

Electronic Thesis and Dissertation Repository

8-2-2017 12:00 AM

Social Media and Cognition

Ana C. Ruiz Pardo
The University of Western Ontario

Supervisor
Dr. John Paul Minda
The University of Western Ontario

Graduate Program in Psychology
A thesis submitted in partial fulfillment of the requirements for the degree in Master of Science
© Ana C. Ruiz Pardo 2017

Follow this and additional works at: <https://ir.lib.uwo.ca/etd>



Part of the [Cognition and Perception Commons](#), and the [Cognitive Psychology Commons](#)

Recommended Citation

Ruiz Pardo, Ana C., "Social Media and Cognition" (2017). *Electronic Thesis and Dissertation Repository*. 4714.
<https://ir.lib.uwo.ca/etd/4714>

This Dissertation/Thesis is brought to you for free and open access by Scholarship@Western. It has been accepted for inclusion in Electronic Thesis and Dissertation Repository by an authorized administrator of Scholarship@Western. For more information, please contact wlsadmin@uwo.ca.

Abstract

Social media is an inescapable platform for sharing media and connecting with others. This thesis investigated how social media impacts cognition; specifically, attention. Study 1 investigated typical social media usage patterns and helped gauge which SM platform was most popular. Study 1 revealed three main platforms people used most often: Facebook, Instagram, and Snapchat. Facebook was reported as the most popular social media platform. Study 2 investigated how a social media post impacts cognition. It was hypothesized that participants who posted, with the intention of provoking a reaction from their followers, on their social media prior to performing a cognitive task would be distracted and have lower performance than a control group. However, there was no significant difference between the conditions. Therefore, the main hypothesis was not supported. An external factor that undermined the experiment (i.e. age) was discussed. Social media's impact on cognition remains unclear and requires future research.

Keywords

Social Media, Cognition, Attention, Distractibility, Executive Functioning, Smartphones, Media Multitasking

Acknowledgment

First, I would like to thank Dr. John Paul Minda for his guidance in completing these studies and for his help with the final draft of this thesis. I am grateful for his encouragement and patience throughout this process and I am overjoyed to continue my graduate studies under his supervision.

I also give thanks to my fellow graduate students, Emily Nielsen and Mikayla Keller, for their friendship and support over the past two years. Also, Sophie Wharmby, who played a role in the collection and organization of data for Study 2. To my fellow MSc. students and lab members, Josh Hatherley and Toka Zhu, for their advice and help throughout the testing process during Study 2. Further thanks to all the members of my lab for their support and advice during this process.

Many thanks to my friends for their unconditional love and support throughout my MSc. program. To Rex, for his love and patience throughout this process.

Lastly, I would like to give a very special thanks to my wonderful and loving family. To my brothers, David and Michael, for their friendship and brotherly-love that can always brighten up my day. To Wendy, who has been like a sister. To my niece and nephew, Isabella and Logan. And to my parents, Delia and Guillermo, for their undeniable love and devotion to my education. Los Amo mucho.

Table of Contents

Abstract.....	i
Acknowledgment.....	ii
Table of Contents.....	iii
List of Tables.....	vi
List of Figures.....	vii
List of Appendices.....	viii
Chapter 1.....	1
1 Social Media and Cognition: Literature.....	1
1.1 What is Social Media?.....	1
1.2 Social Media Prevalence.....	1
1.3 Media Multitaskers.....	2
1.4 Social Media and Well-Being.....	4
1.5 Smartphones and Attention.....	4
1.6 Social Media and Attention.....	6
1.7 Purpose of Thesis.....	7
Chapter 2.....	8
2 Study 1: Social Media Usage Patterns.....	8
2.1 Typical Use and Growing Platforms.....	8
2.2 Purposes and Hypotheses.....	8
2.3 Method.....	9
2.3.1 Participants.....	9
2.3.2 Materials.....	9
2.3.3 Procedure.....	10
2.4 Results and Discussion.....	10

2.4.1	General Patterns	10
2.4.2	Platform Comparisons	11
2.4.3	Distractibility	13
2.4.4	Correlations.....	13
2.5	Discussion.....	16
2.5.1	General Conclusions	16
2.5.2	Limitations	16
2.5.3	Implications and Future Research.....	16
Chapter 3	18
3	Study 2: Social Media and Sustained Attention.....	18
3.1	Social Media and Cognitive Control.....	18
3.2	The SART	18
3.3	Purpose and Hypotheses	19
3.4	Method	20
3.4.1	Participants.....	20
3.4.2	Materials	21
3.4.3	Procedure	22
3.5	Results.....	24
3.5.1	The SART	25
3.5.2	The Social Media Usage Questionnaire.....	27
3.5.3	Correlations.....	32
3.6	Discussion.....	34
3.6.1	General Conclusions	35
3.6.2	Limitations	36
3.6.3	Implications and Future Research.....	36
Chapter 4	38

4	General Discussion	38
4.1	Study 1: Social Media Usage Patterns	38
4.2	Study 2: Social Media and Sustained Attention	38
4.3	Implications and Future Directions.....	39
4.3.1	Future Directions: Integrating Smartphone Literature.....	40
4.3.2	Future Directions: Categorizing Social Media Platforms.....	41
4.4	Conclusion	42
	References.....	44
	Appendices.....	47
	Curriculum Vitae	74

List of Tables

Table 1: General social media patterns for Study 1.....	11
Table 2: Social media platform use comparisons for Study 1.....	12
Table 3: Descriptions of last social media post for Study 1.....	13
Table 4: Perception of distractibility from last social media post in Study 1.....	13
Table 5: Correlation matrix for Study 1.....	15
Table 6: Main analysis demographics.....	20
Table 7: Secondary analysis demographics.....	21
Table 8: Descriptive statistics for main analysis.....	26
Table 9: Descriptive statistics for the secondary analysis.....	27
Table 10: General social media patterns in Study 2.....	28
Table 11: Social media platform use comparisons for Study 2.....	29
Table 12: Descriptions of last social media post for Study 2.....	30
Table 13: Descriptions of assigned social media post for Study 2.....	31
Table 14: Perception of distractibility from assigned and last social media post in Study 2.....	32
Table 15: Correlations for SART and Social Media Usage Questionnaire data for Study 2.....	33

List of Figures

Figure 1: Depiction of SART trials. There are two trials depicted: participants should respond with a “3” key press when the number “5” appears (i.e. “Go” trials, highlighted in green). Participants should refrain from responding with any key when the number “3” appears (i.e. “No-Go” trials, highlighted in red).	22
Figure 2: Study 2 paradigm. Participants were randomly assigned to either an experiential (i.e. social media post) or control (i.e. no social media post) condition. Then all participants completed the SART, followed by the Social Media Usage Questionnaire, and then were fully debriefed.	23
Figure 3: Classification of social media platforms with respect to social presence and media richness, and self-presentation and self-disclosure (Kaplan & Haenlein, 2010).	42

List of Appendices

Appendix A: Social Media Usage Questionnaire: Study 1 and Study 2 (Control Condition)	47
Appendix B: Social Media Usage Questionnaire: Study 2 (Experimental Condition).....	57
Appendix C: Study 2 Instructions (Control and Experimental Condition).....	70
Appendix D: Ethics for Study 1 and 2	73

Chapter 1

1 Social Media and Cognition: Literature

This chapter reviews social media, media multitasking, and smartphone literature to demonstrate how expanding social media research into the cognitive domain is necessary. Previous social media research has focused on its prevalence (Best, Manktelow, & Taylor, 2014), its impact on well-being (Caers et al., 2013), and relationships (O’Keeffe, Clarke-Pearson, & Council on Communications and Media, 2011). However, the impact that social media might have on cognition needs further investigation.

1.1 What is Social Media?

Social media is not only growing in popularity, but is also dynamic in definition. Researchers continue to define it as its definition evolves, but with new platforms and ever-changing functions, it can be difficult to define for experimental research. Kaplan and Haenlein (2010) define social media as: “a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content.” (p. 61). Web 2.0 describes when World Wide Web users used their platforms to provide content that could be continuously modified by all users in a collaboration.

Therefore, Web 2.0 helped make the base for the creation of modern-day social media. User Generated Content (UGC) is how users use social media given the base that Web 2.0 provides. UGC has three criteria: first, the content must be published in a publicly accessible or networking website; second, it must be creative in some way; and third, it needs to be created outside of a professional context (Vickery & Wunsch-Vincent, 2007). Therefore, social media is creative free-speech that can be shared through modern technological platforms.

1.2 Social Media Prevalence

Think about the last time you viewed your social media. It could be on any device (e.g. smartphone, computer, tablet, etc.). Was it an hour ago, a minute? Did you check your

social media during work, class, or a social event? On average, people check their social media multiple times a day on different devices (Best et al., 2014; O’Keeffe et al., 2011). Previous literature focused on how this social media exposure can impact well-being (e.g. depression, self-esteem, etc.) and has mixed findings (Best et al., 2014). However, considering the attentional impacts that smartphones (Stothart, Mitchum, & Yehnert, 2015; Ward, Duke, Gneezy, & Bos, 2017) and media multitasking (Ophir, Nass, & Wagner, 2009; Ralph, Thomson, Seli, Carriere, & Smilek, 2015) have, social media’s impact on cognitive functioning is a reality.

Social media has become an inescapable platform for sharing media, ideas, and overall staying ‘in touch’ with modern society (Kaplan & Haenlein, 2010; Ngai, Tao, & Moon, 2015). Platforms such as Facebook and Instagram are used by over one hundred million people throughout the world and are still growing in popularity (Kaplan & Haenlein, 2010). Social media impacts many differing age groups (Best et al., 2014; O’Keeffe et al., 2011) and its popularity has coincided with an increase in smartphone use (O’Keeffe et al., 2011; Wilmer, Sherman, & Chein, 2017).

These online platforms have become a daily ritual and for many people are essentially unavoidable in modern society (Best et al., 2014; Ngai et al., 2015; O’Keeffe et al., 2011). Some institutions have even taken to using social media to integrate their official communication with an informal and more modern platform (Sędkowski, 2015). Social media platforms are constantly used throughout the day (e.g. during work, class, social events, whenever you are bored, etc.). The continued growth of social media platforms has changed the way companies can control the ‘flow of information’ (Kaplan & Haenlein, 2010). Consequently, the present study aims to investigate social media use and its impact on cognitive functioning.

1.3 Media Multitaskers

Media multitasking, “the concurrent consumption of multiple streams of media” (Ralph et al., 2015, p. 390), has been associated with lower performance on some cognitive tasks (Moisala et al., 2016; Ophir et al., 2009; Ralph et al., 2015; Wilmer & Chein, 2016). Ophir et al. (2009) investigated media multitaskers’ information processing styles. They

defined high media multitaskers (HMM) as those who were at least one standard deviation above the average. This was measured with a media multitasking index, which determined the self-reported mean number of media that participants simultaneously use (Ophir et al., 2009).

The main task Ophir et al. (2009) used was a filter task. In this task, participants viewed two consecutive exposures of an array of rectangles and had to indicate whether a target (i.e. red) rectangle had changed orientation from the first exposure to the second while ignoring distractor (i.e. blue) rectangles. The task measured performance for arrays with two targets and some distractors (i.e. either 0, 2, 4, or 6 distractors). A repeated-measures analysis of variance revealed that self-reported HMM had lower performance on the filter task (Ophir et al., 2009). That is, HMM had difficulty filtering out irrelevant information. These findings suggest that, since they are distracted during cognitive tasks, HMM are possibly distracted in their every-day life by the media they often use.

Other studies found similar results, where distractibility was caused by media multitasking (Moisala et al., 2016; Stothart et al., 2015; Thornton, Faires, Robbins, & Rollins, 2014). Moisala et al. (2016) found that media multitaskers did not experience benefits from their media habits; rather, they showed lower performance and, therefore, higher distractibility. Media multitasking's impact on attention depended on the nature of the media (i.e. positive or negative tweets; Kätsyri, Kinnunen, Kusumoto, Oittinen, & Ravaja, 2016). Meaning, negative tweets distracted participants for longer than positive tweets. Ralph et al. (2015) demonstrated that HMM might face attentional deficits; however, they state that there is more to these attentional costs than just the fact that people are multitasking on their devices. Therefore, I think that expanding the research to investigate social media's role in these attentional costs is needed. Since most people have multiple platforms and use social media during other tasks, such as work and class (Best et al., 2014; Wilmer & Chein, 2016), social media has become analogous to media multitasking. That is, social media is the most probable media that people are multitasking with.

1.4 Social Media and Well-Being

Since social media became more popular, the influences that social media has on well-being have been extensively researched (Best et al., 2014; Caers et al., 2013; Ngai et al., 2015; Wilson, Gosling, & Graham, 2012). Social media's impact on well-being can be controversial, with both positive (Deters & Mehl, 2013) and negative (Lee, 2014; Rosen, Mark Carrier, & Cheever, 2013) impacts. Deters and Mehl (2013) used a web-based experimental design to explore the impact of Facebook on well-being. They found that those who reported updating their status more also experienced a decrease in loneliness due to a level of connectivity with friends and followers (Deters & Mehl, 2013).

Whereas, findings from Lee (2014), who investigated social media use and social comparison, found that those who socially compared themselves more also reported lower self-esteem.

Ongoing social media research investigates how these platforms can impact well-being of an individual and the family (Best et al., 2014; O'Keeffe et al., 2011). O'Keeffe et al. (2011) listed four main risks (e.g. cyberbullying, "Facebook Depression", privacy, etc.) and five main benefits (e.g. communication opportunities, enhancing creativity, fostering identity and social skills, etc.) that social media use can have on youth and adolescents. Furthermore, the type of post (i.e. positive, neutral, or no post) that one views can change how social media impacts well-being (de Vries, Möller, Wieringa, Eigenraam, & Hamelink, 2016). This also depended on participant's tendency to socially compare themselves to others. Therefore, those who viewed positive posts on Instagram experienced higher negative affect only if they socially compared themselves (de Vries et al., 2016). Although many studies claimed that there can be a benefit of social media, robust causal research in this domain is still needed (Best et al., 2014).

1.5 Smartphones and Attention

Attentional costs of cell phone usage during driver performance (Caird, Johnston, Willness, Asbridge, & Steel, 2014; Horrey & Wickens, 2006) and in other contexts (Stothart et al., 2015; Thornton et al., 2014; Tindell & Bohlander, 2012; Ward et al., 2017; Wilmer et al., 2017) have also been found. Cell phone use has been investigated as

a potential concern since it became more common. Tindell and Bohlander (2012) investigated how the rising prevalence of cell phones in the classroom was an issue since little was known about how it can impact cognitive abilities. Smartphone use was linked with resource depletion in cognitive function engagement during a workday (Lanaj, Johnson, & Barnes, 2014) and during day-to-day self-regulation (Reinecke, Hartmann, & Eden, 2014; Wilmer & Chein, 2016). Wilmer and Chein (2016) found that heavier mobile device users tended to have lower impulse control and a weaker tendency to delay gratification.

Stothart et al. (2015) addressed the impact of smartphone notification on cognitive resources. Participants were randomly assigned to one of three conditions: call notification, text notification, or no notification. Those in the notification conditions received a notification during the second block of the main task. Participants were asked to complete the Sustained Attention to Response Task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997), which asked participants to press a key when any number except the target number was flashed. Using the SART, Stothart et al. (2015) demonstrated that even with no direct contact with a cell phone, participants performed worse under the notification conditions when compared to the no notification condition. The fact that the notifications were received on participants' personal cell phones allowed participants to perceive whether they were receiving personally relevant content during the experiment.

Interestingly, Thornton et al. (2014) and Ward et al. (2017) found that even the presence of a cell phone can diminish attention. Participants showed diminished attention during cognitively demanding tasks both when the experimenter's phone was present and when their own phone was present when compared to the control (Thornton et al., 2014). Similarly, Ward et al. (2017) found that cell phone location can impact cognition. Participants completed cognitive tasks that required attention while leaving their smartphones either on the desk, in their pocket or bag, or outside the testing room. All participants were instructed to have their phones on "silent", which meant that the phone would make no sounds or vibrations. Without receiving any notifications, participants showed lower performance on an automated operation span task (OSpan; Unsworth,

Heitz, Schrock, & Engle, 2005) and a subset of Raven's standard progressive matrices (Raven & Court, 1998). For the OSpan, participants completed math problems while remembering a string of letters. This assessed participants' working memory and relied on their ability to maintain attention by forcing participants to keep track of information while performing a complex task (Unsworth et al., 2005). Raven's progressive matrices measured general fluid intelligence by asking participants to complete an incomplete pattern matrix. This task was also sensitive to participants' current availability of attentional resources (Raven & Court, 1998). In their first study, the effect was seen with the mere presence of their smartphones. There was a significant impact of phone location on task performance. For both tasks, participants who left their phones in another room performed better than participants who left their phones in their pocket or bag. However, this was moderated by individual differences in dependency of their smartphone (Ward et al., 2017). Ward et al. (2017) extended their first study by adding a power condition (i.e. each participant's phone was either on or off) and by using the OSpan and a Go/No-Go task. The Go/No-Go task was similar to a SART task, where participants were required to respond to "Go" targets and refrain from responding to "No-Go" targets. This expanded on the research that shows how cell phone use has impacted cognition. Considering that social media is widely used among cell phones and smart phones, it is plausible to think that social media plays a role in decreased cognitive function.

1.6 Social Media and Attention

As stated earlier, social media's impact has recently become a new topic among many fields (Ophir et al., 2009; Wilmer et al., 2017). Social media has also been directly linked to attentional costs (Rosen et al., 2013). During a 15-minute studying task, students were unable to retain their attention for longer than a 10-minute period before switching tasks. This was directly related to the amount of technology that they had available to them and included task-switching to social media use. With respect to academic performance, participants who accessed Facebook demonstrated a lower grade point average. Consequently, Rosen et al. (2013) posited that regular technology breaks would be helpful when battling attentional costs. Forcing oneself to refrain from using task-alternatives, such as social media, can provide an internal distractor to the task at hand.

Considering that social media played a role in losing attention on a task, this thesis wished to expand on the question: how does social media impact cognition?

1.7 Purpose of Thesis

When discussing social media and cognition, there is no comprehensive examination of how social media use can directly impact an individual's attention (McFarland & Polvhart, 2015; Ngai et al., 2015). Previous literature demonstrated that social media use impacts well-being (O'Keeffe et al., 2011). However, given previous research on media multitaskers and attention (Ophir et al., 2009; Wilmer et al., 2017), this research should be extended to a cognitive domain. Self-reported media multitaskers showed detriments (e.g. Ophir et al., 2009; Ralph et al., 2015). Social media is a popular media that people engage in regularly (Best et al., 2014) using their smartphones (O'Keeffe et al., 2011) and should also show analogous effects on cognition. Social media should have similar impacts on cognition since social media is an aspect of the medias most people use to multitask and is usually used on a smartphone. Additionally, using an experimental manipulation (i.e. by asking people to engage in social media prior to a task) should extend both the attentional and social group research. The purpose of this thesis is to use this novel design paradigm to demonstrate that by asking people to use a social media platform prior to a task, their expectancy for feedback from the post should lower their performance.

Chapter 2

2 Study 1: Social Media Usage Patterns

This chapter supports previous social media literature by examining general social media use patterns. Study 1 sought to assess people's typical social media use and gauge which social media platform or platforms were most popular for subsequent studies.

Additionally, Study 1 examined how people perceive their own social media use and how this use can impact their attention.

2.1 Typical Use and Growing Platforms

Due to its popularity, Facebook has been a widely investigated social media platform (Caers et al., 2013). However other social media platforms have begun to rise in popularity and competition between platforms presents a new challenge for social media research: knowledge of people's typical social media use is critical (Alloway, Horton, Alloway, & Dawson, 2013; Davenport, Bergman, Bergman, & Fearington, 2014).

Different social media usage can have varying impacts. For example, Facebook can help users feel more connected, while YouTube does not (Alloway et al., 2013). Therefore, examining people's current social media use can help provide information about current trends in platform preferences and guide future research.

2.2 Purposes and Hypotheses

An online pilot study was used to test the Social Media Usage Questionnaire. This study investigated how the population used social media and how they perceive social media's possible impact on their attention. Study 1 was also a guideline to make appropriate predictions during Study 2. For example, although older social media users might prefer Facebook, younger social media users have more options and might prefer newer platforms (e.g. Snapchat). Therefore, Study 1 was also used to determine what social media platform should be the focus for subsequent studies.

2.3 Method

2.3.1 Participants

A sample of 57 (Females = 40, Males = 16, Unspecified = 1) students enrolled at Western University (86% in first year) completed Study 1. Participants ranged from 17-21 years of age, with an average age of 18.53 years old. No participants were excluded from the analysis.

2.3.2 Materials

2.3.2.1 The Social Media Usage Questionnaire

Participants completed the Social Media Usage Questionnaire. This questionnaire was used in both studies to gauge participant's social media use (see Appendix A and B). Participants were asked to describe their typical social media usage; which included type of use, frequency of use, and response expectancy. The questionnaire also included some general demographic questions (e.g. gender, age, year of study) and questions where participants identified the social media platforms they used and/or preferred.

The questionnaire included 17-Likert scale items (from 1-strongly agree, to 7-strongly disagree), which ask participants about their typical social media use. This included type of use (e.g. to stay connected with friends), frequency of use, and response expectancy (i.e. if they normally expect others to react to their social media posts). Additionally, participants reported their social media usage habits with respect to a given list of social media platforms: Facebook, Instagram, Snapchat, Twitter, Google Plus, Pinterest, Vine, Tumblr, YouTube, LinkedIn, Reddit, Flickr, MySpace, Yahoo, WhatsApp, StumbleUpon, Other. Participants reported which platforms they had, their most used platform, and which platform they would choose if they could "only use one".

With respect to their last social media post, participants reported which platform they used, the number of interactions they received, when the post was made, and the type of post they made (e.g. posted a picture, commented on a post, updated their status, etc.). Qualitative data was also collected for the last type of social media post through an open-

ended question. Lastly, participants reported if they thought about their last social media post during the questionnaire and whether they felt distracted from it.

2.3.3 Procedure

Participants were recruited through the Psychology Department Research Participant Pool. Prior to the study, participants gave informed consent, after which, they completed an online (i.e. outside of a lab) Qualtrics study, which took approximately 30 minutes to complete. One to six questions were presented at a time on the screen, with options to move forward and backwards through the questions. After the study was completed, participants were debriefed and the nature of the study was explained. Participants were then granted 0.5 credits in a psychology course for participating.

2.4 Results and Discussion

Responses to the Social Media Usage Questionnaire were summarized by collecting the proportions of responses for choice items (i.e. which platform do you prefer) and the mean on rating scale items. General patterns reflect participant's typical social media use (e.g. having a large network, uploading photos, wanting feedback, etc.). Platform preferences were performed to compare the most used, the most needed, and the last used social media platform. Additionally, a two-tailed Pearson bivariate correlation was performed to explore the relationship, if any, between different social media uses and preferences.

2.4.1 General Patterns

Participants reported having an average of almost 6 social media platforms. Table 1 depicts participant's general social media use. Any mean than was above the "neutral" mean (i.e. 4) represented higher reports of the behaviour. Participants reported "keep in touch with friends" higher than neutral (i.e. higher than a mean of 4), suggesting that this was the primary use for social media among the participants. Also, participants reported wanting feedback from their social media posts. Similarly, participants reported that they did feel distracted when waiting for responses from their posts on social media platforms.

Table 1: General social media patterns for Study 1.

	<i>M</i>	<i>SD</i>
Total platforms	5.75	2.23
High social media use	4.56	1.12
Want feedback	4.66	1.14
Interact with others	4.44	1.72
Photo uploads	4.28	1.9
Large network	4.46	1.66
Keep in touch with friends	5.46	1.57
Update life events	4.32	1.91
Distracted for response	4.49	1.72

Notes: Participants reported on a 7-point Likert scale (i.e. 1-7) for all items except for "total platforms". Higher scores reflect higher reports of the behaviour.

2.4.2 Platform Comparisons

Participants showed that most had the same “core” social media platforms: Facebook, Instagram, Snapchat, Twitter, YouTube (in order of most used). When reporting which social media platform they used most often, the three top platforms emerged: Facebook, Instagram, and Snapchat (in order of most used). Then, when participants were asked to “only choose one” platform, Facebook (33%) overcame the other top platforms (e.g. Instagram, 26%; Snapchat, 16%). This reflected the current literature (Best et al., 2014; O’Keeffe et al., 2011). Further detail on participant’s platform preferences is depicted in Table 2.

Table 2: Social media platform use comparisons for Study 1.

	Percentage		
	Platform used most often	Platform if only one	Platform of last post
Facebook	28.1	33.3	21.1
Instagram	28.1	26.3	26.3
Snapchat	28.1	15.8	31.6
Twitter	3.5	7	1.8
Tumblr	1.8	1.8	3.5
YouTube	5.3	14	3.5
Yahoo	1.8	0	0
WhatsApp	0	0	1.8
Other	3.5	1.8	10.5

Notes: Participants reported details about their social media use with respect to different platforms. "Platform if Only One" reflects which platform participants would choose if they could only have one platform.

Contrastingly, participants reported that their last social media post was most likely on Snapchat (32%) compared to Instagram (26%) and Facebook (21%). Most participants reported the time of their post on any social media platform to be "more than a day ago" (70%). The most reported type of post was "posted a picture" (77%). Detailed results on participant's last social media post is depicted in Table 3.

Table 3: Descriptions of last social media post for Study 1.

Time of Last Post	Percentage
Immediately prior to study	8.8
Earlier today	8.8
1 day ago	10.5
More than a day ago	70.2
Never posted	1.8
Last Post Type	
Posted a picture	77.2
Shared/Retweeted a picture	3.5
Posted an article	3.5
Shared/Retweeted an article	1.8
Updated your status	1.8
Commented on a post	7
Other	5.3

Notes: Participants reported details about their last social media post.

2.4.3 Distractibility

Participants felt a low sense of distractibility from their last post during the survey and they did not report that they thought frequently about their last post during the survey (i.e. a mean below the “neutral” mean of five; see Table 4 for further details). This suggested that different types of social media usage or goals for using social media should be considered in future studies.

Table 4: Perception of distractibility from last social media post in Study 1.

	<i>M</i>	<i>SD</i>
Thought about last post	4.05	2.89
Distracted by last post	2.49	2.56

Notes: Participants reported on an 11-point Likert scale (i.e. 0-10). Higher scores reflect higher reports of the behaviour.

2.4.4 Correlations

A two-tailed Pearson bivariate correlation examined the relationship between participant’s self-reported social media use factors (refer to Table 5 for the correlation

matrix). This determined if there was a relationship between the items on the scale. There was a significant moderate positive correlation between those who reported being distracted for responses to their social media posts (i.e. “Distracted for response”) and high social media users, $r(55) = .50, p < .001$, and those who wanted feedback, $r(55) = .53, p < .001$. Participants who felt distracted for responses also reported high social media use and a high need for feedback. How much participants wanted feedback from social media posts had a significant strong positive correlation with posting photos on social media, $r(55) = .60, p < .001$. There was a relationship between wanting feedback and posting pictures on social media.

With respect to participants’ last social media post, there was a significant weak negative correlation between thinking about one’s last social media post and interacting with others on social media, $r(55) = -.38, p = .004$. Also, there was a significant moderate negative correlation between feeling distracted by one’s last post and interacting with others on social media, $r(55) = -.46, p < .001$. Therefore, people who think about and are distracted by their posts spend more time making their own posts on social media.

There was a significant weak positive correlation between thinking about one’s last social media post and posting photos on social media, $r(55) = .30, p = .02$. Therefore, thinking about one’s last social media post was related to posting more photos on social media. Lastly, there was a significant moderate positive correlation between thinking about one’s last social media post and feeling distracted by one’s last social media post, $r(55) = .59, p < .001$. So, thinking about the post and being distracted by those thoughts had a relationship.

Table 5: Correlation matrix for Study 1.

		High social media use	Want feedback	Total platforms	Interact with others	Photo uploads	Large network	Keep in touch with friends	Update life events	Distracted for response	Thought about last post	Distracted by last post
High social media use	<i>r</i>	—	.70***	.15	-.03	.66***	.68***	.63***	.63***	.50***	.10	-.08
	<i>p</i>	—	< .001	.25	.83	< .001	< .001	< .001	< .001	< .001	.47	.54
Want feedback	<i>r</i>		—	.20	.007	.60***	.61***	.56***	.60***	.53***	.11	-.07
	<i>p</i>		—	.14	.96	< .001	< .001	< .001	< .001	< .001	.42	.59
Total platforms	<i>r</i>			—	-.13	.18	.21	.09	.23	.14	.16	.04
	<i>p</i>			—	.34	.18	.11	.51	.09	.29	.23	.78
Interact with others	<i>r</i>				—	.01	-.03	.22	-.02	-.09	-.38**	-.46***
	<i>p</i>				—	.94	.80	.10	.91	.53	.004	< .001
Photo uploads	<i>r</i>					—	.55***	.36**	.63***	.21	.30*	.02
	<i>p</i>					—	< .001	.006	< .001	.12	.02	.91
Large network	<i>r</i>						—	.33**	.54***	.41**	.09	-.007
	<i>p</i>						—	.01	< .001	.002	.52	.96
Keep in touch with friends	<i>r</i>							—	.44**	.28*	-.05	-.34*
	<i>p</i>							—	.001	.04	.72	.01
Update life events	<i>r</i>								—	.45**	.19	.12
	<i>p</i>								—	.001	.15	.39
Distracted for response	<i>r</i>									—	.09	.09
	<i>p</i>									—	.50	.51
Thought about last post	<i>r</i>										—	.59**
	<i>p</i>										—	< .001
Distracted by last post	<i>r</i>											—
	<i>p</i>											—

Notes: * Correlation is significant at the 0.05 level. ** Correlation is significant at the 0.01 level. *** Correlation is significant at the 0.001 level.

2.5 Discussion

2.5.1 General Conclusions

Study 1 investigated people's typical social media use and their perception on how social media can impact their attention (i.e. distractibility). General usage results showed that people do have social media for varying uses, such as to interact with others, to keep in touch with friends, and to post photos. Participants also reported using social media to get feedback from their friends or followers. Wanting feedback was related to feeling distracted by their social media use and posting photos on social media. There was an unexpected relationship between wanting to interact with others and distractibility from people's last post (i.e. thinking about and feeling distracted from one's last social media post) where higher distractibility was related to lower reports of using social media to interact with others. With respect to platform preferences, Study 1 suggested that different types of social media platforms may attract varying user types and consequent impacts on people's cognition.

2.5.2 Limitations

Study 1 was intended as an exploratory view of people's typical social media usage patterns. Inherent limitations include a small and specific sample size (i.e. most participants were first-year undergraduate students). Since social media use can vary with age (O'Keeffe et al., 2011), this population sample would not be representative of all the social media users. However, Study 1 does provide a starting point for social media research.

2.5.3 Implications and Future Research

The results for Study 1 helped explore and understand what social media platforms people use and how those people related to their social media. There were three "core" social media platforms that were most popular in the population: Facebook, Instagram, and Snapchat. Additionally, participants reported Facebook as the most wanted social media platform. That is, when asked which they would choose if they "could only have

one”, most chose Facebook. This implied that, although other platforms are growing in popularity, Facebook remains the most popular.

Study 1 also tested and provided validation for the Social Media Usage Questionnaire. Typical social media use trends were supported (Alloway et al., 2013) and items which measured participant’s distractibility (i.e. feeling distracted or thinking about social media during the study) showed internal validity.

Finally, Study 1 was used as a gauge for people's social media preferences. Subsequent research focused on the “core” social media platforms and their impact on cognition. Facebook was the most preferred social media platform; therefore, Study 2 investigated how this platform impacted people’s attention.

Chapter 3

3 Study 2: Social Media and Sustained Attention

This chapter extends from Study 1 by focusing on the most popular social media platforms to investigate how posting on social media impacts people's attention. Previous research for attention (Rosen et al., 2013; Wilmer et al., 2017), smartphone use (Tindell & Bohlander, 2012; Ward et al., 2017), and media multitasking (Ophir et al., 2009; Ralph et al., 2015) was also extended by looking at social media. Social media's impact was extended into a cognitive domain; therefore, the impact of an enticing social media post on sustained attention was investigated.

3.1 Social Media and Cognitive Control

Social media's impact on cognitive control has not been extensively investigated (McFarland & Ployhart, 2015; Ngai et al., 2015). From Study 1, it was found that social media use can be distracting to the user. Due to this result, social media's effect on cognitive function should be investigated using an experimental manipulation.

Participants will post on Facebook (i.e. the most popular social media platform from Study 1) and their performance on a cognitively demanding task will be measured.

From Study 1, social media is used and can be distracting to those users. Social media's impact in a cognitive domain should be investigated using an experimental manipulation. Therefore, asking participants to post on Facebook (i.e. the most popular social media platform, from Study 1) should impact their performance on a cognitively demanding task.

3.2 The SART

To measure participant's performance, the SART (Manly, Robertson, Galloway, & Hawkins, 1999) was used. Participants were asked to memorize a target stimulus (e.g. digit), then, were presented with the visual stimuli, one at a time, on a computer screen. Similar to a Go/No-Go task, participants were required to withhold responses to their target stimulus (e.g. the digit "3"), while responding as quickly as possible to all non-

target stimuli by pressing a key (e.g. the “3” key). Participants’ reaction times and accuracy of participants’ responses were recorded. This required considerable attention and response inhibition and was sensitive to interferences in dual tasks, which measure commission and omission errors as dependent variables.

3.3 Purpose and Hypotheses

Previous research has shown that smartphone notifications can impact SART performance (Stothart et al., 2015). The mere presence of a smartphone can interfere with cognitive performance (Ward et al., 2017). Additionally, media multitaskers have shown decreased performance on cognitive tasks (Ophir et al., 2009). Therefore, Study 2 investigated how an expectation of a notification, such as a comment, like, or share on a social media post, impacted performance on a cognitively-demanding task (i.e. the SART). Facebook is regarded as the most popular social networking site (Błachnio, et al., 2013; Caers et al., 2013; Kramer, et al., 2014); with dramatically increasing users (Wilson et al., 2012). Study 1 found that people were high social media users, wanted feedback, and felt distracted for this feedback. Additionally, Facebook was reported as the most popular social media platform in Study 1. Therefore, Study 2 asked: is there an effect of social media on cognitive processing that comes from people thinking about their social media posts?

It was hypothesized that there was an effect of type of condition (i.e. experimental vs. control) on SART performance (i.e. mean error measured as total error, commission error, or omission error). That is, participants in the experimental condition (i.e. posting on social media prior to the SART) would have lower SART performance. This effect would be driven by a distracting factor caused by participants’ social media post. Since participants were unable to check their social media when they were expecting interactions from their followers, participants were distracted from performing on the SART. This distraction effect from social media notification expectation has many implications for society. Since social media has become an inescapable factor in everyday life, a constant attentional deficit can be overtaking society as a whole. This continual cognitive disruption can have implications for people’s function throughout their daily life.

3.4 Method

3.4.1 Participants

A total of 141 participants completed Study 2. From those, 21 were excluded from the main analysis due to experimenter error and not following instructions. Any participant who did not respond during the SART for at least half of the trials was excluded from any analysis. Therefore, a sample of 120 (Female = 66, Male = 54) students, enrolled at Western University (59% enrolled in first year), were included in the main analysis and the correlational analysis. Participants ranged from 17-47 years of age, with an average age of 20.76 years old. There were 61 participants in the experimental condition and 59 participants in the control condition (see Table 6 for further demographic details).

Table 6: Main analysis demographics.

		Counts	Percentage
Age (years)			
	<i>M</i>		
17-20	18.60	83	69.17
21-24	22.17	23	19.17
25+	31.21	14	11.67
First language			
Other		31	25.8
English		89	74.2
Year of study			
First Year		71	59.17
Second Year		14	11.67
Third Year		11	9.17
Fourth Year		18	15
Fifth Year or Graduate Student		6	5

Notes: Exclusion criteria: no response for at least half of the SART trials.

Additionally, a secondary analysis was performed on a subset of the main analysis sample. This subset included participants who were noted as “no issues” during testing; that is, there were no recorded external distractors (e.g. construction noises, music, etc.) that occurred during testing. The secondary analysis included a sample of 84 (Female =

44, Male = 40) participants (55% enrolled in first year). The average age was 21.04 years old and the age range was 17-47 years old. There were 44 participants in the experimental condition and 40 participants in the control condition (refer to Table 7 for further detail). Participants were tested in groups of up to four participants at a time.

Table 7: Secondary analysis demographics.

Age (years)	Counts Percentage	
	<i>M</i>	
17-20	18.53	53 63.09
21-24	22.10	20 23.80
25+	31.18	11 13.09
First language		
Other		23 27.4
English		61 72.6
Year of study		
First Year		46 54.76
Second Year		10 11.90
Third Year		8 9.52
Fourth Year		14 16.67
Fifth Year or Graduate Student		6 7.14

Notes: Analysis included participants from the main analysis who were noted as "no issues" during testing. Excluded participants experienced possible external distractors.

3.4.2 Materials

3.4.2.1 The Social Media Usage Questionnaire

Participants completed the Social Media Usage Questionnaire from Study 1. This questionnaire was identical to Study 1, with the addition of some questions that were specific to the experimental condition (see Appendix A and B). These questions asked participants to report details about their assigned social media post (e.g. platform they used, notifications received, brief description). Also, participants reported how much they thought about their assigned post and how much they felt distracted by their assigned

post. All other questions remained the same. The experimental and control conditions answered questions about their last social media post.

3.4.2.2 The SART

Participants completed the SART (Manly et al., 1999). This task asked participants to respond with a key press (i.e. “3”) to every number except for the number “3”. Each trial was a maximum of 3s long: each number appeared for the first 250ms, followed by a mask for 1s, and then a blank screen for the remainder of time. There was a total of 270 trials. Participants’ accuracy (i.e. correct versus incorrect responses) and reaction time was collected. Specifically, total errors, commission errors, and omission errors were recorded (see Figure 1).

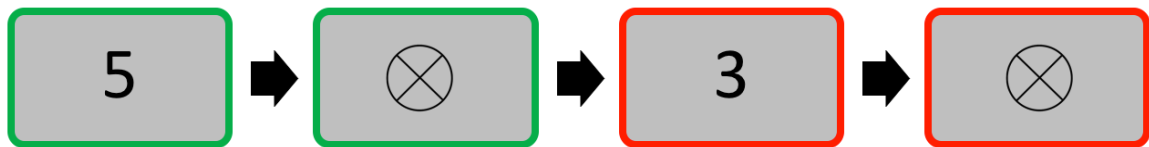


Figure 1: Depiction of SART trials. There are two trails depicted: participants should respond with a “3” key press when the number “5” appears (i.e. “Go” trials, highlighted in green). Participants should refrain from responding with any key when the number “3” appears (i.e. “No-Go” trials, highlighted in red).

3.4.3 Procedure

Participants were recruited through the Psychology Department Research Participant Pool. The study was completed in a lab setting and took approximately 60 minutes to complete. Participants received either 1.0 credit in a psychology course or \$10 cash. Each participant was randomly assigned to either an experimental or control condition (see Figure 2 for the Study 2 paradigm). Participants were informed of the study’s procedures and provided informed consent once all questions were answered. All participants completed the study in groups of up to four.

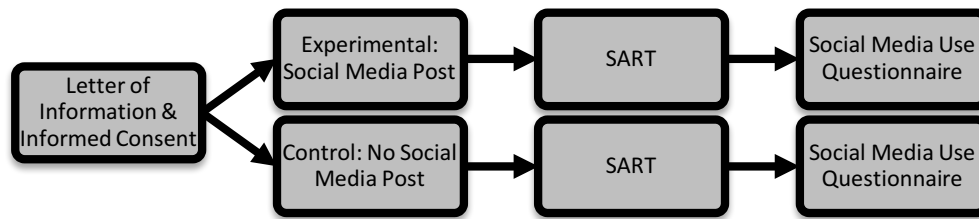


Figure 2: Study 2 paradigm. Participants were randomly assigned to either an experiential (i.e. social media post) or control (i.e. no social media post) condition. Then all participants completed the SART, followed by the Social Media Usage Questionnaire, and then were fully debriefed.

3.4.3.1 Social Media Priming

Participants who were assigned to the experimental group were asked to spend up to 6 minutes reviewing and then posting on a social media platform. They were asked to produce a post (e.g. post a picture, update their status, etc.) that would entice a response (e.g. like, comment, share, etc.) from their friends or followers. From the results of Study 1, participants were told to post on the most popular social media platform: Facebook. If participants did not have Facebook, they were instructed to use the second or third most used social media platforms according to Study 1 (i.e. Instagram or Twitter, respectively). If participants did not have any of those platforms, then their preferred platform was used (refer to Appendix C for further detail). No instructions were given with respect to notifications. Participants in the experimental condition used their personal devices for the assigned post. Those in the control condition were not asked to complete any task prior to the main task.

3.4.3.2 Cognitive Testing: the SART

Then, all participants completed the SART without using their smartphones during the task. That is, participants removed their phones from the table during the SART. Participants were instructed to either place their phones inside their bag or pocket. Both the experimental group and control group used lab computers to complete the SART.

3.4.3.3 The Social Media Usage Questionnaire

After the cognitive testing session, participants in both groups completed the Social Media Usage Questionnaire. Participants described the general content of their assigned post (i.e. participants in the experimental group) or described their last social media post (i.e. experimental and control group). For participants in the experimental group, they reported which social media account they posted to for the study and then checked how many interactions they received (e.g. likes, comments, retweets, etc.). This was not required, but was only collected if they were willing to share the information. Information about the content was never linked to an individual participant's name. Both the experimental group and control group used lab computers to complete the Social Media Usage Questionnaire.

3.4.3.4 Debriefing

At the end of the experiment, the nature of the study was explained and all participants were fully debriefed.

3.5 Results

The primary analysis was designed to test the hypothesis that participants in the social media priming condition would produce significantly more errors on the SART. To test this, I compared mean errors (i.e. total error, commission error, and omission error) across the two conditions. Total error was defined by the number of mistakes made by a given participant during the SART: the sum of commission and omission errors. Commission errors were mistakes made by doing something incorrect: for the SART, those who pressed the “3” key when the number “3” appeared. Omission errors were mistakes made by failing to do something: for the SART, those who failed to press the “3” key when any number except for “3” appeared.

A secondary analysis also used three independent samples t-tests to test the main hypothesis. The secondary analysis also compared mean errors, but with a much smaller sample size to assess if external distractors played a role in the data.

Similar to Study 1, responses to the Social Media Usage Questionnaire were also summarized by collecting the proportions of responses for choice items (i.e. which platform do you prefer) and the mean on rating scale items. General patterns and platform preferences were also evaluated to check for consistency with Study 1.

Finally, a two-tailed Pearson bivariate correlation was performed on the main sample to explore the relationship, if any, between different social media uses and preferences, and the SART data.

3.5.1 The SART

To analyze if the manipulation in Study 2 was effective, three independent samples t-tests were used with the independent variable of condition (i.e. either control or experimental) and the dependent variable of mean error (i.e. total error, commission error, and omission error). This was done for the main sample ($N = 120$) to evaluate Study 2's main hypothesis and for a secondary sample ($N = 84$) to investigate if there were extraneous distractors that impacted the data.

3.5.1.1 Main Analysis: Independent Samples t-Test (Condition vs. Mean Error)

3.5.1.1.1 Condition vs. Total Error

Levene's test confirmed there was homogeneity of variance, $F(1, 118) = 0.13, p = .72$. An independent samples t-test between condition and total error found no significant effect of condition on total error, $t(118) = 0.50, p = .62$. There was no impact of a social media post on total error on the SART task.

3.5.1.1.2 Condition vs. Commission Error

Homogeneity of variance was assumed since Levene's test was not significant, $F(1, 118) = 0.45, p = .50$. An independent samples t-test showed there was no effect of condition on commission error, $t(118) = 1.37, p = .17$. Therefore, posting on social media did not impact participants' ability to stop pressing the "3" key when the number "3" appeared.

3.5.1.1.3 Condition vs. Omission Error

Levene's test showed there was homogeneity of variance, $F(1, 118) = 1.16, p = .28$. An independent samples t-test found no impact of condition on omission error, $t(118) = -0.43, p = .67$. Those who posted on social media prior to the SART did not experience higher omission errors. Refer to table 8 for descriptive statistics for the main analysis.

Table 8: Descriptive statistics for main analysis.

	Group	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>SD</i>	<i>SE</i>
Total Error	Control	59	18.31	17	10.2	1.33
	Experimental	61	17.33	16	11.36	1.45
Commission Error	Control	59	14.44	14	7.34	0.96
	Experimental	61	12.66	12	6.96	0.89
Omission Error	Control	59	3.86	3	5.27	0.69
	Experimental	61	4.31	2	6.11	0.78

Notes: Analysis included all participants who followed task instructions. Excluded participants showed <50% response throughout the task.

3.5.1.2 Secondary Analysis: Independent Samples t-Test (Condition vs. Mean Error)

3.5.1.2.1 Condition vs. Total Error

Homogeneity of variance was assumed since Levene's test was not significant, $F(1, 82) = 1.28, p = .26$. An independent samples t-test found no effect of condition on total error for participants who were noted as "no issues" during testing, $t(82) = 1.60, p = .12$. Even after removing possible confounded participants from the sample, posting on social media did not impact attention.

3.5.1.2.2 Condition vs. Commission Error

Levene's test showed there was homogeneity of variance, $F(1, 82) = 0.99, p = .33$. An independent samples t-test showed no significant effect of condition on commission error, $t(82) = 1.85, p = .068$. Therefore, social media posts may not play a role in attentional tasks.

3.5.1.2.3 Condition vs. Omission Error

Levene's test confirmed there was homogeneity of variance, $F(1, 82) = 0.11, p = .74$. An independent samples t-test demonstrated no significant effect of condition on omission error, $t(82) = 0.54, p = .60$. There was no difference between those who posted on their social media prior to the SART with respect to omission errors. Refer to Table 9 for descriptive statistics for the secondary analysis.

Table 9: Descriptive statistics for the secondary analysis.

	Group	<i>N</i>	<i>Mean</i>	<i>Median</i>	<i>SD</i>	<i>SE</i>
Total Error	Control	40	18.75	17.5	10.78	1.71
	Experimental	44	15.23	13	9.5	1.43
Commission Error	Control	40	14.55	14	7.37	1.17
	Experimental	44	11.73	11	6.61	0.10
Omission Error	Control	40	4.20	2.5	6.11	0.10
	Experimental	44	3.50	2	5.88	0.89

Notes: Analysis included participants from the main analysis who were noted as "no issues" during testing. Excluded participants experienced possible external distractors.

3.5.2 The Social Media Usage Questionnaire

General social media and social media platform preferences were summarized to confirm patterns from Study 1 and further validate the Social Media Usage Questionnaire. Similar to Study 1, the summary was done with the proportion of responses for choice items (i.e. which platform would you choose if you could only use one) and the mean of rating scale items. General patterns reviewed were the mean of rating scale items such as total number of social media platforms, wanting feedback from social media posts, and distracted for responses from social media posts. Platform preferences included participants' assigned (i.e. in the experimental condition) and last social media post (i.e. in the control and experimental condition).

3.5.2.1 General Patterns

Identical to Study 1, participants reported having an average of almost 6 social media platforms. Any mean that was above the "neutral" mean (i.e. 4) represented higher

reports of the behaviour. As seen in Table 10, participants reported wanting feedback from their social media posts and being high social media users. Similarly, participants reported similar ratings of feeling “distracted for response” as in Study 1.

Table 10: General social media patterns in Study 2.

	<i>M</i>	<i>SD</i>
Total platforms	5.58	1.93
High social media use	4.75	1.43
Want feedback	4.95	1.46
Interact with others	5.23	1.70
Photo uploads	4.43	1.99
Large network	4.82	1.82
Keep in touch with friends	6.00	1.40
Update life events	4.15	2.14
Distracted for response	4.53	1.80

Notes: Participants reported on a 7-point Likert scale (i.e. 1-7) for all items except for "total platforms". Higher scores reflect higher reports of the behaviour.

3.5.2.2 Platform Comparisons

Although some changed order, participants showed the same “core” social media platforms from Study 1: Facebook, Snapchat, Instagram, YouTube, and Twitter (in order of usage). Study 2 found that Facebook was still the most common social media platform. When reporting which social media platform they used most often, the three top platforms emerged similar to Study 1, but with a different order: Facebook, Snapchat, and Instagram (in order of most used). Then, almost identical to Study 1, when participants were asked to “only choose one” platform, Facebook (32%) overcame the other top platforms (e.g. Instagram, 25%; Snapchat, 16%). This reflected the current literature (Best et al., 2014; O’Keeffe et al., 2011) and was very consistent with Study 1. Further detail on participants’ platform preferences is shown in Table 11.

Table 11: Social media platform use comparisons for Study 2.

	Percentage		
	Platform used most often	Platform if only one	Platform of last post
Facebook	29.2	31.7	18.1
Instagram	22.5	25.0	22.4
Snapchat	25.8	15.8	19.0
Twitter	2.5	2.5	8.1
Tumblr	0.8	0	2.4
Google Plus	0	0	2.4
Pinterest	0	0	2.4
YouTube	5.8	14.2	8.1
Yahoo	0	0	1
LinkedIn	1.7	1.7	4.8
Reddit	4.2	1.7	3.3
WhatsApp	5.0	5.0	5.2
Other	2.5	2.5	2.9

Notes: Participants reported details about their social media use with respect to different platforms. "Platform if Only One" reflects which platform participants would choose if they could only have one platform.

Similar to Study 1, participants reported their last social media post was most likely on Instagram (22%), compared to Snapchat (19%) and Facebook (18%). Consistent with Study 1, most participants reported that the time of their post on any social media platform was "more than a day ago" (59%). Also, the most reported type of post was "posted a picture" (75%). Detailed results on participants' last social media post is shown in Table 12.

Table 12: Descriptions of last social media post for Study 2.

Time of post	Counts	Percentage
Immediately prior to study	10	8.33
Earlier today	9	7.50
1 day ago	29	24.17
More than a day ago	71	59.17
Never posted	1	0.83
Type of post		
Posted a picture	90	75
Shared/Retweeted a picture	6	5
Posted an article	1	0.83
Shared/Retweeted an article	2	1.67
Updated your status	2	1.67
Commented on a post	9	7.50
Other	10	8.33

Notes: Participants reported the time and type of post they last made on any social media platform.

Study 2 also performed platform comparisons for participants' assigned post. As expected, most participants posted on Facebook (81%) compared to Instagram (6%), Snapchat (3%), and Twitter (5%). Parallel to participants' last post, the most reported type of assigned post was "posted a picture" (34%). Detailed results on participants' assigned social media post is shown in Table 13.

Table 13: Descriptions of assigned social media post for Study 2.

Platform used	Counts	Percentage
Facebook	50	80.65
Instagram	4	6.45
Snapchat	2	3.23
Twitter	3	4.84
Other	3	4.84
Type of post		
Posted a picture	21	33.87
Shared/Retweeted a picture	11	17.74
Posted an article	1	1.61
Shared/Retweeted an article	7	11.29
Updated your status	16	25.81
Commented on a post	1	1.61
Other	5	8.06

Notes: Participants reported the platform and type of post they were assigned during Study 2.

3.5.2.3 Distractibility

With respect to distractibility, participants reported whether they felt distracted or thought about their assigned post and their last post. Contrary to expectation, participants felt low distractibility during the study. However, participants felt more distracted by their assigned post than their last post. Similarly, participants thought about their assigned posts more than their last post. Interactions (i.e. likes, comments, shares received from a social media post) from participants' last post were higher than those from the assigned post. This was not surprising since most participants also reported that their last post occurred "more than a day ago" and would have greater opportunity for interactions (refer to Table 14).

Table 14: Perception of distractibility from assigned and last social media post in Study 2.

	<i>N</i>	Missing	<i>M</i>	<i>SD</i>	Minimum	Maximum
Number of Interactions from post*						
Assigned Post	61	59	5.08	11.40	0	86
Last Post	112	8	119.28	165.43	0	787
Thought about post during study**						
Assigned Post	62	58	4.52	3.05	0	10
Last Post	120	0	1.83	2.63	0	10
Distracted by post during study**						
Assigned Post	62	58	2.87	2.84	0	10
Last Post	120	0	0.93	1.67	0	8

Notes: * The number of interactions participants reported from either their assigned or last social media posts (e.g. “likes”, “shares”, and “comments”). **Participants reported on a 11-point Likert scale (i.e. 0-10). Higher scores reflect higher reports of the behaviour.

3.5.3 Correlations

The main and secondary analyses did not reveal any impacts of social media on sustained attention. One possibility is that any effects of the social media priming task were obscured by some variables, such general usage preference, frequency of social media use, or age. Therefore, a series of two-tailed Pearson bivariate correlations were conducted to examine the relationship between participants’ self-reported social media use factors and SART error values (refer to Table 15 for correlations). This determined if there was a relationship between the items on the scale in the Social Media Usage Questionnaire, including new questions about participants’ assigned social media post. Error values from the SART were assessed for possible confounding variables.

Table 15: Correlations for SART and Social Media Usage Questionnaire data for Study 2.

	Total Error	Commission Error	Omission Error
Total Error	–	.81***	.76***
Commission Error	–	–	.27**
Age	-.30***	-.30***	-.17
Gender	.15	.20*	.06
Year of Study	-.30***	-.29**	-.18*
Assigned Post: Interactions	.03	.05	-.004
Assigned Post: Thought	-.12	-.13	-.15
Assigned Post: Distracted	-.12	-.03	-.19
Last Post: Interactions	.01	-.03	.09
Last Post: Thought	.09	-.002	.16
Last Post: Distracted	.18	.17	.13
Total Platforms	.22*	.21*	.13
High Social Media Use	.08	.11	.02
Want Feedback	-.06	-.04	-.03
Interact with Others	-.10	-.14	-.03
Photo uploads	.06	.13	-.01
Large Network	-.01	.09	-.08
Distracted for Response	-.03	-.01	-.01
Update Life Events	-.11	-.07	-.08
Keep in Touch with Friends	-.19*	-.14	-.17

Notes: * Correlation is significant at the 0.05 level. ** Correlation is significant at the 0.01 level. *** Correlation is significant at the 0.001 level.

3.5.3.1 General Social Media Usage

Similar to Study 1, participants who reported feeling distracted for responses (i.e. interactions such as likes, comments, shares, etc.) from their social media also reported higher social media use, $r(118) = .31, p < .001$, and wanted feedback from their social media posts, $r(118) = .48, p < .001$. Similar to Study 1, participants who wanted feedback had a significant weak positive correlation with posting photos on their social media, $r(118) = .40, p < .001$.

Additionally, posting photos on social media had significant relationships with number of interaction from one's last post, $r(118) = .32, p < .001$; total platforms, $r(118) = .30, p < .001$; high social media use, $r(118) = .66, p < .001$; and interacting with others, $r(118) = -.36, p < .001$.

3.5.3.2 Assigned vs. Last Social Media Post

Feeling distracted by one's last social media post had a strong positive correlation with thinking about one's last social media post, $r(118) = .67, p < .001$. Interestingly, those who felt distracted from their assigned social media post had a moderate positive correlation with those who thought about, $r(118) = .45, p < .001$, and felt distracted by their last social media post, $r(118) = .38, p = .003$. There was a relationship between participants' distractibility (i.e. tendency to think about and feel distracted by social media) for their last and assigned social media post. That is, those who felt distractibility from their last post also felt distractibility from their assigned post and vice versa.

3.5.3.3 Possible External Factor

A possible external factor was found: age. Age had a weak negative relationship with total platforms, $r(118) = -.21, p = .02$, and the number of interactions received from one's last post, $r(118) = -.28, p = .003$. Therefore, older participants tended to have fewer social media platforms and receive fewer interactions from their last social media post. Furthermore, age had a weak negative correlation with total error, $r(118) = -.30, p < .001$, and commission error, $r(118) = -.30, p < .001$, but not omission error, $r(118) = -.17, p = .06$. Overall, older participants performed better on the SART (i.e. lower error rates). This relationship and age as a possible external factor will be explored in the discussion.

3.6 Discussion

It was hypothesized that participants in the social media priming condition would produce significantly more errors on the SART. This hypothesis was not supported. The main analysis and secondary analysis found no significant impact of condition on mean error (i.e. total error, commission error, and omission error). Therefore, posting on social media did not impact participants' mean error (i.e. total error, commission error, and

omission error). Results from the Social Media Usage Questionnaire were similar to Study 1, confirming the same “core” social media platforms and validating the survey as a measure of general social media use patterns. Although the main hypothesis was not supported, a possible external factor is discussed.

3.6.1 General Conclusions

General social media use patterns found that most participants reported having about six social media platforms. The “core” platforms remained consistent, though in a different order of frequency, from Study 1: Facebook, Snapchat, Instagram, YouTube, and Twitter. Consistent with the literature, Facebook was still the most popular social media platform (Caers et al., 2013). Excluding participants’ last social media post, Facebook was the most often used platform. Also, when asked to “choose only one”, Facebook was still the most preferred social media platform. The most frequent type of post for people's last post and assigned post was “posted a picture”. With respect to distractibility (i.e. thoughts about or feeling distracted by social media posts), participants reported a low sense of distractibility from their last and assigned social media posts. However, participants reported higher rates of distractibility for their assigned posts compared to their last posts.

The relationship between social media use factors (e.g. high social media use, interactions with others, wanting feedback, etc.) was similar to Study 1. Most notably, there was a relationship between those who wanted feedback from their social media posts and those who posted photos on their social media. This coincides with the increasing popularity for platforms such as Instagram and Snapchat.

Interestingly, there was a relationship between people who felt distracted by their assigned social media post and general distractibility from participants’ last social media post. Therefore, although directionality cannot be determined, those who felt distracted by their last social media post also tended to feel distracted by their assigned social media posts.

3.6.2 Limitations

Although Study 2's predictions were not supported, a possible external factor was found. In particular, age was related to both total error and commission error in the SART task. This relationship suggested that the older participants were, the better performance they had. Since the design of Study 2 did not account for age, the effect of social media posts on attention could not be reliably determined.

From Ward et al. (2017), the SART may have inherent issues when measuring attention while expecting feedback (i.e. from a social media post). Ward et al. (2017) found that smartphone use does impact cognition (i.e. attention and working memory). However, these findings were not supported using the SART task. It seemed that the SART task was not sensitive enough to detect if participants were distracted. Since there were nine stimuli (i.e. the numbers 1-9) and only one target stimuli (i.e. the number "3"), participants could develop a 'rhythm' and notice that the probability of a No-Go trial is low. Therefore, participants could be distracted during the SART and still make few errors. The working memory task (i.e. OSpan) that Ward et al. (2017) used does not have this issue. It required continuous processing. This allowed Ward et al. (2017) to find an impact of smartphone presence on cognitive functioning. Since Study 2 used the SART, it faced issues similar to those discussed by Ward et al. (2017). Participants' performance did not differ between conditions (i.e. social media priming or not). In comparison, the OSpan task could be sensitive enough to show whether participants are distracted during the task. Ward et al. supports the argument that the SART has inherent flaws for Study 2's goals; however, this was published after Study 2 was designed and completed. Future research should explore other measures for executive functioning (i.e. attention, working memory, etc.).

3.6.3 Implications and Future Research

Study 2 suggested that social media's impact in the cognitive domain may be more complex than anticipated. The Social Media Usage Questionnaire was found to be a consistent measure for people's typical social media use. The main manipulation (i.e. social media priming) was not effective in Study 2; however, there is much future

research to extend from these studies. In Study 2, we saw that social media preferences may drive how social media impacts cognition. It was possible that participants' individual preferences in social media use should be exploited for future research. These implications and future directions are extensively covered in Chapter 4.

Chapter 4

4 General Discussion

This chapter reviews the overall findings from Study 1 and 2. Additionally, implications for both studies and future directions in the field are discussed. These include how to extend social media research by integrating it with smartphone research and by considering categorization of platforms as a factor in how social media impacts cognition.

4.1 Study 1: Social Media Usage Patterns

Study 1 sought to investigate people's general social media use patterns. This was to assess typical social media use in the population and to validate the current literature. Another goal for Study 1 was validating the Social Media Usage Questionnaire as a measure for people's general social media use and people's perception of how social media can impact their attention. Finally, Study 1 was used to gauge which social media platform was preferred and would be the most effective for an experimental study.

It was found that those who reported high social media use also reported feeling distracted by their social media posts. Although ratings for distractibility (i.e. thinking about or feeling distracted due to social media) were lower than neutral, participants did report high social media usage and wanting feedback from their social media posts (i.e. higher than a neutral report).

Study 1 did support previous studies (e.g. Best et al., 2014; Caers et al., 2013; O'Keeffe et al., 2011) with respect to social media platform preferences. Participants had "core" social media platforms (e.g. Facebook, Instagram, Snapchat) and showed a clear preference for one platform: Facebook. This was used to design Study 2, since Facebook was the most likely platform to impact people's cognition.

4.2 Study 2: Social Media and Sustained Attention

Extending from Study 1, Study 2 evaluated the impact social media can have in a cognitive domain. Previous literature demonstrated that the mere presence of a

smartphone (Ward et al., 2017) and higher media multitasking (Ophir et al., 2009) had a detrimental impact on cognitively demanding tasks (e.g. the SART, OSpan, etc.).

Therefore, Study 2 investigated how an enticing social media post impacted performance on the SART (i.e. measured performance with mean error). Unfortunately, there was no significant effect of social media priming on SART performance. That is, I found no evidence that a social media post reduced performance on a task that assessed sustained attention.

General social media trends were consistent with results from Study 1. Additionally, a relationship between distractibility for participants' assigned and last social media post was found. That is, those who felt distracted from their assigned post also felt distracted from their last post.

Limitations for Study 2 included the possible external factor of age. Age was negatively related to mean error (i.e. total error and commission error), which suggested that younger participants would perform worse on the SART regardless of their assigned condition. This factor suggested that Study 2 was undermined by the factor of age and was therefore unable to confidently assess social media's impact on attention. Study 2 also suggested that individual differences in social media platform use and preferences could play a more important role than anticipated. Additionally, the SART was not an adequate measurement of attention while expecting a notification from a social media post. Ward et al. (2017) supports the use of different cognitive tasks (e.g. the OSpan) to measure sustained attention. Future research could use different tasks to ensure they can appropriately measure the impact that social media may have on cognition.

4.3 Implications and Future Directions

Although the main hypothesis in Study 2 was not supported, these studies do have important implications for the field. Both studies showed that social media use is prevalent and a constant factor in people's lives. General social media use patterns suggest that the "core" platforms (i.e. Facebook, Instagram, and Snapchat) might impact people's cognition differently. These studies suggest that social media use is more diverse and that individual differences, along with age differences, should be considered

for future paradigms. Future studies should focus on integrating smartphone literature and categorizing social media platforms.

4.3.1 Future Directions: Integrating Smartphone Literature

Previous social media research has focused on how social media can impact people without considering the context or delivery mechanism. Future research should use smartphone and social media methodology cohesively to investigate how social media can impact cognition. Smartphones might play the key factor in investigating how social media impacts cognitive functioning.

Social media use coincides with smartphone use (O’Keeffe et al., 2011). Smartphone use has demonstrated detrimental impacts on cognition (e.g. Thornton et al., 2014; Ward et al., 2017). It was postulated that shorter attention spans may be a result from increased smartphone contact (Wilmer et al., 2017). This is analogous to how social media’s prevalence has implications for people’s cognition. From Study 1 and 2, investigating social media’s impact in a cognitive domain is more complex than simply posting something on a given platform. Additional factors should be considered.

Smartphones have developed a “pervasive role” in everyday activity (Wilmer & Chein, 2016), p. 1607). A systematic review of smartphone research with respect to three cognitive domains (i.e. attention, working memory, and delay of gratification) suggested that increased smartphone contact was related to detriments in these cognitive domains (Wilmer et al., 2017). Additionally, increased smartphone use has been linked to lower impulse control and less ability to delay gratification. It seems that people are unable to avoid the impulse to check their technology (Wilmer & Chein, 2016). Therefore, it was postulated that higher smartphone use was related to impulsivity and impatience rather than to pursuing rewards (Wilmer & Chein, 2016; Wilmer et al., 2017). That is, people suffer from uncontrolled impulses to use their smartphones constantly.

Considering the existing lack of impulse control, using social media on a smartphone can have additive impacts on cognitive functioning. If the mere presence of a smartphone has led to lower attention (Ward et al., 2017), adding social media as a factor could expand

smartphone research and explain how social media can impact cognition. Social media can solely have an impact on cognition; however, since most social media use stems from smartphone use, this factor should not be ignored.

Therefore, future research should focus on how smartphone use and social media use jointly impact cognitive functioning. For example, using different smartphone conditions (e.g. phone location) with a social media manipulation (e.g. posting a photo) would examine how both smartphones and social media impact cognition independently and interactively.

4.3.2 Future Directions: Categorizing Social Media Platforms

As seen in Study 1 and 2, social media is prominent and requires further investigation. There are also individual differences in social media use and platform preferences (Best et al., 2014; Caers et al., 2013; Wilmer et al., 2017). Therefore, exploring social media in a more systematic manner can be beneficial in future research. That is, defining the different types of social media for experimental design and to understand how people perceive social media's intended goals and uses.

This next phase of research should strive to use a systematic view of social media: specifically, how different platforms are defined and categorized. Kaplan and Haenlein (2010) proposed an innovative view of how to categorize social media platforms based on existing social theories: Social Presence Theory (Short, Williams, & Christie, 1976) and Media Richness Theory (Daft & Lengel, 1986). Social Presence Theory states that all medias have different degrees of "social presence" (i.e. visual, physical, etc.) that happen between communicators. This presence varies with respect to intimacy and immediacy. Therefore, higher social presence results in larger social influence (Short et al., 1976). Media Richness Theory is derived from the assumption that all communication has the end goal of reducing or resolving ambiguity. Therefore, media platforms can differ in "richness" based on how much ambiguity is resolved in a given time (Daft & Lengel, 1986). Considering both the above theories, Kaplan and Haenlein (2010) classified social media based on the richness of the social media platform and the degree of social presence the platform allows.

Additionally, social media platforms can be classified based on the social aspects of self-presentation and self-disclosure (Kaplan & Haenlein, 2010). Self-presentation relates to how people want to control their impression on others. That is, people care about how others perceive them. Self-disclosure relates to the extent to which people present themselves on social media platforms: to friends, family, and even strangers. Kaplan and Haenlein (2010) add the degree of required self-disclosure and the type of self-presentation as the other dimension to classifying social media platforms. Therefore, from Kaplan and Haenlein (2010), the classification of social media divides social media platforms with respect to social presence and media richness, and self-presentation and self-disclosure (see Figure 3).

Classification of Social Media by social presence/media richness and self-presentation/self-disclosure

		Social presence/ Media richness		
		Low	Medium	High
Self-presentation/ Self-disclosure	High	Blogs	Social networking sites (e.g., Facebook)	Virtual social worlds (e.g., Second Life)
	Low	Collaborative projects (e.g., Wikipedia)	Content communities (e.g., YouTube)	Virtual game worlds (e.g., World of Warcraft)

Figure 3: Classification of social media platforms with respect to social presence and media richness, and self-presentation and self-disclosure (Kaplan & Haenlein, 2010).

Kaplan and Haenlein's (2010) systematic view of social media would allow future research to compare these differing platforms more accurately. For example, adding the categorization component would allow a future study to assign participants to post on their social media of choice based on which category the investigation is interested in. Also, this categorized view of social media platforms can allow researchers to adjust to the ever-changing functionalities of social media platforms.

4.4 Conclusion

This thesis investigated typical social media use and how a social media post impacted attention. Although the main hypothesis was not supported, Study 1 and 2 supported previous literature on social media (Alloway et al., 2013; Best et al., 2014; Caers et al.,

2013). Study 1 and 2 showed that Facebook is still the most popular social media platform and that people do use social media to get feedback from their posts. Additionally, this thesis demonstrated that social media is more complex and requires additional factors to confidently investigate social media's impact in a cognitive domain. Future research should focus on how social media use relates to smartphone use. Future research should assess how to classify social media platforms to effectively design experiments and understand how people perceive different social media platforms. Lastly, smartphone use will play a key role in how expecting social media feedback impacts cognitive functioning.

References

- Alloway, T. P., Horton, J., Alloway, R. G., & Dawson, C. (2013). Social networking sites and cognitive abilities: Do they make you smarter? *Computers & Education*, *63*, 10-16.
- Best, P., Manktelow, R., & Taylor, B. (2014). Online communication, social media and adolescent wellbeing: A systematic narrative review. *Children and Youth Services Review*, *41*, 27-36. doi:10.1016/j.childyouth.2014.03.001
- Caers, R., Feyter, T. D., Couck, M. D., Stough, T., Vigna, C., & Bois, C. D. (2013). Facebook: A literature review. *New Media & Society*, *15*(6), 982-1002. doi:10.1177/1461444813488061
- Caird, J. K., Johnston, K. A., Willness, C. R., Asbridge, M., & Steel, P. (2014). A meta-analysis of the effects of texting on driving. *Accident; Analysis and Prevention*, *71*, 311-318. doi:10.1016/j.aap.2014.06.005
- Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, *32*(5), 554-571.
- Davenport, S. W., Bergman, S. M., Bergman, J. Z., & Fearington, M. E. (2014). Twitter versus facebook: Exploring the role of narcissism in the motives and usage of different social media platforms. *Computers in Human Behavior*, *32*, 212-220. doi:10.1016/j.chb.2013.12.011
- Deters, F. G., & Mehl, M. R. (2013). Does posting facebook status updates increase or decrease loneliness? an online social networking experiment. *Social Psychological and Personality Science*, *4*(5), 579-586. doi:10.1177/1948550612469233
- de Vries, D. A., Möller, A. M., Wieringa, M. S., Eigenraam, A. W., & Hamelink, K. (2016). Social comparison as the thief of joy: Emotional consequences of viewing strangers' instagram posts. *Media Psychology*, 1-24.
- Horrey, W. J., & Wickens, C. D. (2006). Examining the impact of cell phone conversations on driving using meta-analytic techniques. *Human Factors*, *48*(1), 196-205. doi:10.1518/001872006776412135
- Kaplan, A. M., & Haenlein, M. (2010). Users of the world, unite! the challenges and opportunities of social media. *Business Horizons*, *53*(1), 59-68.
- Kätsyri, J., Kinnunen, T., Kusumoto, K., Oittinen, P., & Ravaja, N. (2016). Negativity bias in media multitasking: The effects of negative social media messages on attention to television news broadcasts. *PloS One*, *11*(5), e0153712. doi:10.1371/journal.pone.0153712
- Lanaj, K., Johnson, R. E., & Barnes, C. M. (2014). Beginning the workday yet already depleted? consequences of late-night smartphone use and sleep. *Organizational Behavior and Human Decision Processes*, *124*(1), 11-23.

- Lee, S. Y. (2014). How do people compare themselves with others on social network sites?: The case of facebook. *Computers in Human Behavior*, *32*, 253-260. doi:10.1016/j.chb.2013.12.009
- Manly, T., Robertson, I. H., Galloway, M., & Hawkins, K. (1999). The absent mind: Further investigations of sustained attention to response. *Neuropsychologia*, *37*(6), 661-670.
- McFarland, L. A., & Ployhart, R. E. (2015). Social media: A contextual framework to guide research and practice. *The Journal of Applied Psychology*, *100*(6), 1653–1677. doi:10.1037/a0039244
- Moisala, M., Salmela, V., Hietajärvi, L., Salo, E., Carlson, S., Salonen, O., ... Alho, K. (2016). Media multitasking is associated with distractibility and increased prefrontal activity in adolescents and young adults. *NeuroImage*, *134*, 113-121. doi:10.1016/j.neuroimage.2016.04.011
- Ngai, E. W. T., Tao, S. S. C., & Moon, K. K. L. (2015). Social media research: Theories, constructs, and conceptual frameworks. *International Journal of Information Management*, *35*(1), 33-44.
- O’Keeffe, G. S., Clarke-Pearson, K., & Council on Communications and Media. (2011). The impact of social media on children, adolescents, and families. *Pediatrics*, *127*(4), 800-804. doi:10.1542/peds.2011-0054
- Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(37), 15583-15587. doi:10.1073/pnas.0903620106
- Ralph, B. C. W., Thomson, D. R., Seli, P., Carriere, J. S. A., & Smilek, D. (2015). Media multitasking and behavioral measures of sustained attention. *Attention, Perception & Psychophysics*, *77*(2), 390-401. doi:10.3758/s13414-014-0771-7
- Raven, J. C., & Court, J. H. (1998). Raven’s progressive matrices and vocabulary scales. *Oxford Psychologists Press Oxford*, UK.
- Reinecke, L., Hartmann, T., & Eden, A. (2014). The guilty couch potato: The role of ego depletion in reducing recovery through media use. *The Journal of Communication*, *64*(4), 569-589. doi:10.1111/jcom.12107
- Robertson, I. H., Manly, T., Andrade, J., Baddeley, B. T., & Yiend, J. (1997). Oops!?: Performance correlates of everyday attentional failures in traumatic brain injured and normal subjects. *Neuropsychologia*, *35*(6), 747-758.
- Rosen, L. D., Mark Carrier, L., & Cheever, N. A. (2013). Facebook and texting made me do it: Media-induced task-switching while studying. *Computers in Human Behavior*, *29*(3), 948-958.
- Sędkowski, M. (2015). Social media and universities: Challenges and opportunities. *The International Journal of Social Sciences and Humanities Invention*, *2*(7), 1445-1450. doi:10.18535/ijsshi/v2i7.01
- Short, J., Williams, E., & Christie, B. (1976). *The Social Psychology of Telecommunications*. John Wiley and Sons Ltd.

- Stothart, C., Mitchum, A., & Yehnert, C. (2015). The attentional cost of receiving a cell phone notification. *Journal of Experimental Psychology: Human Perception and Performance*, 41(4), 893-897. doi:10.1037/xhp0000100
- Thornton, B., Faires, A., Robbins, M., & Rollins, E. (2014). The mere presence of a cell phone may be distracting. *Social Psychology*, 45(6), 479-488. doi:10.1027/1864-9335/a000216
- Tindell, D. R., & Bohlander, R. W. (2012). The use and abuse of cell phones and text messaging in the classroom: A survey of college students. *College Teaching*, 60(1), 1-9. doi:10.1080/87567555.2011.604802
- Unsworth, N., Heitz, R. P., Schrock, J. C., & Engle, R. W. (2005). An automated version of the operation span task. *Behavior Research Methods*, 37(3), 498-505.
- Vickery, G., & Wunsch-Vincent, S. (2007). Participative web and user-created content: Web 2.0 wikis and social networking. Organization for Economic Cooperation and Development (OECD).
- Ward, A. F., Duke, K., Gneezy, A., & Bos, M. W. (2017). Brain drain: The mere presence of one's own smartphone reduces available cognitive capacity. *Journal of the Association for Consumer Research*, 2(2), 140-154 doi:10.1086/691462
- Wilmer, H. H., & Chein, J. M. (2016). Mobile technology habits: Patterns of association among device usage, intertemporal preference, impulse control, and reward sensitivity. *Psychonomic Bulletin & Review*, 23(5), 1607-1614. doi:10.3758/s13423-016-1011-z
- Wilmer, H. H., Sherman, L. E., & Chein, J. M. (2017). Smartphones and cognition: A review of research exploring the links between mobile technology habits and cognitive functioning. *Frontiers in Psychology*, 8, 605. 1-16. doi:10.3389/fpsyg.2017.00605
- Wilson, R. E., Gosling, S. D., & Graham, L. T. (2012). A review of facebook research in the social sciences. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, 7(3), 203-220. doi:10.1177/1745691612442904

Appendices

Appendix A: Social Media Usage Questionnaire: Study 1 and Study 2 (Control Condition)

. Date: (M/D/Y) _____

. Participant Number: _____

Q1 CONDITION:

(1)

(2)

Q2 Please give your SONA ID below: note: this is required to receive credit for your participation in today's study. _____

Q3 Gender:

Male (1)

Female (2)

Unspecified (3)

Other (please provide) (4)

Q3 If gender is 'other', please specify: _____

Q4 Age (in years): _____

Q5 Year of study (if a student):

1st Year (1)

2nd Year (2)

4th Year (3)

>4th Year (4)

Graduate Student (5)

Q6 What is your program? _____

* Below are a number of statements, about your typical social media use, with which you may agree or disagree. Please indicate how much you agree or disagree with each statement on a 1 (disagree strongly) to 7 (agree strongly) scale. Consider your social media use for all your devices (e.g. computer, smart phone, etc.)

Q7

Q8 Which of the following social media platforms do you have? (select all that apply)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other(s) (please specify) (17)

Q8 If 'other', please specify: _____

Q9 Indicate which one of the following social media platforms you use most often.
(select one only)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other (please specify) (17)

Q9 If 'other', please specify: _____

Q10 If you could only use one social media platform, which of the following would you choose? (select one only)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other (please specify) (17)

Q10 If 'other', please specify: _____

* Think about your LAST social media post. This could be from any social media platform. For example: Facebook, Instagram, Twitter, Snapchat, etc.

Please answer the following questions with respect to your LAST social media post.

Q15 Which social media account did you LAST post on? (select one)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other (please specify) (17)

Q15 If 'other', please specify: _____

Q16 How many interactions (e.g. likes, shares, etc.) have you received from your LAST social media post? _____

Q17 When did you make your LAST social media post?

- immediately prior to study (1)
- earlier today (2)
- 1 day ago (3)
- more than a day ago (4)
- N/A (never posted) (5)

Q18 Which of the following best describes the TYPE of post that was your LAST social media post?

- Posted a picture (1)
- Shared/Retweeted a picture (2)
- Posted an article (3)
- Shared/Retweeted an article (4)
- Updated your status (5)
- Commented on a post (6)
- Other (please specify) (7)

Q18 If 'other', please specify: _____

Q24 Using the scale below, please indicate how much you thought about your LAST post during today's study.

- 0 (0) Not at all
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5) Moderately
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10) Very Much

Q25 Using the scale below, please indicate how much you think your LAST post distracted you during today's study.

- 0 (0) Not at all
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5) Moderately
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10) Very Much

Appendix B: Social Media Usage Questionnaire: Study 2 (Experimental Condition)

. Date: (M/D/Y) _____

. Participant Number: _____

Q1 CONDITION:

(1)

(2)

Q2 Please give your SONA ID below: note: this is required to receive credit for your participation in today's study. _____

Q3 Gender:

Male (1)

Female (2)

Unspecified (3)

Other (please provide) (4)

Q3 If gender is 'other', please specify: _____

Q4 Age (in years): _____

Q5 Year of study (if a student):

1st Year (1)

2nd Year (2)

4th Year (3)

>4th Year (4)

Graduate Student (5)

Q6 What is your program? _____

* Below are a number of statements, about your typical social media use, with which you may agree or disagree. Please indicate how much you agree or disagree with each statement on a 1 (disagree strongly) to 7 (agree strongly) scale. Consider your social media use for all your devices (e.g. computer, smart phone, etc.)

Q7

Q8 Which of the following social media platforms do you have? (select all that apply)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other(s) (please specify) (17)

Q8 If 'other', please specify: _____

Q9 Indicate which one of the following social media platforms you use most often.

(select one only)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other (please specify) (17)

Q9 If 'other', please specify: _____

Q10 If you could only use one social media platform, which of the following would you choose? (select one only)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other (please specify) (17)

Q10 If 'other', please specify: _____

* Please answer the following questions with respect to your ASSIGNED post on your preferred social media (i.e. that you did in today's study).

Q11 Which social media account did you post on today? (select one)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other (please specify) (17)

Q11 If 'other', please specify: _____

* Think about your LAST social media post. This could be from any social media platform. For example: Facebook, Instagram, Twitter, Snapchat, etc.

Please answer the following questions with respect to your LAST social media post.

Q15 Which social media account did you LAST post on? (select one)

- Facebook (1)
- Instagram (2)
- Snapchat (3)
- Twitter (4)
- Google Plus (5)
- Pinterest (6)
- Vine (7)
- Tumblr (8)
- Youtube (9)
- LinkedIn (10)
- Reddit (11)
- Flickr (12)
- MySpace (13)
- Yahoo (14)
- WhatsApp (15)
- StumbleUpon (16)
- Other (please specify) (17)

Q15 If 'other', please specify: _____

Q16 How many interactions (e.g. likes, shares, etc.) have you received from your LAST social media post? _____

Q17 When did you make your LAST social media post?

- immediately prior to study (1)
- earlier today (2)
- 1 day ago (3)
- more than a day ago (4)
- N/A (never posted) (5)

Q18 Which of the following best describes the TYPE of post that was your LAST social media post?

- Posted a picture (1)
- Shared/Retweeted a picture (2)
- Posted an article (3)
- Shared/Retweeted an article (4)
- Updated your status (5)
- Commented on a post (6)
- Other (please specify) (7)

Q18 If 'other', please specify: _____

Q20 Using the scale below, please indicate how much you thought about your ASSIGNED post during today's study.

- 0 (0) Not at all
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5) Moderately
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10) Very Much

Q21 Using the scale below, please indicate how much thinking about your ASSIGNED post distracted you during today's study.

- 0 (0) Not at all
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5) Moderately
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10) Very Much

Q22 Using the scale below, please indicate how much you thought about your LAST post during today's study. This does not include the post you were assigned today.

- 0 (0) Not at all
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5) Moderately
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10) Very Much

Q23 Using the scale below, please indicate how much thinking about your LAST post distracted you during today's study. This does not include the post you were assigned today.

- 0 (0) Not at all
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5) Moderately
- 6 (6)
- 7 (7)
- 8 (8)
- 9 (9)
- 10 (10) Very Much

Appendix C: Study 2 Instructions (Control and Experimental Condition)

CONTROL CONDITION: ~Give LOI & consent form to participant~

Hello, today you will be participating in a study that is investigating social media usage patterns. As stated in the letter of information, you will perform a task on the computer and then you will fill out an online survey about your social media usage patterns, which will ask you some questions about your social media use. If you have no additional questions, please sign the consent form. Please let me know if you have any questions at any moment. Also, if you would like to keep the letter of information form, you are welcome to do so; if not, please leave it unmarked.

Please remove any headphones or electronic devices before beginning.

SART:

Please enter your information in the box on the screen (e.g. age, program, etc.). Do not change any information that is already there.

In this phase of the experiment, we want to collect a basic measure of your reaction time. Please complete the following task on the computer. It will ask you to press the “3” key for every number that appears on the screen--except the number 3. Please try to respond as quickly as you can, because we want to measure your basic reaction time. You can follow the instructions given on the screen.

For example, if the number “7” is presented, then you will click “3”. If the number “3” is presented, then you will not click “3”.

Note, there is a circle with an “X” through it between each number. This task will take approximately 20 minutes.

SURVEY:

Fill-out date, participant number, and condition -- click ‘next’

Now we will do the final part of the study. Please complete the following online Social Media Use Questionnaire. It will ask you to describe your general social media use and about your last social media post. The instructions should be clear; but, please ask me if anything is unclear. You may use your phone to complete the survey.

Make note if they “rush” to check their phones after SART.

~If participant does not have social media:

make note that this participant does not have or use social media in notes section & continue

Although you do not have or use social media, we will continue with the study...

DEBRIEFING: ~Give Debriefing form~

Thank you for participating in today’s study. We were interested in how people’s social media use can impact their cognition. That is, we predict that when people post or generate content on a social media account, that they may spend time thinking about it afterwards, wondering if people liked it or read it.

We are trying to find if thinking about a recent post induces a measurable reduction in basic cognitive processing.

Please avoid describing the nature of today’s study to any friends who might also be participating. Also, if you would like to keep the debriefing form, you are welcome to do so; if not, please leave it unmarked.

EXPERIMENTAL CONDITION: ~Give LOI & consent form to participant~

Hello, today you will be participating in a study that is investigating social media usage patterns. As stated in the letter of information, you will be asked some questions about your social media use, then you will perform a task on the computer, and then you will fill out an online survey about your social media usage patterns. If you have no additional questions, please sign the consent form. Please let me know if you have any questions at any moment. Also, if you would like to keep the letter of information form, you are welcome to do so; if not, please leave it unmarked.

Please remove any headphones or electronic devices before beginning.

Post on Social Media: -- time participant for up-to 6 minutes

Before we go any further in this study, I'd like to you spend up to 6 minutes on a social media platform. If you have a Facebook account, please post on this. If not, please post on Instagram. If you have neither, please choose your most preferred social media platform.

I'd like you to spend a few minutes just browsing but while making your post please keep three things in mind:

- 1. It needs to be a new post, this can include a status update, sharing a picture, etc. If you would like to share an existing article/video/etc, please "share and write post" rather than just "share".*
- 2. Please do not include anything about the current study in the post. For example, please do not mention that this is for a Psychology Study.*
- 3. Most importantly, please ensure that the post is something you think will be interesting to your friends or followers. This can be something personal, news related, something funny, or serious. I want you to try to post something that's going to get people's attention. But nothing that is too "out of character" for you.*

Again, Please keep in mind that you should be posting something to get a response from your followers.

*Once you make the post, please **put your device away** (i.e. not on your desk) and **on vibrate or silent** until the study is over. We'll ask some more questions about your posting and your social media use later.*

Ensure participant has put their device away. Make a note of where they put the device if it is still "on their person". Make note if they "rush" to check their phones after SART.

~If participant does not have social media:

make note that this participant does not have or use social media in notes section & continue

Although you do not have or use social media, we will continue with the study...

SART:

Please enter your information in the box on the screen (e.g. age, program, etc.). Do not change any information that is already there.

In this phase of the experiment, we want to collect a basic measure of your reaction time. Please complete the following task on the computer. It will ask you to press the “3” key for every number that appears on the screen--except the number 3. Please try to respond as quickly as you can, because we want to measure your basic reaction time. You can follow the instructions given on the screen.

For example, if the number “7” is presented, then you will click “3”. If the number “3” is presented, then you will not click “3”.

Note, there is a circle with an “X” through it between each number. This task will take approximately 20 minutes.

SURVEY:**Fill-out date, participant number, and condition -- click ‘next’**

Now we will do the final part of the study. Please complete the following online Social Media Use Questionnaire. It will ask you to describe your general social media use, about today’s social media post, AND your last post. The instructions should be clear which they are asking you about; but, please ask me if you are not sure. You may use your phone to complete the survey.

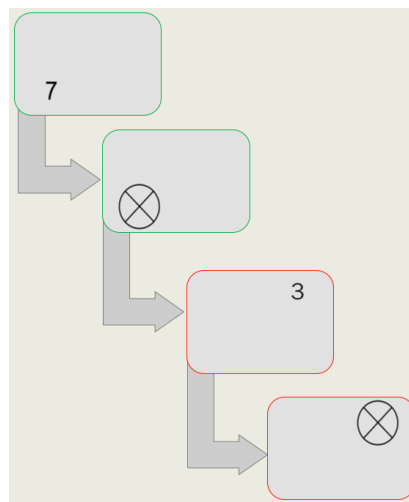
Make note if they “rush” to check their phones after SART.

DEBRIEFING: ~Give Debriefing form~

Thank you for participating in today’s study. We were interested in how people’s social media use can impact their cognition. That is, we predict that when people post or generate content on a social media account, that they may spend time thinking about it afterwards, wondering if people liked it or read it.

We are trying to find if thinking about a recent post induces a measurable reduction in basic cognitive processing.

Please avoid describing the nature of today’s study to any friends who might also be participating. Also, if you would like to keep the debriefing form, you are welcome to do so; if not, please leave it unmarked.

EXAMPLE of SART:

Appendix D: Ethics for Study 1 and 2



Research Ethics

**Western University Non-Medical Research Ethics Board
NMREB Delegated Initial Approval Notice**

Principal Investigator: Dr. John Paul Minda
Department & Institution: Social Science/Psychology, Western University

NMREB File Number: 108119
Study Title: Social Media Usage Patterns

NMREB Initial Approval Date: November 17, 2016
NMREB Expiry Date: November 17, 2017

Documents Approved and/or Received for Information:

Document Name	Comments	Version Date
Western University Protocol	Received November 17, 2016	
Letter of Information & Consent	SONA	2016/11/16
Letter of Information & Consent	Paid	2016/11/16
Recruitment Items	Poster	2016/11/16
Instruments	Social Media Usage and Demographics Questionnaire	2016/11/16
Instruments	All Tasks with Descriptions	2016/05/26
Instruments	Task Description - Categorization Task (L-shape)	2016/05/26
Other	Debriefing Form	2016/10/19

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Western University, Research, Support Services Bldg., Rm. 5150
London, ON, Canada N6G 1G9 t. 519.661.3036 f. 519.850.2466 www.uwo.ca/research/ethics

Curriculum Vitae

Name: Ana Cecilia Ruiz Pardo

Education 2017 M.Sc. Cognitive Psychology
The University of Western Ontario, London, ON
2015 B.A. Honours Specialization Psychology, Major: Family Studies
The University of Western Ontario, London, ON

Selected Honours: Highly commended for “Social Media: Social benefit or Social Problem?”
Undergraduate Awards, 2015

Selected Work Experience Research Assistant
Brescia University College, 2013

Research Assistant
Ivey Business School, 2013

Research Assistant
The University of Western Ontario, 2013-2015

Graduate Teaching Assistant
The University of Western Ontario, 2015-2017

Selected Presentations:

Ruiz Pardo, A. C. (November 2015). Facebook: Social benefit or social problem.
Presented Talk at the Undergraduate Awards: Global Summit, Dublin, Ireland.

Nadler, R., Minda, J. P., & **Ruiz Pardo, A. C.** (November 2015). Using eye-tracking to investigate faking on personality assessments. *Poster presented at the Annual Meeting of the Psychonomic Society, Chicago, USA.*