognition test and demographic questionnaire, they were thanked for their participation and debriefed.

Results

In what follows, first, an overview of the analyses to come is provided. Second, the analyses for accuracy in recognizing whether the photos are “self” or “other” are analyzed followed by whether participants were accurate in terms of whether the photo was posted or not. Second, the analyses examining confidence levels for their responses in terms of “self” or “other” and “posted” or “not” are presented. All results examine whether differences emerged in terms of whether the picture was “self” or “other” and whether the picture was posted on *Instagram* or not.

Method of Analysis

All the proceeding analyses will consist of a 2 (Photo: self vs. other) x 2 (Social media: posted vs. not posted) repeated measures analysis of variance (ANOVA). The dependent variables will consist of a.) accuracy scores (1 = *accurate*; 2 = *inaccurate*) of whether the pictures were taken by the participant (self) or not (other) and whether the picture was posted on social media or not and b.) the participant’s confidence (1 = *not confident*; 10 = *extremely confident*) in whether it was their picture or not and whether they had posted the picture on social media or not. Given that the requisite sample size needed to interpret the present analyses with enough power was not reached as a result of the pandemic and time restraints, the proceeding results should be interpreted with caution.

Accuracy

Self vs. Other

Similar to Maxcey et al. (2019) and Scotti et al. (2020), in order to examine whether individuals could accurately recognize whether the picture was taken by themselves or not, a 2 (Photo: self vs. other) x 2 (Social media: posted vs. not posted) repeated measures analysis of variance (ANOVA) comparing accuracy of recognizing whether the picture was taken by themselves or not was conducted (see Table 1). The results revealed neither a main [“self” vs. “other”: $F(1, 15) = 3.46, p = .083, \eta_p^2 = .19, CI: .00, .43$; “posted” vs. “not posted”: $F(1, 15) = 3.46, p = .083, \eta_p^2 = .19, CI: .00, .43$] nor an interaction effect [$F(1, 15) = 3.46, p = .083, \eta_p^2 = .19, CI: .00, .43$]. Essentially, the results reveal a ceiling effect. Outside of the posted, “other” pictures ($M = 1.06; SD = .13$; again, above 1.00 represents more errors), the participants accurately recognized all the pictures (all M ’s = 1.00; $SD = .00$). Thus, overall, participants were very good at accurately identifying whether the picture was taken by themselves or not.

Table 1: Average (Standard Deviations) self vs. other recognition accuracy in terms of whether the picture was “self”/“other” and “posted”/“not posted.”

	Photo	
	Self	Other
Posted	1.00 (.00)	1.06 (.13)
Social media		
Not Posted	1.00 (.00)	1.00 (.00)

Note: Scores higher than 1.00 represent more errors.

Posted or Not Posted

To examine whether participants accurately recollect whether the participant actually posted the picture on social media or not, a similar 2 (Photo: self-vs. other) x 2 (Social media: posted vs. not posted) repeated measures ANOVA was conducted to compare their accuracy of recollecting whether the presented picture was posted or not on social media (see Table 2). The results revealed neither a main (“self” vs. “other”: $F(1, 15) = 3.72, p = .073, \eta_p^2 = .20, CI: .00, .44$; “posted” vs. “not posted”; $F(1, 15) = 1.65, p = .218, \eta_p^2 = .10, CI: .00, .34$) nor an interaction effect ($F(1, 15) = 0.46, p = .509, \eta_p^2 = .03, CI: .00, .23$).

Table 2: Average (Standard Deviations) posted vs. not posted recognition accuracy in terms of whether the picture was “self”/“other” and “posted”/“not posted.”

	Photo	
	Self	Other
Posted	1.06 (.18)	1.21 (.24)
Social media		
Not Posted	1.13 (.27)	1.33 (.54)

Note: Scores higher than 1.00 represent more errors.

Confidence

Self vs. Other

To examine whether confidence in recognition as a result of whether the pictures were “self” vs. “other” and posted on social media or not, a 2 (Photo: self vs. other) x 2 (Social media: posted vs. not) repeated measures ANOVA was run with confidence scores as the dependent variable (see Table 3). The results revealed a main effect for Photo, $F(1, 15) = 19.00, p > .001, \eta_p^2 = .60, CI: .22, .71$. That is, participants were more confident in their recognition of

the “self” pictures ($M = 9.83$, $SD = .45$; CI: 9.59, 10.07) relative to the “other” pictures ($M = 5.00$, $SD = 4.48$; CI: 2.61, 7.39) regardless of whether the pictures were posted on social media or not. There was neither a main effect for “posted” vs. “not posted” [$F(1, 15) = .58$, $p = .459$, $\eta_p^2 = .04$, CI: .00, .24] nor an interaction effect [$F(1, 15) = .23$, $p = .637$, $\eta_p^2 = .02$, CI: .00, .20].

Table 3: Average (Standard Deviations) confidence ratings for recognitions in terms of whether the picture was “self”/“other” and “posted”/“not posted.”

	Photo	
	Self	Other
Posted	9.90 (.42)	5.27 (4.80)
Social media		
Not Posted	9.77 (.82)	4.73 (4.77)

Posted or Not Posted

To examine whether confidence in terms of whether the picture was posted on social media or not as a result of whether the pictures were “self” vs. “other” and posted on social media or not, a 2 (Photo: self vs. other) x 2 (Social media: posted vs. not) repeated measures ANOVA was run with confidence scores as the dependent variable (see Table 4). The results revealed a main effect for Photo, $F(1, 15) = 5.62$, $p = .032$, $\eta_p^2 = .27$, CI: .01, .50. That is, participants were more confident in their recognition of the “self” pictures ($M = 9.00$, $SD = 1.28$; CI: 8.32, 9.68). Relative to the “other” pictures ($M = 8.15$, $SD = 1.57$; CI: 7.31, 8.98) regardless of whether they were posted on social media or not. There was neither a main effect for “posted” vs. “not posted”; $F(1, 15) = .20$, $p = .658$, $\eta_p^2 = .01$, CI: .00, .19 or an interaction effect ($F(1, 15) = 2.21$, $p = .158$, $\eta_p^2 = .13$, CI: .00, .37].

Table 4: Average (Standard Deviations) confidence ratings for whether the picture was posted on social media or not in terms of whether the picture was “self”/”other” and “posted”/”not posted.”

	Photo	
	Self	Other
Posted	9.19 (1.59)	7.77 (2.09)
Not Posted	8.81 (1.80)	8.52 (1.77)

Social media

Discussion

The primary goal of this study was to examine the mnemonic consequences associated with posting personal vs. non-personal photos on social media, as well as how it may affect the confidence participants have in their recognition. The results from the present study do not support our hypotheses. The results from the present study reflected no significant results in terms of accuracy for photos posted and photos not posted. For confidence, a significant result reflected that participants were more confident when identifying self-photos for both posted and not posted. No other significant results were found. It is worth noting, though, that the dearth of statistically significant results may have been a result of the study being under-powered, a point that is discussed below in the limitations section.

Non-Personal vs. Personal Information

Accuracy

The current study does not coincide with past research. While the research by Sparrow et al. (2011) found poor recall of information available online and Wang et al. (2016) found better

recall of information posted online, the current study found no interaction between the personal nature of the material or whether it was posted online or not: the results reflected high accuracy levels among all conditions when recognizing whether the photo was “self” or “other”. For the current study, the results may not have exhibited poorer recognition, as found in the Sparrow et al. study, for the posted pictures because it is possible that the non-personal photos were easily identifiable due to external factors limiting people from doing various activities they would normally be doing (i.e., Covid-19 quarantine limiting people from going outside). The photos were taken in New York City within a 10-block radius on John Jay College campus. However, all of the participants were residents on Suffolk County, Long Island. Thus, it is likely that the differences between the “self” and “other” photos made identifying which photos were taken by participants easier during the recognition tests, regardless of whether they were posted on social media or not. This was shown through the results by such high rates of accuracy levels across all conditions.

Additionally, these results may differ from Wang et al.’s (2016) study because in their study participants were able to self-select the photos used during the experiment, and analyses showed that these photos were rated as more important. Each of these may have led the researchers to find higher levels of accuracy. Additionally, in the current study, the photos sent to participants were chosen by the researcher and the photos participants had taken themselves had limitation to what they were allowed to take a picture of (i.e., no selfies, no people, and no pets). This was done in an attempt to limit bias toward the pictures taken by participants to make all the photos (both taken by participant and taken by the researcher) overall more universal in nature (i.e., not distinctively self-relevant). Self-selecting photos could have led to an increased bias result in Wang et al. (2016) by showing higher levels of accuracy. However, unlike the

accuracy results, participants tended to be more confident in their recognition of “self” vs. “other” photos, regardless of whether they were posted or not.

Confidence

In the current study, when participants were asked their confidence on “self” versus “other” pictures, participants were more confident when identifying their own pictures opposed to the other photos. These results are inconsistent with past research. Stone et al. (2013b) study found high confidence rates with photos that were posted; whereas, the current study found, overall, higher confidence for “self” photos, whether posted or not. It is possible that these results do not support the results of Stone et al., because of the nature of the “other” pictures. If, like suggested with accuracy, that the distinctive nature of the “suburban” (i.e., Suffolk County) “self” photos and the “urban” (Manhattan) “other”, one might expect that the participants could confidently reject the “other” photos and, thus, have high confidence ratings. The fact that the participants did not, may reflect the familiarity the participants have with Manhattan and/or urban areas and thus, in turn, lead to doubts and is reflected in their confidence ratings. Future research should examine such possibilities.

Additionally, given that the “self” photos were always first (post) and second (do not post), this may have led to a primacy effect (i.e., better “recall” of the first in a list). Future research should randomize the order of the texts instructing participants to post or not, personal or non-personal pictures.

Failure to Find RIF

The findings in this research study aimed to extend the works of Barnier et al. (2004), Cuc et al. (2007), and Stone et al. (2013a, 2013b) that focuses on retrieval-induced forgetting as

a result of posting on social media (see Stone & Wang, 2018 for a review). Barnier and colleagues (2004) adapted Anderson and colleagues' original paradigm (1994) to find selectively retrieving autobiographical memories induced forgetting of related autobiographical memories. Stone and colleagues (2013b) extended this line of research by examining confidence ratings with the assumption that inhibited or "forgotten" memories would have decreased confidence levels. Stone and colleagues introduced confidence as a measuring variable and concluded that positive emotions produced less confidence responses for not practiced but related (Rp-) than practiced and unrelated (Nrp) from participants. The current study found higher confidence levels for photos that were taken by the participant (self-photos) and posted; as well as a higher overall confidence level for all photos that were taken by the participants. This is contradictory with Stone et al. (2013b) study. The difference in results from Stone et al. (2013b) study could be explained by the lack of Nrp items in the current study design. Without Nrp items, it proves difficult to ascertain whether the "not posted" pictures exhibited any form of induced forgetting or not, be it in terms of accuracy or confidence. Future studies should be sure to include an Nrp category to better ascertain whether RIF occurs as a result of posting personal pictures on social media.

Despite not having an Nrp category, all the RIF research suggests that the present study should have found differences between those pictures posted (Rp+) and those pictures not posted (Rp-) (e.g., Anderson et al., 1994; Cuc et al., 2007). This was not the case. As mentioned previously, there was a significant difference between the "self" photos and the "other" photos physically (i.e. covid-19 restrictions, current participants not being from midtown NYC but being from Suffolk County). With the difference between the location and content of the photos, it is possible this could account for why participants were more confident when identifying their

own photos over the “other” photos, regardless of posted or not. Future research should better match the “other” photos with the “self” photos to examine whether differences may emerge as a consequence of posting either “self” or “other” photos on social media or not as the RIF suggests should be the case.

Future Research and Limitations

While this study attempted to examine whether posting non-personal and personal information on social media leads to induced forgetting of related pictures, there were limitations that may have impacted the results of the study. The first major limitation to this study was the low sample size and personal relationship of the participant pool to the researcher (i.e., friends and family of the researcher). Each will be discussed in turn.

As for the low sample size, due to Covid-19 (spring, 2020), there were zero students volunteering for the study. One major reason for the decrease of participants was because all work and school went remote, many people could not commit to *not* posting on social media for other purposes outside of the requirements of the present study. The limited sample size likely skewed the results. It is recommended that this study be conducted with a larger sample size to ensure enough power to better interpret the significant and non-significant results. This may be a major reason we did not find a significant difference between posted self, not posted self, posted other, and not posted other. Having recruited friends and family could have also impacted the results by adding to the differences within the photos themselves. All of the participants, as mentioned before, were from Suffolk County, Long Island and all of the photos were taken in Midtown, Manhattan. Additionally, friends and families may have, despite being blind to the

aims of the study, “tried” to provide results they believed were desired in order to help out a friend and family member.

Second, again, as a result of the Covid-19 pandemic, participants completed the final recognition phase at home rather in the lab. Thus, it is impossible to know whether the participants a.) took the study serious; b.) were distracted while completing the recognition task; and/or consulted social media to check whether the picture was theirs and whether they posted it or not (despite being instructed not to consult social media). The extent to which either of these occurred may have influenced the present results in myriad and unknown ways. Thus, future research should have the recognition test completed in the lab where the researcher can be sure that the participants complete the task as instructed and without distraction.

Third, the present study lacks a level of ecological validity. The photos, whether they were taken by participants or sent to them by the researcher, had restrictions (i.e., no selfies, pictures with friends, etc.). Social media, in practice, does not function this way. Social media allows people to self-select the content they choose to post (both non-personal and personal in nature). Posting on social media typically includes photos of friends, personal memories, important locations, and personalized captions for each post. By choosing the content for the participants and giving guidelines for content, this may shape the mnemonic consequences associated with posting, but may not reflect the mnemonic consequences associated with posting pictures individuals self-select to post.

Last, the present examination of recognition accuracy was rather blunt and may not have been sensitive enough to find differences. Future research should consider adapting Signal Detection Theory models to the present methodology and results (see, e.g., Hilford et al., 2019;

Kellen et al., 2018; Wixted, 2007) or, at the very least, measure reaction times. In doing so, more nuanced results in terms of the mnemonic accessibility of the pictures posted or not could be ascertained.

Conclusion

Although the current study failed to find a mnemonic difference between posting and not posting non-personal and personal information on social media, the present study adds to the growing literature aimed at better understanding how posting personal information on social media, in particular, *Instagram*. This study was the first to focus on the mnemonic consequences associated with posting or not personal vs. non-personal photos on *Instagram*. The results indicated no difference in recognition accuracy for “self” and “other” photos or for posted or not posted photos. Alternatively, the results did show that participants had higher confidence when identifying photos taken by participants (self-photos) over photos not taken by participants (other-photos). However, due to the limitations of the present study, the results of this study preclude any definitive understanding of how posting social media shapes the way individuals remember the past. Regardless, the present study provides a potentially, fruitful methodology to move forward and better examine how social media influences the way individuals remember the past. This is important given that social media usage continues to expand, and researchers are only beginning to understand how social media use shapes the way individuals remember their personal past. While future research is needed, the present results add to this growing field and may help lead to a better understanding of how something as ubiquitous as social media use shapes the way individuals remember their personal past and may in turn, shape their identity.

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Appendix A**THE CITY UNIVERSITY OF NEW YORK***John Jay College of Criminal Justice**Department of Psychology***CONSENT TO PARTICIPATE IN A RESEARCH STUDY****Title of Research Study: Social Media & Memory: Self vs. Others****Principal Investigator: Charles B. Stone, PhD**
Assistant Professor of Psychology
John Jay College of Criminal Justice**Research Assistant: Chloe Cardinale**
MA Candidate
John Jay College of Criminal Justice.

You are being asked to participate in a research study because you have volunteered to participant in this research study on your own accord, you are between 18-65 years old, have a phone that can take and post photos and have a public *Instagram* profile and an active user.

Purpose:

The purpose of this research study is to examine how social media use shapes the way people remember the past. Investigators will be looking at how posting or not posting an image on social media effects how we remember an image.

You may wish to participate to become familiar with the way psychologists' study human cognition and memory processes in a controlled research lab. You may also enjoy helping us build our knowledge base so that we can better understand how social media shapes the way individuals remember the past.

In terms of reasons that you may not want to participate: (1) It is possible that you find this task repetitive or long. (2) It is also possible that you might forget about the tasks of the study or get bored. You may wish to withdraw from the study at any given time.

Procedures:

If you volunteer to participate in this research study, we will ask you to do the following:

Day 1: You be sent a Qualtrics link. This link will provide you with all of the information you need for the study. It will also provide you contact information for researchers, if any questions arise, you can contact researchers and they will answer any questions you have. You will first

read an informed consent. Then there will be instructions about what the study will entail. You will also have to acknowledge having a profile on Instagram and to not use Instagram outside the purposes of this study. Once you acknowledge that they understand the purpose and requirements of the study, you will complete a contact information sheet and will then be thanked for your participation and that will be the end of day one.

Day 2-5: Throughout the 4-day span, you will be texted through Textedly two days out of the four. You will be randomly texted throughout the day (nine in total) on the days you assigned to be texted. When you receive these texts, you will be asked to take a picture (no selfies) of what you are doing at that moment. Three times, you will be texted a picture and asked to post that photo on Instagram. For half of these pictures taken (3), the you will be asked to post on Instagram and 3 photos that were sent to you will be posted. The texts will provide instructions about posting or not posting a photo on Instagram, where to send the photo to researchers and explain it is essential to post the photo within 1 hour of the text. After 1 hour of no posting the photo, a reminder text will be sent. If no photos are posted by the end of the day, the participate will be contacted by researcher and told they are excused from the project. This will take approximately 5 minutes every time participate is texted by researcher.

Day 6-8: You will complete a recognition test of all the pictures they took as well as 3 lure pictures (i.e., "other" pictures) on Qualtrics (3 were sent and posted on Instagram, 3 are random photos never seen before). You will also answer a series of questionnaires and a demographic sheet. You must answer all questions in the Qualtrics survey in order to receive credit. It is important all questions are answered in order for researchers to be able your accuracy with identifying the photos. Once you complete the experimenter will debrief you and you will be thanked for your time.

Audio Recording/Video Recording/Photographs:

You will not be recorded directly but will be taking photographs of their surroundings over the course of two days. You must consent to taking photos and allowing the photos they take to be displayed to the public via Instagram and sent to the researchers.

Time Commitment:

Your participation in this research study is expected to last for a total of 8 days, this study is completely online. However, the total amount of time online over the course of those 8 days is not expected to last longer than 1 hour and the total amount per day for the only survey should take no more than a 20 minutes per day.

Potential Risks or Discomforts:

- Possible risk or discomforts you may experience due to the procedures listed above include feeling uncomfortable about posting photos of your surroundings on a public Instagram profile.
- If you are unable or unwilling to post the photos onto Instagram, they will be dismissed from the study.

Potential Benefits:

- You will not directly benefit from your participation in this research study.
- Society and science will benefit from this research by looking into the effects social media has on our memory. Social media is a relatively new platform that needs to be investigated further to understand the effects social media has on our memory.

Payment for Participation:

You will not receive any payment for participating in this research study. You will participate on your own accord. You will not be compensated for your time.

New Information:

You will be notified about any new information regarding this study that may affect your willingness to participate in a timely manner.

Confidentiality:

We will make our best efforts to maintain confidentiality of any information that is collected during this research study, and that can identify you. We will disclose this information only with your permission or as required by law.

We will protect your confidentiality by using an anonymous texting application. An anonymous texting application is an app that generates a text without experimenters having to use their actual phone numbers. This allows us to keep complete anonymity and your information as secure as possible. Your numbers and account information will remain confidential and will not be included in the results of the study. Texts will be distributed through an anonymous texting application. Only researchers in this study will have access to the information you provide for us. Although it should be noted, what is posted online may be visible to others outside of this research study.

The content that you post on your Instagram account will be accessed by researchers. The information and content that you post will be recorded for the purposes of this study. To ensure confidentiality, the content you send to researchers, and content observed on your page will be stored on a computer and on Qualtrics and deleted at the end of the research study. The data collected from you will not be stored or used for future research.

The research team, authorized CUNY staff, and government agencies that oversee this type of research may have access to research data and records in order to monitor the research. Research records provided to authorized, non-CUNY individuals will not contain

identifiable information about you. Publications and/or presentations that result from this study will not identify you by name.

Participants' Rights:

- Your participation in this research study is entirely **voluntary**. If you decide not to participate, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled.
- Your participation or nonparticipation in this study will in no way affect your status with the College.
- You can decide to withdraw your consent and stop participating in the research at any time, without any penalty.

Questions, Comments or Concerns:

If you have any questions, comments or concerns about the research, you can talk to one of the following researchers:

Charles B. Stone PhD
chstone@jjay.cuny.edu
(646) 557-4806

Chloe Cardinale
chloe.cardinale@jjay.cuny.edu
(631) 316-5799

If you have questions about your rights as a research participant, or you have comments or concerns that you would like to discuss with someone other than the researchers, please call the CUNY Research Compliance Administrator at 646-664-8918 or email HRPP@cuny.edu. Alternatively, you may write to:

CUNY Office of the Vice Chancellor for Research
Attn: Research Compliance Administrator
205 East 42nd Street
New York, NY 10017

If you agree with the requirements of the study, please press 'yes' below.
If you do not agree please press 'no'

Appendix B

Recognition Questions for Participants



Is the photo above a picture you took yourself?

Yes

No

How confident are you that the photo above is a photo you took yourself on a scale from 1-10?

1 2 3 4 5 6 7 8 9 10

Least Confident

Most Confident

Did you post this photo on *Instagram*?

Yes

No

How confident are you that the photo above was posted or not posted on Instagram on a scale from 1-10?

1 2 3 4 5 6 7 8 9 10

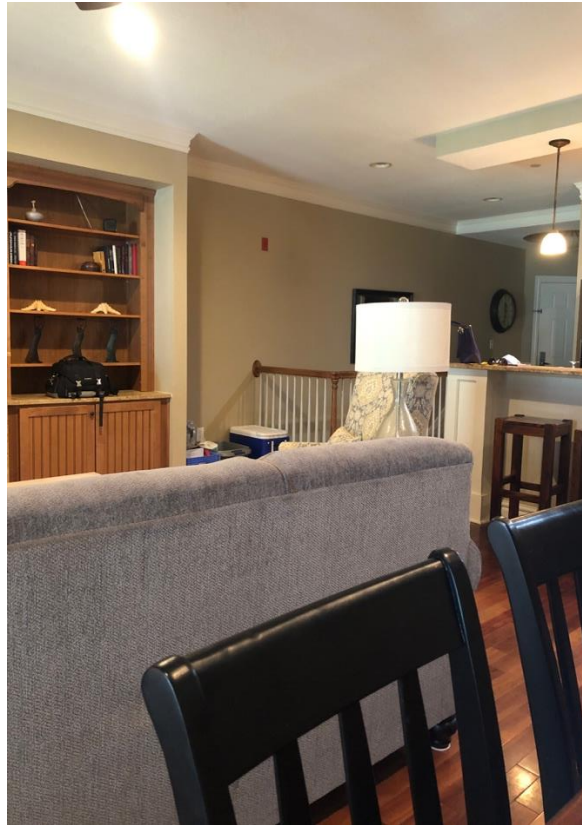
Least Confident

Most Confident

Example of Photo Taken by Researcher



An Example of the Type of Photo Taken by a Participant



Appendix C**Demographic Survey**

What is your name/ *Instagram* user name?

What is the highest level of school you have completed or highest degree you have received?

Less than high school degree

High school graduate (high school diploma or equivalent including GED)

Some college but no degree

Associate degree in college (2-year)

Bachelor's degree in college (4-year)

Master's Degree

Doctoral degree

Professional degree (JD, MD)

Are you Spanish, Hispanic or Latino or none of these?

Yes

None of these

Choose one or more races that you consider yourself to be

White

Asian

Black or African American

Native Hawaiian or Pacific Islander

American Indian or Alaskan Native

Other _____

What is your sex?

Male

Female

Other

Appendix D

Debriefing

You have completed the social media and memory study self vs. others. Thank you so much for your participation. Your time and effort is so greatly appreciated. The purpose of this study was to look at the effect posting photos on social media has on someone's memory. Past research has shown how the concept of selectively remembering a memory induces forgetting of related memories (i.e. retrieval-induced forgetting). We were interested in whether the retrieval-induced forgetting paradigm extended to the instances of posting pictures on social media. In addition, choosing what pictures/content to post on social media may lead to induced forgetting of related pictures/content. Ultimately, this experiment will provide insights into how social media use may ultimately shape the way individuals remember their personal past. If you have any questions or concerns, please do not hesitate to reach out to Chloe Cardinale or Dr. Charles Stone. Our contact information is below. Thank you again for your participation.

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