Social Media Usage Effects on Focus-Related Tasks

by Dr. Joy Martina

christallin.com

Social Media Usage Effects on Focus-Related Tasks

Joy N. Martina

Social Media Usage Effects on Focus-Related Tasks

Background

The human mind is incapable of prolonged periods of high focus. Although focus thresholds vary greatly—and are determined both by non-voluntary factors such as genetics and voluntary factors such as the development of meditative skills—it has still been observed that maintaining high levels of focus on demanding cognitive tasks for more than between 4 to 6 hours at a stretch leaves the mind depleted and the body weak (Baumeister, Bratslavsky, Muraven, & Tice 1998).

Researchers have cast a great deal of light on the physiology of human focus. It is known that, when the brain focuses on a demanding cognitive task, it consumes more nutrients—especially glucose—than in its rested state (Schmeichel, Vohs, & Baumeister 2003). Like a machine, the brain needs more fuel to run at high speeds and less fuel to run at low speeds. Therefore, people in nutritionally compromised states also display less of an ability to focus on cognitive tasks; a state of what is commonly known as brain fog descends on those people whose brains have an inadequate glucose supply (Greenberg & Pyszczynski, 2004).

Assuming that the physiological substrates of focus are present—that, in other words, the brain is well-supplied with sugar—it is still not clear whether the act of breaking focus is an aid or an impediment to both the (a) speed and (b) quality of future cognition (Greenberg & Pyszczynski, 2004). There are numerous ways to conceptualize this problem. Imagine the case of a student working hard to finish reading an important book. After the first hour of fixed focus on reading, the student begins to feel mentally fatigued and might take numerous breaks during the rest of the reading session. However, another student might soldier on with the task of reading, ignoring or trying to suppress the feeling of fatigue and refusing to take a break. These are two very different strategies of applying focus to a task. The act of remaining dedicated to a task, and allowing little extraneous distraction to emerge, has been described as fixed focus; the act of taking frequent mental breaks during the completion of a task is known as floating focus. Humans use both of these strategies every day, often in rapid succession. For example, a driver driving on a flat, wide, unoccupied road might daydream during this task, as it is easy to execute; but, when reaching a steep precipice, might focus much more intently in order to ensure that an accident does not take place.

It is clear that, depending on the complexity of a task, different states of focus impose different states of what scientists call cognitive load on the human brain (Sweller, Ayres, & Kalyuga, 2011). Cognitive load is analogous to physical load, whose effects vary considerably. A particular person might run five miles with ease, but only be able to run twenty by slowing the pace of running and taking breaks during the activity. In physical activity, it is easy to measure the effectiveness of different coping strategies. For example, a runner who runs twenty miles without stopping can compare his or her performance to running twenty miles while taking rest breaks as needed.

The situation of a student or other cognitive worker is, however, quite different. It is not as easy to create a baseline for cognitive performance measurement. The cognitive worker without an empirical basis for deciding whether he or she ought to soldier through a complex mental task (such as writing a paper, reading a book, or taking a test) without stopping, or whether it would be better to give the mind breaks, just as the runner can take breaks during a race. This dilemma can be characterized as the choice between fixed and floating focus (Plass, Moreno, & Brunken, 2010).

In cognitive work, just as in physical work, there are a number of variables that have to be carefully monitored in order to determine whether a fixed or floating approach would be better. Extraneous physical factors—such as an adequate supply of sleep and nutrition—matter greatly in the performance of both mental and physical tasks. So does the relative absence of distraction, and the presence of behavioral states such as motivation and self-efficacy (Miller, Vandome & McBrewster, 2006). Nonetheless, the question arises: If these variables can be held as stable as possible in an experimental setting, is it possible to measure both the (a) speed and (b) performance dimensions of human cognitive performance under different states of focus—that is, floating focus versus fixed focus? An experiment of this sort would, under ideal conditions, filter out the effect of other variables and be able to measure the effects of fixed versus floating focus alone. In doing so, the experiment might prove to provide helpful information to students, knowledge workers, and others who work primarily with their brains as to whether they should simply soldier through mental tasks without stopping and without distraction (fixed focus) or whether it is better to give themselves mental breaks as necessary (floating focus). In other words, it is possible to use empirical means to judge the relative effectiveness of these two very different cognitive strategies.

In the current research literature, as well as in the popular press, social media usage has been discussed in the context floating focus. In an era of always-on connectivity, students, knowledge workers, and others with digital access have to balance the necessity of working fixedly on tasks with the constant temptation of checking on, and interacting with, social media. Despite the widespread recognition of social media as constituting a potential task distraction, there is little empirical research on whether intermittent social media usage aids (a) cognitive performance and (b) speed of completion on sustained tasks. Given the substantial literature on social media's relation to distraction and cognitive load, as well as the addictive nature of social media, it seems likely that people who are given access to social media during the execution of a cognitive task will not do as well on that task, in terms of performance as well as speed, as peers with no access to social media. The main purpose of this empirical study was to test this proposition in an experimental format.

The study has been structured as follows. The first section, the introduction, presented the background to the study and briefly discussed a means of measuring the phenomenon of interest. The second section, the literature, consisted of a review, analysis, and synthesis of key empirical findings and theories related to the interaction between Web / social media, cognition, behavior, emotion, and performance. The third section contained a description of the experimental research design used in the study. The fourth section contained a presentation of empirical findings. The fifth and final section, the conclusion, contained a reiteration of the findings of the study, a discussion of the findings in light of past empirical and theoretical work, recommendations for practice, recommendations for future study, and an acknowledgement of study limitations.

Literature Review

The literature review consists of three distinct sub-sections. The first sub-section is a discussion of social media and distraction in light of past theoretical and empirical findings. The second sub-section is a review of literature detailing the potentially deleterious effects of heavy Web / social media on cognitive, emotional, and behavioral outcomes. The third sub-section is a review of studies pertaining to social media as a self-reinforcing outlet for stress. Collectively, the review of literature suggests that social media use is likely not only to degrade the quality of cognition (and therefore task speed and performance) but also to lead to negative emotional and behavioral outcomes.

Social Media, Focus, and Distraction: Relevant Theoretical and Empirical Findings

The human power for distraction has been discussed along two dimensions: (a) Internal and (b) external distraction. Internal distraction can consist of wandering thoughts, day-dreams, and other states of reverie or cognitive meandering (Ellis, 2007). External distraction can consist of leaving an assigned task to read a book, watch television, surf the Web, or engage in any form of engagement with an outside stimulus (Ydewalle, Nuttin, & Lens, 1981). It is important to better define and demarcate how these forms of distraction can be taken to be examples of floating focus.

Floating focus refers to a kind of focus that comes and goes, but that returns to a baseline of some defined and structured task. For example, if one is driving a car from London to Manchester, this drive itself is the task; if one daydreams while driving, or listens to the radio during the drive, these actions would be proof of floating focus. Instead of spending the drive purely focused on the road, the driver's focus floats, or wanders, back and forth from the task to a set of distractions from the task. No activity is innately distracting or innately demanding of a particular kind of focus; it is only within the context of a set task that it is possible to define what is meant by fixed, and what is meant by floating, focus (Walker & Herrmann, 2005).

A great deal of cognitive work now takes place while people are at their computers or analogous devices. The degree and duration of computer usage among students and knowledge workers are very high. As such, much of the recent research on fixed and floating focus has taken place in the context of the computer (Walker & Herrmann, 2005). The main reason for this trend in the literature is the nature of the World Wide Web. The Web has been described as the mightiest engine for distraction that has ever existed (Strauch, 2010). Any task that takes place on an Internet-based computer can be subject to the extrinsic distractions of social media in particular. For example, a student using a networked computer to write a term paper is more easily able to take cognitive breaks on social media sites. A student using pen and paper to write a term paper in a locked and bare room has, by contrast, almost no scope for extrinsic distraction.

Carr (2011) is one of several theorists who has argued that the increasing pervasiveness of the Web has changed human cognitive abilities, so that what Fu and Pirolli (2007) referred to as "information foraging" has replaced more fixed approaches to the completion of cognitive tasks. Carr referred to this dynamic as the Google effect, in which both the time and accuracy of task completion are negatively correlated with accessibility to the Web.

What Carr (2011) called the Google effect has been formally studied in limited contexts of information foraging. Fu and Pirolli's (2007) landmark study of human cognition during Web use found that Web navigation both develops and rewards what is known as the "information foraging" form of cognition. There is an interesting overlap between information foraging as detected by scientists in the laboratory and former Microsoft VP Linda Stone's anecdotal description of the phenomenon of continuous partial attention:

> To pay continuous partial attention is to pay partial attention—CONTINUOUSLY. We want to effectively scan for opportunity and optimize for the best opportunities, activities, and contacts, in any given moment...It is an always-on, anywhere, anytime, anyplace behavior... (Stone as quoted in Guilmartin, 2009, p. 219).

In cognitive terms, information foraging both creates and reinforces what Warcup and Zimmerman (2009) have discovered to be a strategy of shying away from heavier cognitive processes in favor of lighter ones. In Warcup and Zimmerman's experiment, two groups of users were directed to two different Websites, one of which presented information of its own whereas the other directed users to other, more authoritative Websites. The users were then asked to answer questions based on information from these Websites. The results demonstrated that users of the high-information sites did better at answering the questions, reported greater ease of use, and spent less time on task. To generalize these findings, the suggestion is that the majority of Web users will automatically gravitate to lower-load cognitive experiences, while the minority of users who engage in higher-load experiences obtain better results in terms of task performance and speed of execution. Warcup and Zimmerman's finding might explain the popularity of Wikipedia and other Websites (including social media) that purport to spoon-feed attractively packaged information directly to users over print media that contain more scholarly and authoritative content.

There are two key cognitive dynamics in the human-Web interface. The first is that, because the Web consists of a repository of billions of documents that can be reached by contextual clicking (or 'surfing'), there is an open invitation to immediately surf away for a cognitively demanding or unpleasant task towards a more rewarding one, such as abandoning the research process of a graduate paper in favor of browsing online comic books. This phenomenon has been described by Stone (as quoted in Guilmartin 2009) as an extension of continuous partial attention, in which the user takes advantage of the Web to seek out better and better tasks based on shifting moods, typically moods that are allied to recreation and distraction. Because the world of the Web is open-ended, there is an endless possibility of diversion, which in itself erodes the quality of cognition by pulling the user into ever-more frivolous and time-wasting tasks. Lavie's (2010) empirical study found that, when confronted by cognitive load, distraction is a common strategy for alleviating the strain. Galanter and Kleber (2010) further found that breadth of available distraction is an important mediating factor in whether someone confronted by cognitive load will seek out distraction from it, and added that the Web's unlimited scope for distraction is thus an invitation to flee cognitive difficulty and embrace distraction in less cognitively challenging tasks.

The second phenomenon complements the first. In using the Web, cognitive load has been demonstrated to be highest at two moments, namely when the user (a) formulates a query and (b) evaluates and mentally interconnects various sources of information revealed by searches. Cognitive load in every aspect of Web browsing was measured in Gwizdka's (2010, p. 1) experiment, which reached the conclusion that cognitive load "was significantly higher during query formulation and user description of a relevant document as compared to examining search results and viewing individual documents." As such, cognitive load on the Web is highest precisely when engaging in creative and research-oriented tasks that require document examination and specialized search syntax—the heart of so much knowledge work, including the kind of works that students and business researchers do. Thus, combining this finding with those of Lin (2009), it becomes clear that the can be Web is a sort of Id for the cognition, serving to tempt cognition away from its assigned tasks and towards the ease and pleasure of Web surfing.

It is true that there are those such as Johnson (2007) who argued that, because the Web makes people better at information foraging, it should be considered a boon, not a hindrance, to cognition. The crux of the debate is that different theorists have tended to privilege different forms of cognition. To an admirer of reading, for example, the habits of mind cultivated by the Web are insidious. To Nicholas Carr (2011), who considered himself an avid reader before the Web, human-computer interaction in the age of Google robbed him of a once-enjoyed faculty.

However, there is also research demonstrating that inveterate Web users and others mired in always-on communications can solve certain kinds of puzzles more quickly than others, and can also hold more information in short-term memory (Johnson).

Because there is an ongoing debate about whether the Web (and, in particular, the use of social media) steeps users in good or bad cognitive habits, it is also a relevant and fascinating topic for a quantitative study designed to measure the speed and accuracy of cognitive task performance both in and out of a social media environment. The current study centered on an experiment to measure the comparative accuracy and speed of the same test-takers (that is, a matched pairs approach) in order to try to isolate the cognitive effects caused by the floating versus fixed attention in a Web context.

There are two positions in the debate—positions between which the experiment described in this study can discriminate. The first, standard position, articulated by Carr (2011) and other theorists, is that fixed focus is a superior approach to cognition. Ignoring or suppressing distractions is, according to this view, the best means of completing a cognitive task quickly and accurately. The second position, defended by Johnson (2007) and allied theorists, is that the brain needs and in fact benefits from the kind of floating focus brought about in a Web surfing (or other distractive) context. In Johnson's view, the brain is much like the body, which uses rest as replenishment; thus, someone who takes a break from a difficult task such as writing a paper to surfing the Web for entertainment, will in Johnson's theory come back to the paper with a clearer mind, just as someone who takes a break during a foot-race will come back with less fatigue. Carr disagreed, arguing that there is no such analogy; the brain, pulled off-task by floating focus, will be less effective than if it had never given in to distraction in the first place. There is little middle ground between these two contending views. The methodological section of this paper will explain how a carefully-structured experiment can help to determine whether the kind of position espoused by Carr is more justified than Johnson's position.

Cognition, Emotion, and Behavior

Among popular writers and the lay populace, there is a great deal of debate over whether the Internet is, as Helprin (2009) has famously argued, making people less intelligent. Some writers have argued that the structure of the Web is promoting heightened intelligence whereas others have reached the opposite conclusion (Johnson 2007). The debate exists because the nature of cognition is as yet little-understood. There is general activity that the factor known as *g*, or general intelligence, both exists and can be tested by a battery of psychometric means (see for example Bernstein, Penner, & Clarke-Stewart 2007). However, beyond consensus on *g*, there are many different theories about the content and qualities of cognition, which creates rich grounds to disagree on whether (and how) the Web—and, in particular, social media, is influencing this aspect of human development. There are so many aspects of cognition that it would be premature to claim that social media use has degraded cognition *per se*. However, based on the research cited above, it is legitimate to argue that the Web and social media might have eroded those aspects of cognition that create high cognitive load. The question then becomes: What exactly are these aspects of cognition, and how does the Web erode them?

General knowledge is surely an important aspect of cognition. To some theorists (Helprin, 2009), general knowledge is as important in its own way as processing ability (known as *g* to scientists). While *g* represents what might be considered intrinsic ability, general knowledge is the indicator of the extrinsic facts that a human being has learned about the world around her. *G* without general knowledge is useless; mental processing ability must be applied to the world of facts and prior thoughts to result in the profound forms of cognition that we associate with, say, new scientific theories. In this regard, it is safe to say that the mile-wide, inch-deep quality of the Web noted by Carr (2011) might have robbed humans of important cognitive functions. By various measures, general knowledge is declining, and declining in ways that owe themselves to the Web. Zhong's (2009) study demonstrated that humans who use the Web frequently organize and retrieve information in less rapid and less accurate ways than humans who do not use the Web. In other words, using the Web changes the mental architecture of human memory for the worse, which in turn degrades our ability to remember items of general knowledge. Our mental processing power may remain unchanged, but our memory capacity and accuracy goes down, robbing us of one important component of overall intelligence.

In the introduction, a brief mention was made of so-called extended cognition, the idea that a human plus a tool (such as a computer) are smarter than the unaided human. There is empirical evidence against such a proposition. Kuorikoski (2009) demonstrated that humans can in fact make stronger inferential associations without the assistance of a computer. Thus, to the extent that the Web cuts against human general knowledge storage capacity and inferential strength, it can be said to erode cognition.

What does it mean to claim that social media has rendered emotional and behavioral changes in human function? The claim is not as airy as it seems, and is in fact grounded in many of the theories and research that are consulted in the other sections of the literature review. The hypotheses in this regard are that (a) changes in human cognition and behavior brought about by social media have themselves brought about changes in emotional function and (b) social media has generated its own powerful, and dysfunctional, emotional pull on users.

For example, the phenomenon of continuous partial attention discussed in the first section of the literature is a cognitive change. Continuous partial attention generates in normal humans a state much like that suffered by those with attention deficit hyperactivity disorder (ADHD). These changes turn up in the brain; they alter cognition. However, changes in cognition also impinge on emotions.

In order to make this point, it is only necessary to consult the extensive literature on ADHD, which reveals that ADHD sufferers have impaired emotional relationships (see for example Gudjonsson, Sigurdsson, Smari, & Young, 2009). The literature reveals that ADHD is correlated with both poor social function and poor emotional control. As it turns out, extensive Web and social media use is also associated with poor social function (Courtois, Mechant, De Marez, & Verleye, 2009) and poor emotional control (Hasson, Brown, & Hasson, 2010). Ironically, according to Hasson et al, people who use the Web extensively often report that they are doing so to better manage their emotions, but upon testing are revealed to have less emotional control than their peers.

The salient point that emerges from these studies is that both ADHD and extensive Web / social media use tend to bring about an inactivity to focus on other people and their emotions, in addition to a loss of control over personal emotions. The ADHD sufferer / social media addict flits from topic to topic and from preoccupation to preoccupation, and is generally incapable of sustained and serious attention to the problems or feelings of other people (Courtois et al., 2009). As such, it is hardly remarkable that the cognitive deficits of ADHD and continuous partial attention translate into emotional deficits as well (Hasson et al., 2010). In modern society, the smart phone, computer, and endless access to information have altered both the quantity and quality of human emotional availability, such that families now sit clustered around their respective computers and people lead parallel lives that intersect largely by means of electronic signals rather than through personal, non-technological interactions.

Doctors have recognized that excessive use of the Web can result in serious emotional and behavioral deficits, so much so that Internet addiction may be added to the spectrum of addictive disorders, and has in any case generated a great deal of clinical research and literature. Weinstein and Lejoyeux (2010), summarizing the scholarly consensus on this point, write that:

> Cross-sectional studies on samples of patients report high comorbidity of Internet addiction with psychiatric disorders, especially affective disorders (including depression), anxiety disorders (generalized anxiety disorder, social anxiety disorder), and attention deficit hyperactivity disorder (ADHD). Several factors are predictive of problematic Internet use, including personality traits, parenting and familial factors, alcohol use, and social anxiety. (Weinstein & Lejoyeux, 2010, p. 277).

These findings suggest it is not just social media itself that is at fault. In fact, according to Weinstein and Lejoyeux (2010), social media does not so much generate these dysfunctions as give them a domain of expression. However, for purposes of this discussion, the effect is the same; the semantics of expression hardly matter.

Social Media Use and Stress Management Theory

The previous section of the literature review contained a review of evidence for the claim that heavy social media and Web use are emotionally, behaviorally, and cognitively damaging. There needs to be an explanation of why presumably rational agents would indulge in social media use if it were harmful. Theories of stress and information-seeking behavior can explain why heavy social media use appears to reinforce itself despite its ill effects on many people.

Theories of stress suggest that information behavior is a common and natural response to stress. In a seminal paper, Miller (1979) argued that what made stress stressful was the individual perception of controllability; in Miller's theory, stress was not only a set of physiological signals but also an important cognitive and behavioral event. Individuals who feel stress more keenly are those who are more worried about the loss of control, with this worry leading to specific cognitive and behavioral coping responses, many of which are predicated on seeking, creating, or somehow interacting with information.

Conceptually, information behavior can play a role in coping strategy. For example, Palus, Fang, and Prawitz (2012) found evidence that college students were engaging in Internet postings in order to focus on and vent emotions, orchestrate social support, and engage in positive reinterpretation and growth in the aftermath of the 2008 Northern Illinois University shootings. Palus et al. are among the few scholars who have specifically sought to study the role of information behavior as part of the stress coping strategies of college students. However, there are many scholarly works on the role of information behavior in stress management for cancer patients and other high-stress populations (Rutten, Squiers, & Hesse, 2006). In these contexts, information behavior has been found to be remarkably flexible in its ability to support different kinds of stress-related coping strategies.

In particular, the Internet has made it possible for college students and other high-stress populations to engage in the full spectrum of coping responses. What is not clear, however, is whether information behavior—whether it takes place on the Internet or through traditional channels—functions to ameliorate or exacerbate stress. According to Weinstein and Lejoyeux (2010), there is empirical evidence on both sides. In some studies, information behavior has been found to ease stress whereas in other studies information behavior has served to actually increase stress (Weinstein & Lejoyeux, 2010).

People undergo various forms of stress, in particular stresses arising from academic, familial, financial, and social pressures (Brougham, Zail, Mendoza, & Miller, 2009). According to Carver, Scheier, & Weintraub (1989), there are 15 separate coping strategies for stress:

1. Positive reinterpretation and growth
2. Mental disengagement
3. Focus on and venting of emotions
4. Use of instrumental social support
5. Active coping
6. Denial
7. Religious coping
8. Humor
9. Behavioral disengagement
10. Restraint
11. Use of emotional social support
12. Substance use
13. Acceptance
14. Suppression of competing activities
15. Planning

Carver et al. created an instrument, the COPE inventory, to measure the prevalence of each of these coping strategies among individuals. Numerous scholars have applied COPE to the study of college students' responses to stress; however, there is limited research on the intersection between students' information-seeking behavior and stress management. One of the few recent studies on this topic was by Palus et al. (2012), who found that students used Internet postings to manage stress in the aftermath of the 2008 mass shootings at Northern Illinois University.

Whether or not information behavior succeeds in reducing stress appears to be dependent on two other theoretical constructs, instrumentality and control. In Miller's (1979) theory of stress, coping strategies are successful if they serve as instruments that give the individual under stress a means of re-establishing the lost sense of control. The risk of information behavior, particularly involving social media, is that, because of the unmanageability of information itself. it can either (a) lead to further, unanticipated sources of stress or (b) fail to address the initial source of stress (Weinstein & Lejoyeaux, 2010). Because the Internet is a medium that is not circumscribed, and allows the information consumer to access any form of information in any way, there is a more pronounced risk that information behavior on the Internet will, rather than serving as a coping mechanism, exacerbate stress (Weinstein & Lejoyeaux, 2010). On the other hand, there is also empirical evidence that the Internet can serve as a focused venue for information behavior that is directly relevant to resolving a specific stress (Palus et al., 2012).

In a seminal paper, Blaney (1986) argued that information behavior could be used in at least two distinct ways by highly-stressed populations; information behavior could serve to either (a) resolve or (b) reinforce the stress felt by an individual. Various forms of stress resolution have been discovered through empirical testing over the years; for example, Carver et al. (1989) discovered fifteen specific kinds of stress reduction behaviors, each of which can theoretically be entered into through information behavior. As such, there is both theoretical and empirical support for the idea that information behavior—which can be operationalized as seeking information, sharing stories, building narratives, seeking diversion, and other tasks supported on social media—can play a central role in resolving stress.

However, there is also a body of literature suggesting that information behavior can reinforce stress (Weinstein & Lejoyeux, 2010). There are numerous mechanisms through which information behavior can have this effect. In some cases, it is possible that people under stress actively seek more stress; while this phenomenon remains under investigation, there is preliminary consensus among neuroscientists that people under stress might become addicted to their own biological experience of stress, which they then seek to reproduce rather than remove (Frueh & Rosen, 2010). However, there also appear to be cases in which information behaviors entered into for the express purpose of resolving stress end up inadvertently reinforcing stress instead. For example, Rutten et al.'s (2006) work on stress management among cancer patients reached the conclusion that some patients felt depressed rather than empowered by learning more about their cancer.

While there is scant empirical research on college students' management of stress through information behavior, there is more research on college students' general information behavior. Some of this general research is directly relevant to the topic of stress management. For example, Warwick, Rimmer, Blandford, Gow, and Buchanan (2009) conducted a student of college students' information behavior and found that such behaviors were limited in both scope and utility. For example, Warrick et al. (2009) discovered that college students engaged in "minimum information-seeking effort" (p. 2402). This finding suggests that, if college students come under stress, the limited nature of their informational behavior repertoire might make it difficult to obtain information-based relief from stress.

This point was partially reinforced in the study conducted by Selfhout, Branje, Delsing, ter Bogt, and Meeus (2009), who found that the use of human-centered information behavior (such as reaching out to others via instant message) was not predictive of either depression or stress, but that non-human-centered information behavior (such as surfing the Web) was in fact a precursor of further stress. Selfhout et al (2009) observed the "poor-get-poorer effects of surfing on depression and social anxiety" (p. 819). This finding indicates that information behavior that is more likely to resolve rather than reinforce stress is likely to be human-oriented and purposive. Thus, it seems that social media use, like Web use in general, could be part of a strategy to manage stress that, ironically, causes stress in its own right.

Methodology: Overview of Experimental Procedure

The first component of study design has to do with recruitment. The researcher sought a sample of at least 30 so as to satisfy the Central Limit Theorem's stipulation of a minimum of 30 cases (Creswell 2009). The sample consisted of university students who are the researcher's peers. Recruitment took place via the posting of flyers and the use of a Facebook group designed to promote the experiment. Recruits were promised a chance at a randomly drawn lottery prize of a $150 Amazon card for participation in the test. The use of an honorarium has two purposes. First, it has been empirically demonstrated that differing levels of motivation can affect performance on cognitive tasks (Guilmartin, 2009). Students who are asked to spend several hours taking tests, for no compensation, are likely to be motivated in different ways. Some students might be motivated by the sheer intellectual pleasure of taking a test, while others might be motivated only to pass some time or procrastinate. Dispensing an honorarium to all participants has the effect of creating a somewhat uniform substrate of motivation, and therefore to reduce the effect of this extraneous variable on the dependent variables of the experiment.

After recruitment of subjects, the next methodological step is inclusionary criteria. In order to transition from being a recruit to being an official study subject, each participant had to (a) give informed consent to participation, consistent with ethical best practices, (b) be over 18, (c) not have taken either of the GRE tests before, and (d) be a Facebook user. The two GRE tests used for this study came from the Educational Testing Services (ETS) organization's bank of five free tests, which come bundled on free software and are often used by students who are preparing for graduate school in North America. As part of the recruitment process, students were asked whether they have taken sample GRE tests before; anyone who had done so was not included in the experiment.

Once the sample was assembled, the experiment consisted of two tests. Each test was an administration of the mathematics portion of the GRE. GRE software, key-logging software, and Web blocking software (that was manually configured to allow access solely to Facebook.com) were temporarily installed in a computer laboratory affiliated with the university, a laboratory with 40 computers. This software was uplinked to the researcher's laptop, such that all student performances were recorded directly on the researcher's tracking software. This measure reduced the possibility of error in student self-reporting of scores to the researcher, and it also allowed the researcher to track both (a) computer use patterns and (b) time to completion of the GRE tests.

Time to completion was one of the dependent variables of the study, as was the overall GRE score; it was therefore simple to justify tracking both of these variables centrally, on the researcher's computer. However, the use of key-logging software also needs to be explained and defended. Consider that there will be two tests administered as part of the experiment: (a) A computer-based GRE test on a computer that has no connection to the Internet and that cannot minimize the GRE window in case the student wants to use another installed program and (b) a computer-based GRE test in which the Internet is available, the time limit on the GRE has been deactivated, and the GRE window can be minimized.

Floating focus takes place when performers of cognitive tasks feel cognitively burdened. People have different thresholds of cognitive load. Some students might be able to concentrate well for three hours at a stretch, whereas others might feel burdened every fifteen minutes. During the portion of the experiment in which students will take the GRE test on a Web-enabled computer, the point of the exercise is to let subjects determine their own pace of floating. One student might feel like checking Facebook for a total of 10 minutes during the session, but otherwise to concentrate on the test. Another student might be thoroughly bored and spend 2 hours on Facebook over the course of the test.

In order to be able to compare the cases of these two different levels of cognitive floating, it is necessary to be able to quantify floating behavior. Fixed behavior is not quantified; it will merely be assumed that, because test-takers have no leeway to use their computers to do anything but the GRE (and also because they will not be allowed to have cell phones, books, or other distractions), their focus will be fixed, just as it would be in a real testing environment. However, precisely because the subjects had complete freedom as to how to use their ability to float between the GRE and computer distractions, some arrangement had to be made to capture the variability of student behavior. Key-logging software captured information about how long each user spent on the GRE versus social media, broken down into minutes and seconds. This information was useful for matched-pairs t-tests, as it helped to determine whether any observed differences between performances were significant.

The two tests were scheduled exactly one week apart, at an appropriate time in the university's calendar. The purpose of scheduling in this way was to minimize the impact that exams could have on student performance. Additionally, both tests took place at the same time of day, to reduce the likelihood that variations in a student's Circadian sleep cycle could be responsible for performance variations. Students were asked to obtain their usual complement of sleep before each test, and, to the extent possible, to eat nutritious meals in the lead-up to the test. The purpose of these criteria was, once again, to reduce the potential impact of extraneous variables on test performance characteristics.

It should be reiterated that each student took 2 tests, once in the fixed group and once in the floating group. Of the 30 students in the sample, 15 were randomly assigned to be in the floating group first, then in the fixed group. The 15 computers in the fixed group were equipped with Web-blocking software, and these students were also asked to report to the site without phones. The test center itself was carefully controlled. Time was blocked off so that no other users were present while the tests were being administered. As mentioned, students were not allowed to bring cell phones, electronic devices, books, or other distractions with them into the test environment; the 15 Web-enabled computers provided the sole opportunities for distraction, with Facebook the only Web site accessible from the Internet-enabled computers. They were also warned against talking during the test or leaving their stations for anything other than a bathroom break or medical emergency. To the extent possible, the researcher simulated the fixed-focus conditions of a genuine test administration. In the floating version of the test, students were put under the same conditions, except that they were verbally instructed that they were allowed to use the computer for Facebook-checking purposes as they completed the test. The only stipulation was that they had to complete the test, no matter how long they spent on Facebook. The GRE software allowed all test-takers to complete the test at their own pace by advancing through the questions whenever they provided an answer.

As mentioned, data were collected by means of key-logging and test performance tracking software temporarily installed on each test computer. The data consisted of five sets of inputs: (a) GRE score for the fixed focus test; (b) GRE score for the floating focus test; (c) GRE completion time for the fixed focus test; (d) GRE completion time for the floating focus test; and (e) time spent on Web-based computer distractions during the floating version of the test.

Research Questions and Hypotheses

The following research questions and hypotheses guided the empirical analysis:

RQ1: Did fixed-focus conditions enable better GRE test performance than floating-focus conditions?

$H1_0$: Fixed-focus condition GRE scores ≤ floating-condition GRE scores.

$H1_A$: Fixed-focus condition GRE scores > floating-condition GRE scores.

RQ2: Did fixed-focus conditions enable faster GRE test performance than floating-focus conditions?

$H2_0$: Fixed-focus condition GRE times ≥ floating-condition GRE times.

$H2_A$: Fixed-focus condition GRE times < floating-condition GRE times.

RQ3: In floating-focus test conditions, was there a significant relationship between time spent on Facebook and GRE performance?

$H3_0$: In floating test conditions, there was not a significant relationship between time spent on Facebook and GRE performance.

$H3_A$: In floating test conditions, there was a significant relationship between time spent on Facebook and GRE performance.

RQ4: In floating-focus test conditions, was there a significant relationship between time spent on Facebook and time to completion of GRE?

H4_0: In floating test conditions, there was not a significant relationship between time spent on Facebook and GRE time.

H4_A: In floating test conditions, there was a significant relationship between time spent on Facebook and GRE time.

RQ5: Was there an overall improvement in test scores from the first to the second administration? *Note*: This research question was specified in order to determine whether there was a general test-taking improvement from the first to the second test, regardless of which condition the student was placed in. This research question was thus designed to test the validity of the experimental procedure.

H5_0: Mean test score for first administration = mean test score for second administration.

H5_A: Mean test score for first administration ≠ mean test score for second administration.

All data analysis took place in Stata 13.0. The chosen level of significance was 0.05. Note that RQs 1 and 2 were one-tailed, whereas RQs 3, 4, and 5 were two-tailed.

Results

The first RQ was as follows: Did fixed-focus conditions enable better GRE test performance than floating-focus conditions? The boxplot for RQ1 appears in Figure 1 below and indicates that the mean score for the fixed condition appeared to be higher than the mean score for the floating condition.

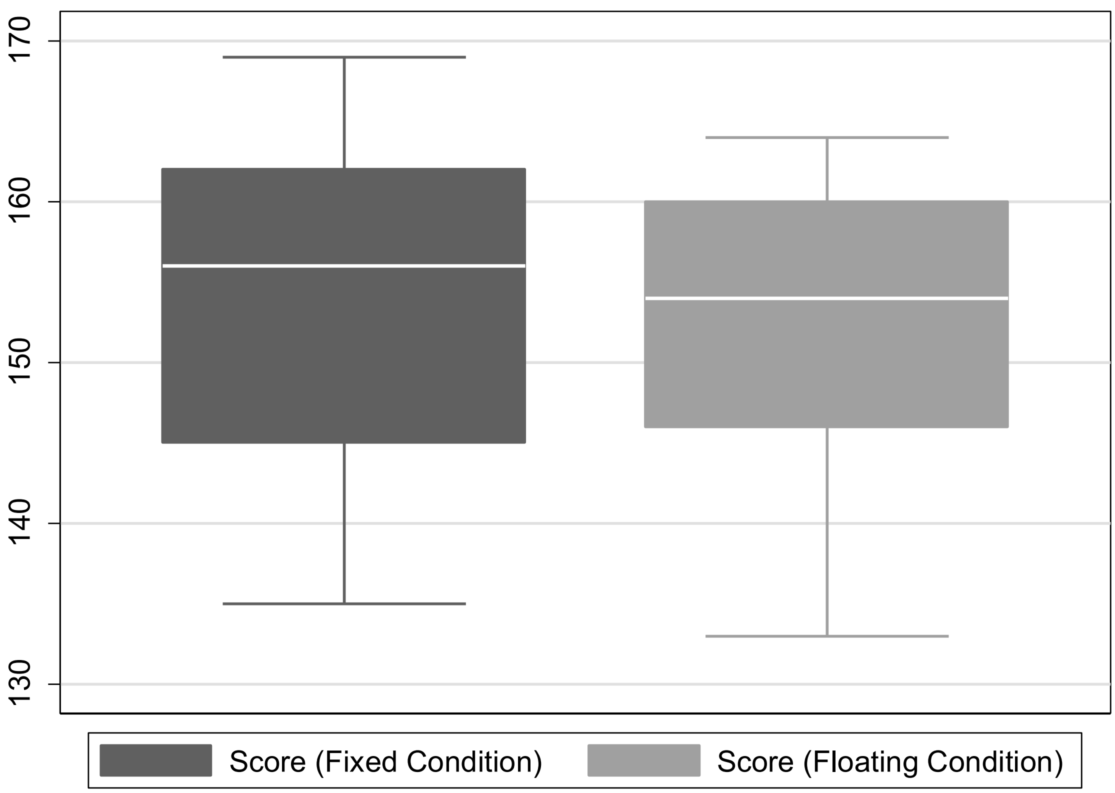

Figure 1. Boxplot, GRE scores by condition.

A matched-pairs *t* test indicated that there was a significant effect of test group on GRE performance, $t(29) = 4.6012$, p (one-tailed) < 0.001. GRE scores in the floating condition (M = 152.6667, SD = 1.6632) appeared to be significantly lower than GRE scores in the fixed condition (M = 154.2667, SD = 1.6828).

The second RQ was as follows: Did fixed-focus conditions enable faster GRE test performance than floating-focus conditions? The boxplot for RQ2 appears in Figure 2 below and indicates that the mean time for the fixed condition appeared to be lower than the mean time for the floating condition.

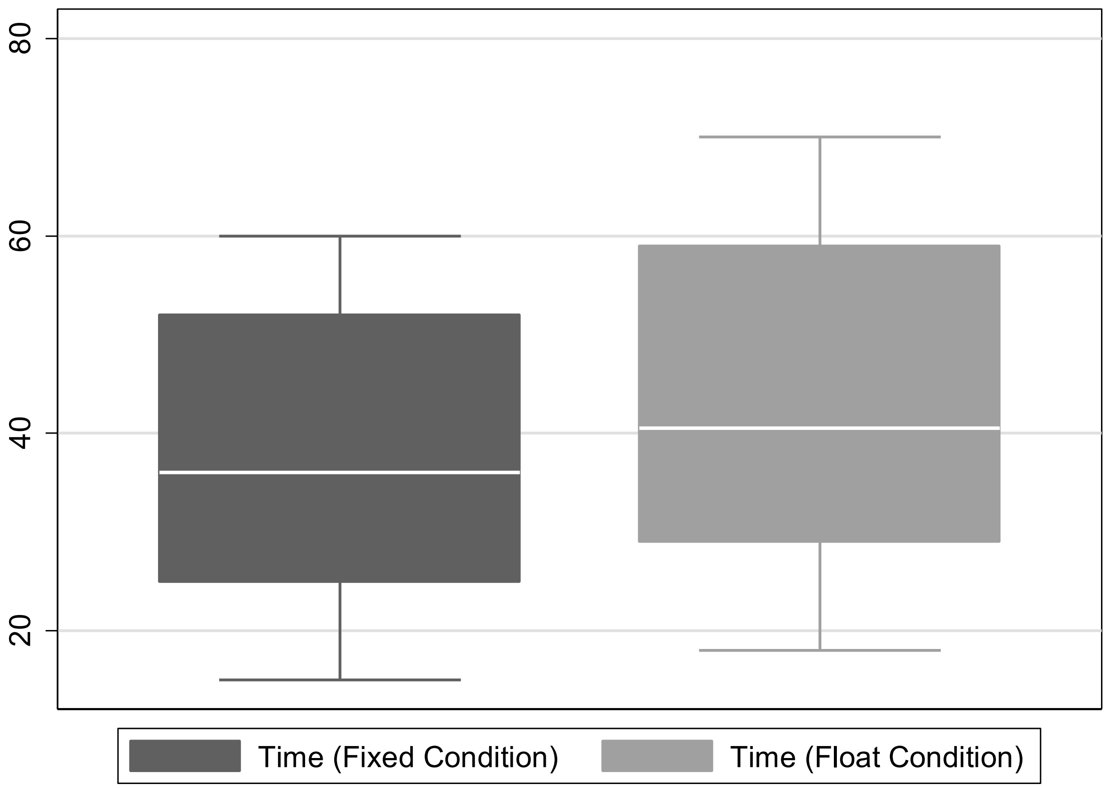

Figure 2. Boxplot, GRE completion times (rounded minutes) by condition.

A matched-pairs *t* test indicated that there was a significant effect of test group on GRE completion time, $t(29) = -4.8935$, p (one-tailed) < 0.001. GRE completion time in the floating conditions (M = 43.7667, SD = 2.9119) appeared to be significantly higher than GRE completion times in the fixed condition (M = 37.8667, SD = 2.8344).

RQ3 was as follows: In floating-focus test conditions, was there a significant relationship between time spent on Facebook and GRE performance? The scatterplot, ordinary least squares (OLS) line of bets fit, and 95% confidence interval for these 2 variables appears in Figure 3 below and suggests the absence of any discernible pattern, whether linear, quadratic, exponential, or otherwise. In fact, the adjusted R^2 of the OLS regression of time on floating condition score was -0.0294; the negative coefficient of determination suggested that a linear fit was inappropriate for these data. The OLS fit was $F(1, 28) = 0.17$, $p = 0.6811$, with the Beta coefficient of time being 0.0447.

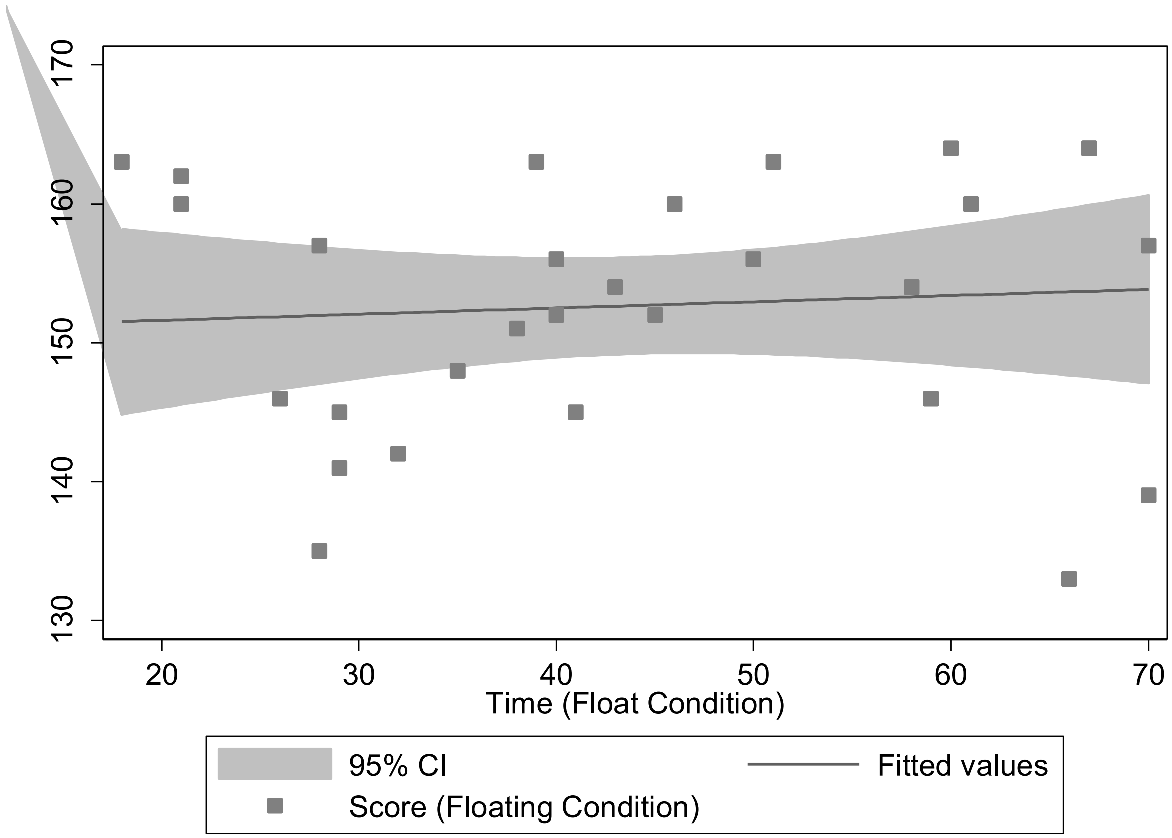

Figure 3. Scatterplot, time to completion and GRE scores in the floating condition.

A finding closely related to the analysis was of the effect of time spent on Facebook on scores in the floating condition. The scatterplot for that regression appears as Figure 4 below. What is notable about Figure 4 and the associated regression is the suggestion that the deleterious effect of the floating condition on GRE scores demonstrate in the analysis for RQ1 was qualitative rather than quantitative; in other words, the negative effective of social media on GRE scores was independent of how long individuals actually spent on Facebook during the floating condition.

The OLS regression of Facebook time on the GRE score obtained in the floating condition demonstrated no significant effect, $F(1, 28) = 1.59$, $p = 0.2180$. When considering alongside the OLS result for the regression of time taken on GRE score in the floating condition, the regression of Facebook time on GRE score suggests that the deleterious effect of social media does not have to do with time, but, perhaps, with some quality of concentration that is diluted by accessing social media. This speculation requires further empirical testing; all that can be concluded based on the analysis for RQ3 is that time was not the mechanism through which social media lowered test scores in the floating condition.

RQ4 was as follows: In the floating-focus test condition, was there a significant relationship between time spent on Facebook and time to completion of GRE? The scatterplot for this research question appears in Figure 5.

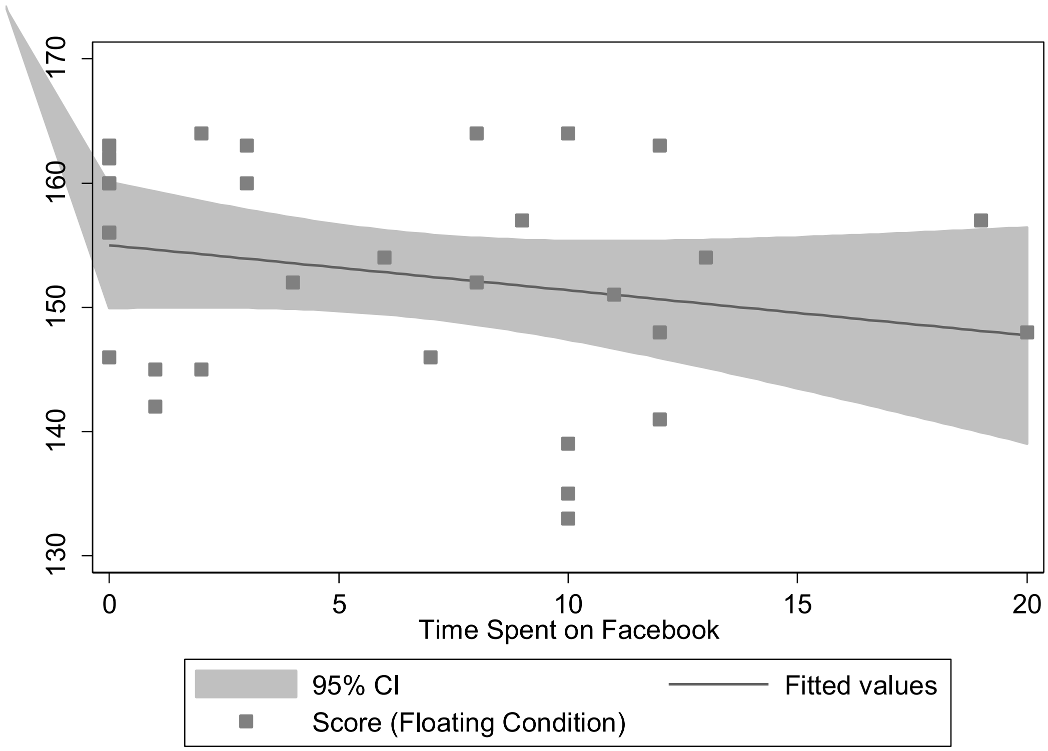

Figure 4. Scatterplot, time on Facebook and GRE scores in the floating condition.

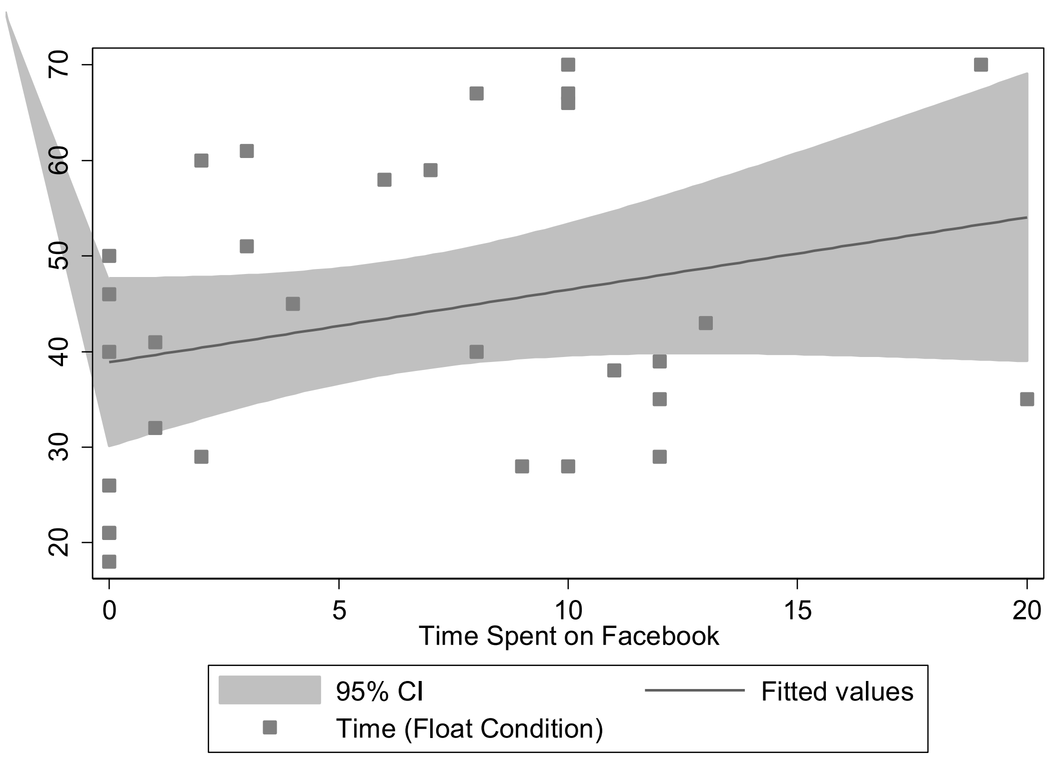

Figure 5. Scatterplot, time on Facebook and GRE completion time in the floating condition.

The OLS regression for RQ4 showed no effect of Facebook time on time to completion of the GRE in the floating condition, $F(1, 28) = 2.31$, $p = 0.1398$. This finding was unexpected and requires further interpretation. It was assumed that, the more time a participant spent on Facebook, the longer he or she would complete the test. The absence of this correlation can be understood in light of the findings for RQ3. If the negative effect of social media on GRE performance is not through the mechanism of time, as the RQ3 findings appeared to demonstrate, then it seems plausible that Facebook use did not time-handicap test-takers. However, more analysis is needed to better understand the findings associated with RQ4.

RQ5 was as follows: Was there an overall improvement in test scores from the first to the second administration? It was noted earlier that this research question was specified in order to determine whether there was a general test-taking improvement from the first to the second test, regardless of which condition the student was placed in; hence, RQ5 was designed to test the validity of the experimental procedure by ruling out bias associated with increasing test familiarity.

As indicated in Figure 5 below, the test scores for the first and second administrations were fairly close to each other:

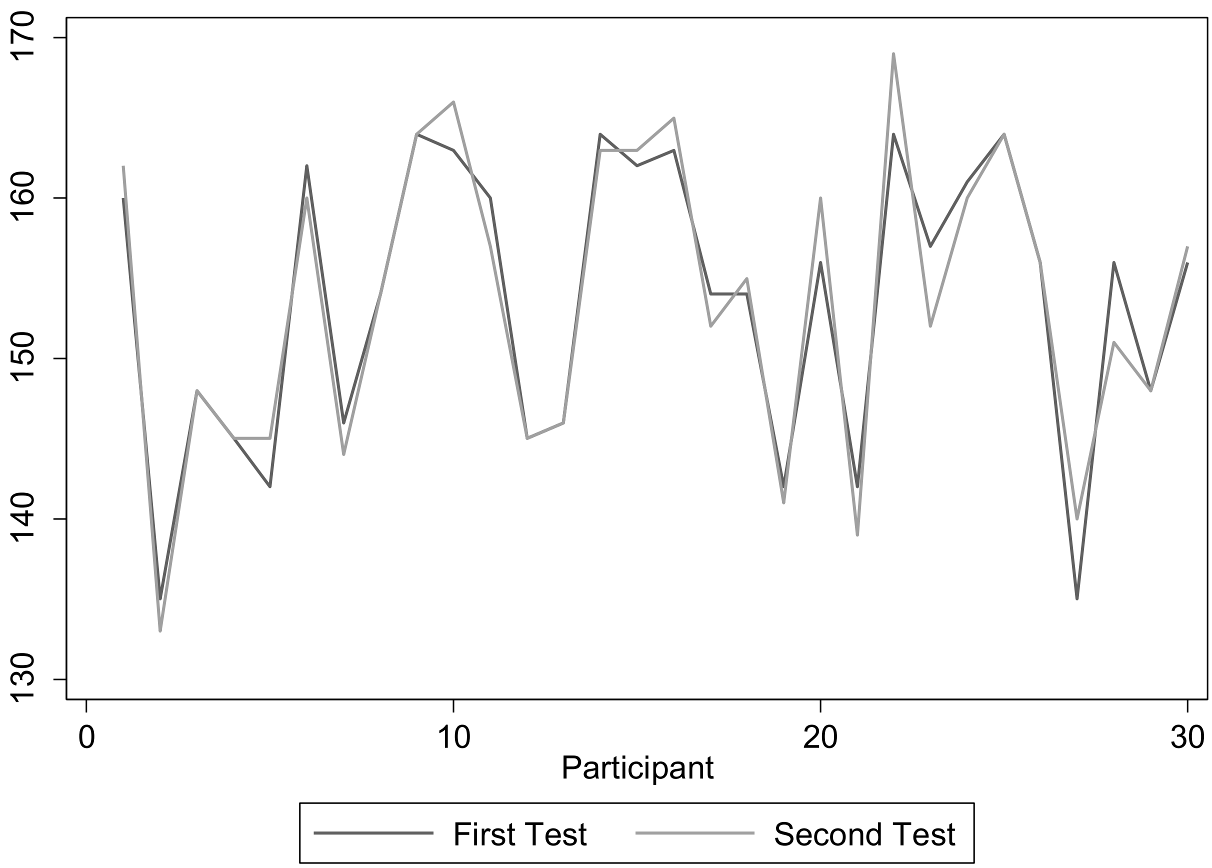

Figure 6. Line graph, GRE scores by order of test administration.

A matched-pairs *t* test revealed no effect of order of test administration on test score, $t(29) < 0.0001$, $p = 1.000$. In fact, analysis revealed that the mean of GRE scores on the first test administration (*M* = 153.4667, *SD* = 1.6412) was exactly the same as the mean GRE score on the second test administration (*M* = 153.4667, *SD* = 1.7172).

Conclusion

The findings of the study have been summarized in Table 1 below.

Table 1
Hypothesis Testing Table

RQ	Hypotheses	Result
RQ1: Did fixed-focus conditions enable better GRE test performance than floating-focus conditions?	$H1_0$: Fixed-focus condition GRE scores ≤ floating-condition GRE scores. $H1_A$: Fixed-focus condition GRE scores > floating-condition GRE scores.	Null hypothesis was rejected. Fixed-focus scores were higher.
RQ2: Did fixed-focus conditions enable faster GRE test performance than floating-focus conditions?	$H2_0$: Fixed-focus condition GRE times ≥ floating-condition GRE times. $H2_A$: Fixed-focus condition GRE times < floating-condition GRE times.	Null hypothesis was rejected. Fixed-focus times were faster.
RQ3: In floating-focus test conditions, was there a significant relationship between time spent on Facebook and GRE performance?	$H3_0$: In floating test conditions, there was not a significant relationship between time spent on Facebook and GRE performance. $H3_A$: In floating test conditions, there was a significant relationship between time spent on Facebook and GRE performance.	Null hypothesis could not be rejected.
RQ4: In floating-focus test conditions, was there a significant relationship between time spent on Facebook and time to completion of GRE?	$H4_0$: In floating test conditions, there was not a significant relationship between time spent on Facebook and GRE time. $H4_A$: In floating test conditions, there was a significant relationship between time spent on Facebook and GRE time.	Null hypothesis could not be rejected.
RQ5: Was there an overall improvement in test scores from the first to the second administration?	$H5_0$: Mean test score for first administration = mean test score for second administration. $H5_A$: Mean test score for first administration ≠ mean test score for second administration.	Null hypothesis could not be rejected.

Overall, the findings of the study affirmed the themes discussed in the literature review, which suggested that social media use is associated with deleterious cognitive effects. A decline in performance, one that seems to be connected to the use of social media, was in fact detected in this study. However, further research is necessary to better establish the nature and magnitude of the link between social media use and cognitive performance. Note that all data from which the findings were generated have been presented in the appendix to this study; the dataset can be used for replication purposes.

Discussion of Findings with Reference to Past Literature

The study was of significance given the ongoing debate about optimal cognitive strategies in the age of the Web. Carr (2011) has argued that contemporary times carry the most potential for distraction that has existed at any time in human history, by orders of magnitude. The nature of this distraction is magnified by the fact that the very machine we use for so many of our life and professional tasks, the computer, is also the vehicle of distraction. At the click of a mouse, the Web can immerse us in almost any experience and form of media; Web surfers can establish contact with friends and loved ones through instant messaging and e-mail, browse books and newspapers, play online games, listen to music, and watch movies, all with minimal effort.

This information environment has existed for a brief time—not yet two decades. In this time, it has not yet become clear what the Web's potential for distraction—its perpetual invitation to floating focus, especially for those people who already work on computers—on the content and character of human cognition will be. There are those, such as Carr (2011), who feel that the distractions of the Web have rewired human cognition, making it more shallow, less patient, and less acute than in the age of print. There are others, such as Johnson (2007), who believe that the Web is not a degrader of cognition, but, on the contrary, a boon to new kinds of thinking and creativity.

The larger trajectory of this debate cannot be settled by this study. However, the study did provide a viable way in which to explore a specific and highly interesting aspect of the debate, providing an answer to the question: Does the ability to take cognitive breaks from a demanding task improve both (a) speed and (b) accuracy of task performance? It is uncontested that taking a cognitive break, for example in the form of putting down one's schoolbooks and talking a walk or playing a game, is part of general psychological health; if we do not pause at all from hard cognitive tasks, we incur depression and other unwanted psychological effects (Guilmartin, 2009). However, what is not yet answerable is whether, in the performance of cognitive tasks, the ability to float actually makes us better at the fixed task.

Recommendations for Practice

The experiment showed, within the constraints of its sample and methodology, whether a cognitive break is good for performance, or whether a cognitive break was just an emotional reprieve from a difficult task, a reprieve that might bring a psychological benefit, but that does not improve actual performance. In fact, it turned out that a fixed focus environment was better—in terms of both GRE score and time of completion—than floating focus. This kind of research is of great importance given how little is known about the new cognitive environment made possible by the Web, and how vital it is for students, knowledge workers, businesses, and even governments to arrive at a better understanding of how to structure cognitive tasks. The results in this study indicate that, when knowledge workers or student need real results, they ought to put themselves into fixed focus environments.

Recommendations for Future Study

There are numerous recommendations for future study that can be made on the basis of the current study's findings. The main factor that needs to be investigated is the mechanism of cognitive decline associated with social media use. Cognitive load is a potential candidate for one such mechanism. However, the absence of a significant relationship between time spent on Facebook and GRE score in the floating condition suggests that cognitive load might not be the right mechanism, given that time away from task (i.e., time spent on Facebook) did not correlate with performance on the task. The fact that *any* time on social media resulted in a drop in performance suggests that whatever mechanism might be responsible cannot be time-dependent. It could be that checking social media during the course of a task results in complex changes (such as to task attitude) that last longer than short-term cognitive declines associated with distracting stimuli. Given the complexity of the systems involved, it would be particularly instructive to use magnetic resonance imaging (MRI) or a similar technique in order to get a real-time view of the brain changes that might be brought about through social media use in the context of a task such as the GRE.

Limitations of the Study

The GRE is a very specialized cognitive task that might not correlate highly with many other kinds of cognitive tasks. As such, regardless of what the study has to say about the impact of fixed versus floating focus on the GRE, this conclusion cannot be considered to hold outside the GRE, and, specifically, the mathematics portion of the GRE. Perhaps the effects measured in this study would be very different if the task were not taking the GRE, but learning to play the piano or writing a poem. Thus, an important limitation and delimitation of the study is that it applies to the GRE (math) only and cannot necessarily be taken to cast light on other kinds of cognitive tasks.

Another limitation of this study was the small sample (N=30). Resource limitations prohibited the conduct of a study with the hundreds of subjects who would be necessary to be able to generalize the results. The results will not therefore be held to be significant for any larger body, including the population of the researcher's university. However, the general method demonstrated in the study is can be applied by researchers who have the ability to assemble a much larger sample.

Another limitation of the study is that only a portion of the study, the actual testing, took place under strict laboratory conditions. Given the limitations of the researcher, it was not possible to strictly monitor all subjects in the run-up to the testing; it cannot be ruled out that a subject might have obtained eight hours of sleep before one of the tests, and one hour of sleep before the other, or that a subject consumed psychoactive substances between the test administrations. However much the administration of a detailed questionnaire and set of instructions helped to ensure that all test-takers approached both tests in the same general physical and mental state, the researcher could not control what took place outside the testing site and therefore might be confronted with confounding variables.

References

Baumeister, R.F. & Bratslavsky, E., Muraven, M., & Tice, D.M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology, 74*(5), 1252-1265.

Blaney, P.H. (1986). Affect and memory: A review. *Psychological Bulletin, 99*(2), 229-246.

Brougham, R.R., Zail, C.M., Mendoza, C.M., & Miller, J.R. (2009). Stress, sex differences, and coping strategies among college students. *Current Psychology, 28*(2), 85-97.

Carr, N. (2011). *The shallows*. New York, NY: W.W. Norton & Co.

Carver, C.S., Scheier, M.F., & Weintraub, J.K. (1989). Assessing coping strategies: A theoretically-based approach. *Journal of Personality and Social Psychology, 56,* 267-283.

Courtois, C., Mechant, P., De Marez, L., & Verleye, G. (2009). Gratifications and seeding behavior of online adolescents. *Journal of Computer-Mediated Communication, 15*(1), 109-137.

Creswell, J.W. (2009). *Research methods*. Thousand Oaks, CA: Sage.

Ellis, A. (2007). *Overcoming resistance*. New York, NY: Springer.

Frueh, C. & Rosen, G. (2010). *Clinician's guide to posttraumatic stress disorder*. Hoboken, NJ: Wiley.

Fu, W-T. & Pirolli, P. (2007). SNIF-ACT: A cognitive model of user navigation on the world wide web. *Human-Computer Interaction, 22,* 355-412.

Galanter, M. & Kleber, H.D. (2010). *Psychotherapy for the treatment of substance abuse*. New York, NY: American Psychiatric Publications.

Greenberg, J. & Pyszczynski, T.A. (2004). *Handbook of experimental existential psychology*. New York, NY: Guilford Press.

Gudjonsson, G. H., Sigurdsson, J. F., Eyjolfsdottir, G. A., Smari, J., & Young, S. (2009). The relationship between satisfaction with life, ADHD symptoms, and associated problems among university students. *Journal of Attention Disorders, 12*(6), 507-515.

Guilmartin, N. (2009). *The power of pause.* New York: John Wiley & Sons.

Gwizdka, J. (2010). Distribution of cognitive load in Web search. Retrieved from http://arxiv.org/ftp/arxiv/papers/1005/1005.1340.pdf.

Hasson, H., Brown, C., & Hasson, D. (2010). Factors associated with high use of a workplace web-based stress management program in a randomized controlled intervention study. *Health Education Research, 25*(4), 596-607.

Helprin, M. (2009). *Digital barbarism: A writer's manifesto*. New York, NY: Harper.

Johnson, S. (2007). *Everything bad is good for you.* San Francisco, CA: Riverhead Books.

Kuorikoski, J. (2009). Simulation and the sense of understanding. *Models and Simulations,* 3, 1-31.

Lavie, N. (2010). Attention, distraction, and cognitive control under load. *Current Directions in Psychological Science, 19*(3), 143-148.

Lin, L. (2009). Breadth-based versus focused cognitive control in media multitasking behaviors. *PNAS, 106*(37), 15221-15222.

Miller, F.P., Vandome, A.F., & McBrewster, J. (2010). *Cognitive load*. New York, NY: VDM Publishing House.

Miller, S.M. (1979). Controllability and human stress: Method, evidence, and theory. *Behavior Research and Therapy, 17*(4), 287-304.

Palus, S.R., Fang, S-R S., & Prawitz, A.D. (2012). Forward, together forward: Coping strategies of students following the 2008 mass shootings at Northern Illinois University. *Traumatology, 18*(4), 13-26.

Plass, J.L., Moreno, R., & Brunken, R. (2010). *Cognitive load theory*. Cambridge, England: Cambridge University Press.

Rutten, L.J., Squiers, L., & Hesse, B. (2006). Cancer-related information seeking: Hints from the 2003 Health Information National Trends Survey (HINTS). *Journal of Health Communication: International Perspectives, 11*(1), 147-156.

Schmeichel, B.J., Vohs, K.D., & Baumeister, R.F. (2003). Intellectual performance and ego depletion: Role of the self in logical reasoning and other information processing. *Journal of Personality and Social Psychology, 85*(1), 33-46.

Selfhout, M.H., Branje, S.J., Delsing, M., ter Bogt, T.F., & Meeus, W.H. (2009). Different types of Internet use, depression, and social anxiety: The role of perceived friendship quality. *Journal of Adolescence, 32,* 819-833.

Strauch, B. (2010). *The secret life of the grown-up brain*. London, England: Penguin.

Sweller, J., Ayres, P., & Kalyuga, S. (2011). *Cognitive load theory*. New York, NY: Springer.

Walker, W.R. & Herrmann, D.J. (2005). *Cognitive technology*. New York, NY: McFarland.

Warcup, S. & Zimmerman, D. (2009). The relevance of information scent to information seeking on the Web. *IPCC*(2009), 1-5.

Warwick, C., Rimmer, J., Blandford, A., Gow, J., & Buchanan, G. (2009). Cognitive economy and satisficing in information seeking: A longitudinal study of undergraduate information behavior. *Journal of the American Society for Information Science and Technology, 60*(12), 2402-2415.

Weinstein, A. & Lejyoeux, M. (2010). Internet addition or excessive Internet use. *The American Journal of Drug and Alcohol Abuse, 36*(5), 277-283.

Ydewalle, G., Nuttin, J., & Lens, W. (1981). *Cognition in human motivation and learning*. New York, NY: Psychology Press.

Zhong, N. (2009). A unified study on human and Web granular reasoning. *ICCI*(2009)*,* 3-4.

Appendix: Dataset

part	test1	test2	floating	fixed	fixtime	floattime	facebook
1	160	162	160	162	58	61	3
2	135	133	133	135	56	66	10
3	148	148	148	148	15	35	20
4	145	145	145	145	40	41	1
5	142	145	142	145	31	32	1
6	162	160	160	162	25	21	0
7	146	144	146	144	52	59	7
8	154	154	154	154	52	58	6
9	164	164	164	164	59	67	8
10	163	166	163	166	27	39	12
11	160	157	157	160	51	70	19
12	145	145	145	145	27	29	2
13	146	146	146	146	28	26	0
14	164	163	163	164	18	18	0
15	162	163	162	163	21	21	0
16	163	165	163	165	48	51	3
17	154	152	152	154	32	40	8
18	154	155	154	155	30	43	13
19	142	141	141	142	17	29	12
20	156	160	156	160	58	50	0
21	142	139	139	142	60	70	10
22	164	169	164	169	57	67	10
23	157	152	152	157	41	45	4
24	161	160	160	161	46	46	0
25	164	164	164	164	58	60	2
26	156	156	156	156	42	40	0
27	135	140	135	140	18	28	10
28	156	151	151	156	27	38	11
29	148	148	148	148	23	35	12
30	156	157	157	156	19	28	9

Name	Label
part	Participant
test1	First Test
test2	Second Test
floating	Score (Floating Condition)
fixed	Score (Fixed Condition)
fixtime	Time (Fixed Condition)
floattime	Time (Float Condition)
facebook	Time Spent on Facebook

Read More from Joy

christallin.com

Join the Conversation

facebook.com/joyandroy/

&

facebook.com/groups/Christallin/