IMPLICIT MEMORY AND FLUENCY EFFECTS IN COMMUNICATION RESEARCH

Temple Northup

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Doctor of Philosophy in the School of Journalism and Mass Communication.

Chapel Hill
2011

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ABSTRACT

TEMPLE NORTHUP: Implicit Memory and Fluency Effects in Communication Research
(Under the direction of Francesca Dillman Carpentier)

One of the fundamental questions researchers in mass communication generally and advertising specifically want to answer is how to measure the effectiveness of a message. The purpose of this dissertation is to highlight the usefulness of implicit memory measures for doing just that. By using the transfer appropriate processing framework as a guide, this dissertation will examine the differences between implicit and explicit memory. This comparison will be done by manipulating both how the ad is encoded and the level of cognitive load the participants are under. Finally, the different types of memory performance will be correlated with attitudes to see if and when memory might serve to predict affect.

In a 2 (encoding: conceptual or perceptual) X 2 (attention: full or divided) between-subjects experimental design, participants were exposed to a series of advertisements embedded on news websites. After performing a distraction task, participants completed one of the following memory measures, depending on which condition they were assigned: conceptual implicit memory, perceptual implicit memory, conceptual explicit memory, or perceptual explicit memory. All participants then completed attitudes measures.

Results suggest that compared to a control group, significant priming occurred in both the conceptual and perceptual implicit memory tests such that those who had seen the advertisements performed significantly better on the memory measures than those who did not see the advertisements. Furthermore, for the conceptual measures, how the information was encoded mattered, as those who encoded the advertisement conceptually significantly outperformed those who had encoded the advertisement perceptually. More importantly, only conceptual implicit memory performance significantly correlated with the attitude measures.

Overall, this dissertation provides evidence that implicit memory measures are important to be used within future advertising research studies. These measures represent an alternative and indirect method to assess advertising effectiveness. Furthermore, this dissertation adds to the literature on fluency effects by suggesting that it is conceptual fluency that mediates the relationship between ad exposure and attitudes toward the brands in the ads.

ACKNOWLEDGEMENTS

If I were ever to accept an Oscar, I would surely get cut off because I enjoy thanking people.

But there are really an incredible number of people who helped to get this dissertation written. First and foremost, I would be remiss—and in trouble—if I didn't thank my wonderful wife, Dalis. It is hard to believe that it has been five years since we left Los Angeles for this crazy adventure called graduate school. Looking back, I don't know if it feels as if we just left yesterday or ten lifetimes ago. Either way, it's been an adventure that I couldn't have made without her. I also want to thank both my and Dalis's parents. They have all been incredibly supportive—both emotionally and financially—and I know this would have been tougher without them.

I next want to thank my chair and advisor, Francesca Dillman Carpentier. When I arrived at UNC, I thought I knew a lot. Francesca has consistently shown me how wrong I was. I thought I knew what priming was. Francesca showed me I had not a clue. I thought I knew that I didn't like scotch. Francesca showed me that I just wasn't drinking the right kind. I truly wish I could stay here a few more years because there is so much more she could teach me. I really could not have asked for a better advisor than she has been. Thank you.

Sri Kalyanaraman was one of the first people I met from UNC. He was sporting a Beatles shirt, drink in hand, at the AEJMC annual conference in Washington. Ever since that first encounter, he has always been extraordinarily generous in sharing his time, energy, and knowledge.

The same night I met Sri, I also met Janas Sinclair. Like Sri, she was incredibly gracious with her time. My first impression of Janas was how nice she was—and that impression could not be more accurate. As I have gotten to know her better, I am also impressed with what a great scholar she is and I thank her for her time and feedback on this project.

I knew very little about memory when I first took Neil Mulligan's memory course. Neil has been very kind in allowing a student with little cognitive psychology background to soak in as much as I can. I look forward to continuing this research with his help.

Last, and certainly not least, I have to thank Keith Payne for being part of this endeavor. My motivation in asking Keith was simple: I could think of nobody better qualified and who knew more about implicit social cognition than he. Keith's productivity and contributions to psychology are inspiring, and I appreciate his taking the time to be part of this dissertation.

I am very grateful for the financial support of the Park Family. The generous gift of the Roy H. Park Fellowship made my scholarship at UNC possible.

Finally, I want to thank everyone at UNC who has helped get me here. Of course, I have to mention the dream cohort. I think it's safe to say no group of students will ever be as awesome as we were—at least, not as awesome as we were in our heads. I also want to specifically thank Rhonda Gibson for all of her guidance over the past few years. Rhonda might like to say that her pets are her children, but I've got news for you, Rhonda: we're your kids, too.

And now I ride off into the sunset, Texas bound. Giddy up.

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Chapter One: Introduction

> *Every morning, after having arrived at work but before actually doing any work, Fred spends at least 30 minutes perusing his favorite websites. He begins with the news, scanning such websites as yahoo.com and usatoday.com. From there, he moves on to some of his favorite sports websites, entertainment websites, and finally, he actually begins to do work…*

In the scenario outlined above, Fred begins his day as many people across the country probably do. Although everyone has his or her own personal favorite websites to be routinely checked, one thing is almost certainly present across all of those sites: advertisements. Despite the increase in the presence of these ads, it is not entirely clear whether they are reaching the consumer as many individuals have developed what has been coined "banner blindness" (e.g., Pagendarm & Schaumburg, 2001). To counteract this inattention, website designers have developed new online advertising techniques, such as pop-ups and pop-unders, but a great deal of traditional advertising research, wherein participants are explicitly asked to recall advertisements to which they had been exposed, has found that banner ads are still not entirely effective when it comes to demonstrating memory for them (Burke, Hornof, Nilsen, & Gorman, 2005). More recent research, in contrast, has found that banner advertising may actually reach consumers in ways not previously realized (Yoo, 2007, 2008, 2010). According to this new line of

research, it is possible that individuals are influenced unconsciously by advertisements and these influences could weigh heavily in later consumer decisions (Yang & Roskos-Ewoldsen, 2007).

The understanding that unconscious influences exert pressure on our behavior is certainly not a new idea in the world of psychology or consumer behavior (e.g., Dijksterhuis, Smith, Baaren, & Wigboldus, 2005). Many if not most everyday consumer decisions (e.g., buying a pack of gum) are surprisingly efficient and occur outside the realm of deep conscious processing (Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Such decisions are open to a number of influences that operate at an unconscious—or implicit—level. It is that implicit influence, and implicit memory in particular, that is the heart of this present dissertation.

Implicit memory is "revealed when previous experiences facilitate performance on a task that does not require conscious or intentional recollection of those experiences" (Schacter, 1987, p. 501). For example, if you were exposed to an advertisement for the gum Orbit, you would later be more likely to list it as the first brand of gum that comes to mind, at least compared to others who had not seen the advertisement. In this way, the "previous experience," which was the viewing of the advertisement, helped to "facilitate performance" on naming the brand "Orbit."

A key component of implicit memory measures—and indeed implicit measures more broadly—is that they are *indirect* in nature. In other words, the memory measure described above did not direct you to think back to a specific episode (the viewing of the Orbit ad); rather, the influence of that prior episode was unconscious as you were unaware that the prior presentation of Orbit contributed to its likelihood of being

mentioned first. This is an important distinction, as the lack of awareness and the general ability for memory to influence thoughts unconsciously closely mimic everyday decision processes more than a deliberative, directed use of memory does.

Therefore, the purpose of this dissertation is to explore implicit memory effects within the advertising context. Although prior research has demonstrated that implicit measures can be useful for gauging advertisement effectiveness (e.g., Parker & Dagnall, 2009), few studies have situated their research within a theoretical framework specific to memory that guided predictions or grounded results. A major contribution of this current endeavor is to do just that by integrating the Transfer Appropriate Processing (TAP) framework to mass communication research (Morris, Bransford, & Franks, 1977). Although the context of this study will be advertising, this framework can be broadly applied to drive predictions related to both explicit and implicit memory for all forms of mediated messages.

It should be noted that the focus of the present research will relate to implicit memory for brand names specifically. Brand names will be used in the stimulus materials and it will be those same brand names that are later tested for with memory tests. Although some could argue that drawing specific attention to the brand name in an online advertisement—as will be done here—is not ecologically valid, because this framework and line of research is relatively new to advertising, it is important to start with the most straight forward research design and add complexity from there. Once this research provides the groundwork for the TAP framework and a basic understanding of implicit memory, more ecologically valid research designs can follow.

Integral to the TAP framework is the understanding that information can be encoded in two distinct manners, either conceptually (meaning-based) or perceptually (features-based), and that encoded information can then be tested with memory measures that are either conceptual or perceptual in nature. The TAP framework predicts that the performance on any given memory measure will be enhanced to the extent that the processing performed at encoding matches the processing engaged at testing. Accordingly, within the advertising context, it would be predicted that when advertisements are encoded conceptually, conceptual memory measures will show better performance than perceptual ones, and vice versa.

Having enhanced performance on implicit memory measures might be an indicator that an advertisement is influencing an individual even when he or she is not aware of that influence and that in turn could be leading to increases in positive affect toward the brand in the ad. This is because enhanced performance on implicit memory measures is associated with the increase in accessibility of the primed items in memory. Accessibility, which is also known as processing fluency, can then translate into an increased liking for an item (e.g., Zajonc, 1968). In other words, it is possible that being exposed to an Orbit advertisement will make an individual like the brand more just because it is more accessible in memory. Therefore, prior exposure to advertisements, in addition to showing effects on implicit memory measures, might also lead to an increase in positive attitudes toward the brands in the ads.

In summary, this dissertation will explore implicit memory measures within the advertising context. Implicit measures, which are indirect in nature, more closely mimic many everyday consumer decisions and therefore may be more appropriate measures to

use as compared to more traditional explicit ones. By incorporating the TAP framework, it will be possible to make the specific predictions that when information is encoded conceptually, performance on conceptually-based memory measures will be enhanced whereas when information is encoded perceptually, performance on perceptually-based memory measures will be enhanced. Furthermore, the mere exposure of a brand through advertising may lead to an increase in fluency of the brand, which will in turn lead to more positive attitudes toward the brand. These effects may be tempered by the amount of attention an individual has to devote to the processing of any given ad, such that a division of attention may negatively affect memory performance and therefore not translate into any changes of attitudes.

Clearly key to this research is an understanding of what is meant by the term "implicit." The remainder of this chapter will provide an overview of implicit cognition. Chapter Two will then provide an overview of memory. Chapter Three will discuss research in advertising that has used some form of implicit memory measures, followed by Chapter Four, which will examine the concept of attention. Attention is an important antecedent for almost any media effect to occur—that is, without there being full attention paid to a message, it is unlikely that message will yield a large influence. Chapter Five will conclude the literature review by highlighting the connection between implicit memory and attitudes based on the prior research that has looked at fluency effects.

Implicit and Explicit Cognition

Conceptually, implicit social cognition is concerned with the unconscious processes that underlie judgments, attitudes, and behaviors. Past research has explored

topics ranging from studies demonstrating that doctors who held more negative unconscious views of African Americans were then less likely to recommend certain treatments for African American patients (Green et al., 2007) to studies showing that subliminally induced feelings of guilt resulted in less self indulgent purchase decisions (Zemack-Rugar, Bettman, & Fitzsimons, 2007). The roots of this implicit cognition research can be found in the work exploring selective attention and implicit memory (see Payne & Gawronski, 2010).

From the attention paradigm, the focus typically explores whether a thought process is automatic or controlled, with the key idea being that information processing can be divided into those that are either controlled or automatic in nature. Controlled processes demand attention, are limited in capacity, and are voluntarily initiated; automatic processes demand little attention, are unlimited in capacity, and are difficult to suppress. In contrast, the implicit memory paradigm focused much more on conscious and unconscious processes rather than controlled and automatic processes. Although in many contexts, the terms controlled/uncontrolled and conscious/unconscious can be used interchangeably, it is important to note that they do not necessarily describe the same phenomenon. As will be made evident, a process that is controlled or uncontrolled refers to an individual's ability to influence the processing that occurs as well as the effects of that processing; in contrast, a process that is conscious or unconscious is one of which a participant is aware or unaware—regardless of whether it can be controlled. Details of this latter perspective will be discussed in greater depth in a later chapter.

A key component, therefore, of implicit cognition research is distinguishing between automatic and controlled processes. In a highly influential article, Bargh (1994)

described the “four horsemen” of automaticity as being lack of awareness, lack of intentionality, lack of controllability, and high efficiency or nonreliance on cognitive resources. Although not all four of these qualities need to be present in order for a process to be considered “implicit,” and indeed there can be varying levels for each of these constructs, a review of each aspect is warranted to further distinguish how implicit processes work and to later tie them in with implicit memory.

Awareness

Of the “four horsemen,” awareness—or lack thereof—is often seen as critical, as it helps to determine other aspects of implicit cognition, such as intention and control. On the surface, being aware or unaware of a process is relatively simple to understand. If a participant is unaware of how an object is influencing a cognitive process, then it can be considered an implicit cognition, whereas if a participant is aware of the process, it is most likely an explicit cognition.

According to Bargh (1994), there are three chief manners in which one can be unaware of how a stimulus material is influencing cognition. The first is absence of awareness of the actual stimulus itself. This typically relates to materials presented subliminally, a scenario wherein participants are unaware simply because the presentation of the stimulus materials is too fast to consciously process. More related to media studies, a second way that an individual can be unaware is if there is not an understanding of how a stimulus material is influencing attitudes, evaluations, or behaviors. For example, if, while Fred is surfing the Internet, he happens to see an ad for Orbit, he may be unaware that his decision to buy a pack of gum later was influenced by that exposure. Finally, it is also possible that the lack of awareness of the influence of stimulus materials will cause a misattribution of an attitude or behavior to an alternative

cause. Thus after having purchased his pack of Orbit, Fred possibly would indicate an alternative reason aside from the banner ad exposure for his purchase—e.g., his last experience with the gum was positive.

Therefore, not being aware of the influence of stimulus materials is a fundamental attribute for a cognitive process to be considered implicit. If a participant is unaware of a stimulus, aware of the stimulus but unaware of its influences, or aware of the stimulus but then misattributes the stimulus's effect to something else, then it can be said that the ensuing process is implicit. Closely tied to awareness are two related concepts: intentionality and control.

Intention & Control

For Bargh (1994), intentionality referred to the extent that one has the ability to engage in a cognitive process. This is similar to but uniquely different from control, which refers to one's ability to override or confirm a process once it has been engaged. In other words, an unintentional process is one that begins automatically—for instance, because of cues in the environment. Any automatically activated processes would be considered implicit, whereas a goal or cognitive process that is engaged consciously would be considered explicit. In contrast, if a process has been initiated automatically or unconsciously, the ability to then confirm that process or override the process would make it controllable, whereas an inability to stop a cognitive process once it has begun would make it uncontrollable.

Returning to Fred and his purchase of Orbit, it is likely that having Orbit readily accessible in his memory made him have generally more positive feelings toward the gum. The influence of the ad is therefore *unintentional*, as the positive affect experienced

from the prior presentation is automatically experienced. This is not to necessarily say, though, that the positive affect brought on by the exposure is uncontrolled. If Fred is aware that he just saw that Orbit banner ad and that it could be coloring his evaluation of Orbit, he could then make a conscious correction to ensure that his feelings are not unduly influenced by this increase in accessibility. In this way, the automatically (unintentionally) activated positive affect could be overridden by conscious thought, thereby making it *controlled*.

Efficiency

The final component of an implicit process is that it is typically highly efficient and requires little cognitive resources. This is in contrast to explicit processes, which typically require thoughtful, effortful actions on the part of the individual. In this way, implicit processes appear to be effortless and tend to occur rapidly. It is clear how efficiency ties directly back with the previous two constructs: intentionality and control. Processes that tend to be unintentional and uncontrolled tend to be highly efficient precisely because they are (usually) operating outside of one's awareness.

Implicit Processes, Automaticity, and Consumer Behavior

Within the consumer behavior literature, there is a great deal of support for the assertion that many decisions by consumers are made automatically or at least have an automatic component. In a nice illustration of this, North, Hargreaves, and McKendrick (1999) demonstrated that when French music was played in a wine store, there was an increase in the sales of French wine; conversely, when German music was played, German wine sales increased. The consumers, presumably, were unaware that the music playing was influencing their purchase decision (in that way, the decision-making process

certainly lacked awareness and intentionality). One important question to ask, then, is under what circumstances do automatic rather than controlled processes tend to direct decisions?

Although a number of models have been used to explain the relationship between automatically activated attitudes and behaviors, one of the most influential is Fazio's (1990) MODE model (Motivation and Opportunity as DEterminants). This model suggests that attitudes influence behavior via two processes—one, a controlled and deliberative process; the other, an automatic process. As the name suggests, motivation and opportunity are the key determinants of whether the controlled or the automatic process is engaged. Motivation refers to a participant's desire or goal to engage in effortful processing. For example, when buying a home, there is probably a greater motivation to actively engage in cognitive processing in order to make a deliberative decision. If the decision is which candy bar to buy, there is probably less motivation to spend a great deal of time thinking about the decision. Opportunity simply refers to the amount of time an individual has to make any given decision. If the decision is made under time duress, then it can be said that the opportunity to make the decision was limited.

Automatically activated attitudes will drive behavior when *either* the motivation or the opportunity to engage in deliberative processing is low. Therefore, regardless of the amount of opportunity one has, if the motivation is low, automatic attitudes will dominate the decision making. Similarly, even with high motivation levels, if there is not adequate opportunity, then automatic processes will lead the way. However, when

motivation and opportunity are high, deliberative processes are likely, which will then result in behavior that may or may not match the automatically activated attitudes.

Fazio's MODE model (1990) has been very successful in describing and predicting a number of different behaviors (e.g., Perugini, Richetin, & Zogmaister, 2010). The implication for consumer research is that it predicts that both motivation and opportunity influence how "controlled" a decision is. If there is a high level of motivation to make a well-reasoned decision then the process is likely to be controlled. However, for most consumer decisions, this strong motivation does not exist. Low involvement decisions in fact dominate most consumer contexts (Laaksonen, 1994; Zaichkowsky, 1985) and it can therefore be expected that implicit influences would be highly predictive of behavior.

Similarly, the MODE model (Fazio, 1990) suggests that a lack of opportunity would lead to a more automatic process. Although typically the lack of opportunity is experimentally manipulated so that decisions *have* to occur rapidly, it is also possible that consumers limit the amount of time taken simply in order to make the purchase decision faster. In other words, although there may not be a true time limitation imposed on that decision of Orbit versus Extra gum, the reality is that nobody would want to spend more than a few seconds on that decision and risk the possibility of never getting finished with the grocery list. In that way, opportunity can be seen as limited in the consumer setting due to the fact that the decision will be made quickly.

In sum, because motivation and (perhaps) opportunity are both low for many consumer decisions, the MODE model (1990) would predict that implicit processes will be highly influential and predictive in determining consumer behavior. It is important,

then, to have a set of measurements that can be effectively used to detect different implicit effects. The purpose of this dissertation is to try to determine if exposure to embedded advertisements can induce different types of processing that then leads to implicit memory effects, which in turn could translate into changes in attitude toward the advertised brand. Of course, for an individual to be influenced by an ad, several steps need to occur. First, there needs to be an ad that is attended to by the consumer. Second, the attended advertisement needs to be processed and stored. Third, the ad needs to be recalled—implicitly or explicitly. The next chapter will discuss that final step, recall, in terms of explicit and implicit memory.

Chapter Two: Memory

Most of the time, if a random individual were asked to define memory, he or she would probably give a definition that roughly maps onto what we can more properly define as "explicit" memory—that is, a conscious recollection of some past event. For instance, many people report that they have vivid memories of their wedding days, 16th birthdays, or other important—and sometimes mundane—events in their lives. A basic and operating definition of explicit memory would be the conscious, deliberative recall or recollection of some prior event or learning episode (Mulligan, 2003).

In contrast to explicit memory stands implicit memory—a domain that has dominated the cognitive psychological literature over the past few decades. Simply put, implicit memory is the unconscious influence of some prior learning episode (Roediger, 1990). In other words, it is the memory for some previously encoded information that we may not be entirely aware of and it therefore exerts its influence in an unconscious way.

Effects related to implicit memory are typically measured by changes in behavior caused by prior exposure, with the change in behavior occurring without conscious or intentional recollection (Mulligan, 2002). This change in behavior, which is typically reflected by the enhanced performance on an implicit memory measure, is called priming. Although the term priming can refer to many different types of measures

or procedures (e.g., Woltz, 2010, for a recent discussion of semantic and repetition priming), at its core, priming relates to the activation of some concept in memory which in turn makes that concept more readily accessible so that it then influences performance on a subsequent task. This increase in accessibility can be reflected in both cognitive and affective measures.

Therefore, when conceptually distinguishing between explicit and implicit memory, two core differences emerge. The first is the conscious aspect of the memory. Explicit memory relates to memories that one consciously thinks about, whereas implicit memories typically operate below the level of consciousness. If someone sees a really compelling story on the evening news about the state of the educational system, it is possible that the following day, he or she will remember that story and consciously think about it and be concerned with the state of education. On the other hand, that same person may not explicitly be thinking of that story the next day, but when asked about a current problem the country faces, will respond that education is very important. Even though that story was not in the conscious memory of the individual, it was still present in its influence.

Though related, the second difference pertains to the intentionality of the retrieval. In explicit memory, one is intentionally thinking back to some prior episode in life and thinking about the details of that event to guide his or her response. In contrast, with implicit memory, the prior event that is influencing the response is doing so without any intentional retrieval of it. Again, using the example of the prior evening's newscast, an intentional retrieval would be generated if asked to directly name the stories that are remembered from the previous night. In contrast, if the influence of the newscast occurs

unintentionally, then education will continue to be at the forefront of memory without ever specifically thinking back to that episode. The lack or presence of consciousness and intentionality, then, is a key distinction between implicit and explicit memory.

Dissociations between Explicit and Implicit Memory

When statistically significant differences occur between implicit and explicit memory—for instance, when there is evidence of implicit memory but no evidence of explicit memory—a memory dissociation is said to occur (Roediger & McDermott, 1993). These dissociations happen when some variable differentially effects one type of memory from the other.

In a rather brilliant demonstration of a memory dissociation, Jacoby (1983) had participants study words (e.g., COLD) under three different study conditions: a) with no context (xxxx-COLD), b) within context (hot-COLD), or c) within a generation context (hot-XXXX). After studying the words under these different conditions, participants either performed explicit memory measures or implicit memory measures. The results clearly demonstrate successful memory dissociation manipulations. For the explicit test, there was robust recall for the generation context, less recall when the word was presented in context, and much less recall when the word was presented with no context. Implicit memory showed the opposite pattern: there was greatest priming in the no context condition, less priming for the context condition, and least priming for the generation condition. Jacoby was therefore able to produce dissociations between implicit and explicit memory depending on the study condition.

This type of dissociation is called a functional dissociation (the two other types of dissociations, which do not relate to the current research, are population dissociations,

e.g., Warrington & Weiskrantz, 1968, and pharmacological dissociations, e.g., Danion, Zimmerman, Willard-Schroeder, Grange, & Silver, 1989). Functional dissociations are caused by differences between or among the encoded information. The dissociation produced in the Jacoby (1983) procedure would be a type of functional dissociation because it was the specific manipulation of how each word was studied that produced the differences.

In fact, the functional dissociation of Jacoby (1983) represents a special type of functional dissociation—the cross-over functional dissociation. It is so named because there were opposite effects on implicit versus explicit memory. In contrast, single functional dissociations effect either implicit or explicit memory bit not both. If the attention of the participants is divided when stimulus materials are presented, explicit memory suffers, whereas implicit memory typically remains the same (Mulligan & Hartman, 1996). In this way, attention is a variable that causes dissociations between explicit and implicit memory. More on this particular dissociation will be discussed in Chapter Four, which looks at attention.

Theoretical Accounts of Implicit Memory

Although there have been a number of different theoretical explanations for implicit memory and the dissociations between implicit and explicit memory, the two most popular are the multiple memory systems explanation and the Transfer Appropriate Processing framework. As will be seen, each has its own strengths and ability to explain the demonstrated dissociations while also not being able to fully explain all of the results.

In many ways, the multiple memory systems is the most straight-forward explanation in that it argues simply that different memory systems control different types

of memory (Schacter, Wagner, & Buckner, 2000). Research suggests that there are at least four types of memory: a) episodic, which is first person remembering of specific events, b) semantic, which represents our factual knowledge of the world, c) procedural, which relates to our ability to learn a skill, and d) perceptual representational system, which relates to our perceptual knowledge. In general, explicit memory would be related to episodic memory, whereas implicit memory can relate to the other three.

Although the multiple memory systems approach explains population (and pharmacological) dissociations well, it is unable to explain functional dissociations. Because functional dissociations are the focus of this research, more time will be spent on the second theory, the Transfer Appropriate Processing (TAP) framework (Morris, Bransford, & Franks, 1977; Roediger, 1990).

According to the TAP framework, memory performance is enhanced to the degree that the cognitive processes engaged at test match the cognitive processes engaged in study. Two main types of cognitive processing are said to occur: conceptual processing and perceptual processing. Conceptual processing relates to an analysis of meaning of an object whereas perceptual processing relates to an analysis of the surface features of an object. These two different types of processing can occur both during the study phase, which would relate to the encoding process, and at test phase, which would relate to the retrieval process.

When an item is encoded conceptually, some sort of meaningful analysis is performed on the object. In this way, a more thoughtful process occurs when the object is being analyzed, a process that tries to assess some sort of meaning from the object. For instance, when looking at an advertisement for Orbit, a conceptual process would be one

that looks at the ad and tries to determine how pleasant the advertisement is. By classifying the ad as pleasant or unpleasant, some semantic processes are engaged and the item is said to be encoded conceptually. In contrast, when an item is encoded perceptually, the analysis of the item is conducted at a much more superficial level, as only surface features of the item are considered. For example, when looking at the Orbit advertisement, it is possible that the only thing noticed is that the ad uses really bright colors. In this way, an analysis of the advertisement is only done to the surface features of the ad rather than an analysis of what the advertisement's meaning is.

In the same way that items can be encoded conceptually or perceptually, memory tests can also be conceptual or perceptual in nature. A conceptual memory test would ask questions that force participants to think about the semantic meaning of the question and response in order to answer the question. A perceptual memory test, on the other hand, would only require a participant to look at the surface features of the question in order to come up with a response. The TAP framework argues that when testing and encoding processing match, memory performance is enhanced. In other words, if encoding is performed in a conceptual manner, performance on a conceptual memory test will be better than performance on a perceptual memory test. Similarly, if encoding is conducted in a perceptual manner, performance will be better on perceptually based tests and worse on conceptually based ones.

As an example of different encoding and testing procedures, let us now return to the Jacoby (1983) study. Considering first the encoding conditions, for those participants who were exposed to the "generation" context, wherein they were given a word (e.g., hot) and had to produce its opposite (cold), it is clear that the encoding process performed on

the generated would be conceptual in nature. After all, it is nearly impossible to think of an opposite of one word without thinking about the meaning of the word. Therefore, when "cold" is generated as the opposite of "hot," a conceptual process must occur. In contrast, when the words are presented without any context, no analysis is likely performed on the word outside of a cursory analysis of the word to establish what word is being presented. In other words, when "cold" is flashed on a computer screen, it is unlikely that a participant would semantically analyze the word unless instructed to do so. Therefore, those items are presumably perceptually processed.

Similarly, the specific tests used were also conceptual and perceptual in nature. For the explicit test, participants were given a recognition test that asked participants if they recognized a presented word as being one from their earlier study phase. A recognition measure is conceptual in nature (as you have to analyze the meaning of the word in order to determine if you saw it earlier) and it therefore fits the TAP framework that those who had encoded information conceptually performed well on this conceptual measure whereas those who had encoded the words in a perceptual manner performed worse. For the implicit test, a perceptual identification procedure was used, which flashes a word momentarily (33 ms) and asks for participants to recognize the word. Because the word is flashed at a rate that makes it nearly impossible to identify, only a feature analysis can be performed, which makes it a perceptual test. It is not surprising, then, that those who had encoded the words perceptually performed better on the test than those who encoded the word conceptually.

According to the TAP framework and well illustrated in the Jacoby experiment (1983), most explicit memory tests rely on conceptual processing whereas most implicit

memory tests rely on perceptual processing. Indeed, in the Jacoby procedure, the explicit test was conceptual whereas the implicit test was perceptual. Because of this, the type of cognitive processing represents a confound to explicit and implicit memory dissociations. In other words, it could be the difference in processing that is causing the dissociation between explicit and implicit memory. It is necessary, then, to use both conceptual and perceptual memory tests to determine if the processing type is the source of the dissociation.

Conceptual and Perceptual Explicit and Implicit Memory Measures

Researchers investigating the TAP framework have identified many implicit and explicit tests that can be conceptual or perceptual in nature. Although most explicit tests typically used are conceptual in nature, as will be seen, it is not difficult to modify directions in order to turn them into implicit tests. After all, the key distinctions between implicit and explicit measures are whether the use of memory is conscious and intentional. Therefore, assuring that the use of memory is unconscious and unintentional will make any explicit test implicit.

For implicit memory, common perceptually based tests include the word-fragment completion (O_b_t for Orbit), the word-stem completion (Or___), lexical decision making (is Orbit a brand or non-brand using response latencies), and perceptual identification (through either degraded images, masked images, or briefly presented images). Each test is perceptual in nature because it strictly requires an analysis of the surface features of the word in order to respond. For example, for the word-fragment completion procedure, all that is required to respond to the word fragment "O_b_t" is to determine that using an "r" and "i" will create the brand; no analysis of what "Orbit"

means is required. The measure is typically implicit in nature because there are no instructions that point back to the study phase to help clue in the participants that they have seen the words before. In this way, any enhanced ability to complete the word fragments can be attributed to the prior presentation.

Common conceptual implicit memory tests include category-exemplar production, general knowledge questions, and word associations. Category-exemplar production measures typically ask participants to name the first item (or items) from a category that comes to mind. For instance, a participant could be asked to name the first brand of gum that comes to mind, with the idea being that items previously encountered (the ad for Orbit) will make it more likely that Orbit will be listed first compared to those who had not seen the ad. Because these measures require an analysis of meaning (that is, an analysis of what the category "gum" means and then what item is the first to come to mind that fits into that category), they are considered conceptual in nature. Furthermore, because there is no direct reference to the earlier study episode, they are implicit in nature.

For explicit memory tests, common conceptual tests include cued recall, free recall, and recognition. Using cued recall as an example, participants could be asked what gum advertisement was presented earlier. This measure is conceptually based because it requires participants to think semantically about any prior ads that they remember. In other words, they are thinking about the ads that they saw earlier and doing an analysis to see which, if any, relate to gum. This measure is also explicit in nature because it is directing participants to think back to their prior exposure. These directions

are in contrast to the conceptually based implicit measures described above where no mention is made of any prior presentation.

Though rare, it is also possible to have a perceptually based explicit test. This is typically done by using an implicit measure but varying the instructions to indicate that the answers could be coming from the study episode. With a word-fragment completion task, participants could be given the same word fragment mentioned above (O_b_t), only instead of merely asking for the fragment to be completed with a brand name, participants could be told that word fragment can be completed with a brand from an advertisement previously encountered. In this way, the measure is still perceptual in nature because participants are still only trying to analyze the surface meaning of the fragment, but it is also explicit because participants will be directing their memory back to the study episode in order to help complete the fragment.

For this dissertation, a conceptual and perceptual implicit and explicit test will be used. For the conceptual implicit measure, a category exemplar production task will be employed, whereas for the perceptual implicit measure, a word-fragment completion task will be used. For the conceptual explicit measure, a cued-recall procedure will be used, whereas for the conceptual implicit measure, a cued word fragment completion task will be used. These specific tests will be used because they are closely related in nature and differ chiefly by instructions. For the conceptual measures, the implicit test will ask for the first brand of (gum) that comes to mind to be listed and the explicit test will ask for the brand of gum from exposure to be listed. These tests are similarly conceptual in nature and so the differences should be that one is direct in nature whereas the other is indirect. Similarly, the perceptual memory measures are literally identical except for the

directions. Having the tests match in this way should make comparisons between implicit and explicit as well as perceptual and conceptual measures more meaningful.

Awareness

In order for the implicit tests to remain implicit, an underlying assumption is that they are indirect in nature and therefore the participants are not aware of a connection between the memory measures and the prior study phase. If participants do become aware of the connection, they may begin to use intentional and conscious recollection strategies (that is, explicit strategies) in order to answer the implicit measures. This phenomenon, known as explicit contamination, threatens the validity of implicit measures (McKone, 1997).

An awareness questionnaire can be used to determine whether participants are test aware (Bowers & Schacter, 1990). A typical awareness questionnaire has increasingly specific questions that try to determine the level of awareness of each participant. In a series of studies, Barnhardt and Geraci (2008) determined that these awareness questionnaires are valid measures and, if anything, are conservative in their estimate of unaware participants. In other words, the questionnaires may put many who were not using intentional memory or were not aware of the connection as being test-aware. However, the fact that these are conservative only points to the worth of their use, as they are highly unlikely to keep any participants who were aware in the unaware group.

The importance of making this distinction between aware and unaware participants was successfully demonstrated in a series of studies by Mace (2003). Mace categorized participants into three groups: test unaware, test-informed (those aware of the

connection but who did not use any intentional retrieval strategies to answer the implicit questions), or test-aware (those who were aware of the connection and used explicit strategies to respond). In his research, for those who encoded the stimuli in a perceptual manner, there were no differences among the unaware, informed, or aware conditions; however, in the conceptual encoding conditions, there were differences between the unaware and informed and also between the unaware and aware conditions, with the informed and aware conditions typically demonstrating more priming. Therefore, under certain conditions, there can be what appears to be a robust priming effect that might be overstated or non-existent if explicit contamination is considered. Consequently, it is critical to use a post-test questionnaire to determine the level of awareness so that groups can be split into aware and unaware groups.

Although implicit memory measures have been developed and used frequently in cognitive psychology literature over the past few decades, they have not been used extensively in communication research generally or advertising research specifically. Because this dissertation plans on addressing implicit memory within an advertising context, an overview of the advertising literature that has used implicit memory measures will be conducted next.

Chapter Three: Implicit Memory in the Advertising Literature

Over the past decade, the advertising literature has paid a slow but steadily increasing amount of attention to implicit memory. This research has provided some interesting and compelling results that will be discussed below. It has also laid the groundwork necessary to establish implicit memory measures as being appropriate for use in the advertising context. The time is now ripe for a strong theoretical framework to be applied to this prior research, which can in turn drive future predictions. The TAP framework (Morris, Bransford, & Franks, 1977) will do just that, as most research conducted thus far can be explained through its lens. Although a full review of all implicit memory research in the advertising literature is outside the scope of this chapter, a number of key studies will be highlighted that are representative of the types of contexts within which this research has taken place, experimental manipulations that have occurred, and outcomes measures that were most often used.

Overview of Past Research

In an early example of implicit memory for advertising research, Shapiro and Krishnan (2001) investigated implicit and explicit memory for print advertisements displayed in magazines. In their experiments, they included two theoretically important manipulations. The first was a manipulation of attention. As will be discussed in the

next chapter, many memory paradigms (e.g., Lang's (2000) limited capacity approach) suggest that dividing attention reduces one's ability to encode an item, leaving little memory for that item. Based on this framework, the authors predicted that dividing attention at presentation of the advertisements would hurt explicit memory; however, they predicted no such effect on implicit memory based upon the prior research that suggested that it remains intact even under divided attention conditions.

The second manipulation used related to the timing of the test. In one condition, participants were tested immediately following exposure; in another, they were tested one week later. Past research (e.g., Tulving, Schacter, & Stark, 1982) has suggested that priming for implicit memory can still demonstrate robust effects even after a long delay. In contrast, explicit measures show delay effects wherein participants have little memory for what was seen earlier. Based on this past research, the authors predicted that explicit memory for the advertisements would decrease over time whereas implicit memory would remain roughly the same.

Shapiro and Krishnan (2001) used a conceptually driven explicit measure of recognition and a perceptually driven implicit measure of forced choice. In this type of implicit measure, participants are forced to choose between two products, one to which participants had been exposed earlier and the other being new. Results for the recognition measure demonstrated strong performance in the full attention, immediate test, whereas performance significantly suffered when attention was divided or testing was delayed. It is important to note that significant priming results were obtained in all conditions for the implicit measure. These results were promising because they demonstrated a dissociation between implicit and explicit memory depending on attention

and time of test. Under conditions that traditionally hurt explicit memory performance, implicit memory was still strong. This research helped to create the argument that relying solely on explicit measures may not be a sound decision.

Yang, Roskos-Ewoldsen and colleagues (2006, 2007) made further significant contributions to implicit memory research when they investigated what is perhaps the most applied use for implicit memory: product placements within movies and advertisements placed in video games. It is easy to understand the interest in both of these. For movies, it is common practice to have companies pay to have their products featured. However, it has been difficult to establish the efficacy of this strategy with explicit measures alone, as products merely featured in the background will almost never be recalled after the movie. Of similar applied importance is their research looking at in-game advertising for video games. Video games bring in more money per year than any other form of entertainment, reach a larger audience, and are particularly popular with younger demographics that advertisers often want to reach. Being able to demonstrate that having products featured within the context of a game enhances memory performance would be a promising result for advertisers.

In their experiments looking at product placement in movies, Yang and Roskos-Ewoldsen (2007) used what they describe as the "level of placement" within the movie as their key manipulation. They defined this manipulation in terms of how noticeable the product was within the movie and operationalized it to have three levels: (a) those products that are in the background, (b) those products that are used by a main character, and (c) those products that have a specific tie-in with the story. Each level should be increasingly noticeable for a viewer and, based on the landscape model framework,

predicted better explicit memory for items that were central to the story than those that were not. Citing previous research in implicit memory, they also predicted that implicit memory performance for items placed in the movies will be better for those who watch the clip than for those who do not (the control group).

To measure memory, Yang and Ewoldsen (2007) used a conceptually driven explicit test (product recognition—was the product present or not?) and a perceptually driven implicit test (word-fragment completion). As predicted, for the explicit test, only those products that were heavily featured in a storyline were recognized as being present in the movie. Unlike the recognition test, though, the word-fragment completion test showed robust priming at all three levels. These results replicated the previous work of Yang, Roskos-Ewoldsen, Dinu, and Arpan (2006), who similarly found very low recognition for those brands placed within video games whereas implicit memory performance was robust. Together, these results are encouraging, as they demonstrated that for an implicit memory measure, priming can be detected in situations where there is virtually no explicit memory for what was seen. In this way, the authors were detecting memory in situations in which prior research would have demonstrated none.

In a more recent series of studies, Yoo (2007, 2008, 2010) investigated implicit memory for banner ads seen on the Internet. He, too, used theoretically interesting manipulations. In one study, Yoo manipulated what he referred to as "processing effort." In the design, participants were exposed to a webpage with a single news story on it and a banner ad. In the low processing effort condition, participants were told that they would be asked a question after looking at the webpage that was strictly about the story. In the high processing condition, the participants were told that they would be asked about the

entire webpage, including any advertisements. In another study, Yoo also directed attention toward the ad or let the exposure be "incidental" and merely a reflection of seeing the ad. In both cases, the manipulations are similar to those that relate to attention, as it can be argued that participant attention is higher when directed toward the banner ad than when not directed toward the banner ad.

Yoo (2007, 2008, 2010) used two conceptually driven explicit measures (recognition and recall) and one implicit measure (word-fragment completion) to measure memory for banner ads. As predicted, regardless of how the banner ad was processed (that is, whether participants were directed or not directed to look at it), robust priming occurred for the implicit measure. Similarly predicted was better performance on explicit tests when the banner ads were specifically attended. These results demonstrate that memory dissociations can occur within the online environment and that priming can occur even when attention is directed away from the stimuli.

Many other contexts and measures have been used in implicit memory research within the advertising field (e.g., Coates, Butler, & Berry, 2004, 2006; Finlay, Marmurek, & Morton, 2005; Marks, Tidwell, & Spence, 1991). Although all of these examples and the ones outlined above provide compelling research, they are similar in that they generally use some theory to drive predictions related to explicit memory but rely solely on past research to drive predictions about implicit memory. In other words, predictions related to explicit memory were theoretically driven whereas the predictions related to implicit memory were data driven. The time is appropriate, therefore, to introduce the TAP framework to advertising research as it will help ground results. Indeed, all of the

previous examples discussed confirm the predictions the TAP framework would have made.

Considering first the research of Shapiro and Krishnan (2001), the TAP framework predicts that the division of attention only affects conceptually driven processes. Therefore, their results of conceptual explicit measure performing poorly under a divided condition is unsurprising; similarly unsurprising is that the perceptual implicit measure would show no differences regardless of the level of attention. Shapiro and Krishnan also manipulated time. As with attention, the TAP framework would generally predict that perceptually driven processes are less affected by delays than conceptually driven measures. Therefore, their results conform to this prediction, as only the conceptual explicit memory test was influenced by time.

The results of Yang, Roskos-Ewoldson and colleagues (2006, 2007) also support the TAP framework. In their product placement study, they found that only when the product was heavily featured was there explicit memory for the product. It is easy to understand why: products that are integrated into the storyline would be used and be critical to the development of the story. It is likely, then, that those products would be thought about in a conceptual manner. In other words, if a particular cell phone is critical to saving a hero from disaster, it is likely that someone would pay more attention to that specific product. When using a conceptual explicit measure, only those products that were encoded conceptually should be remembered, which is exactly what was found. Considering the perceptually driven implicit measure, priming was found across levels of placement. This again conforms to the TAP framework. In all conditions, there was at least some encoding of the product, even if entirely superficially. The surface analysis of

the product would be a perceptual process, meaning the items were all encoded at least partially perceptually. When tested later with a perceptual implicit memory test, it only follows that there would be priming for all levels.

Finally, the research conducted by Yoo (2007, 2008, 2010) generally followed predictions that could have been made by the TAP framework. As expected, regardless of how the banner ad was processed, implicit (perceptual) priming occurred; however, only when the ad was specifically looked at was there any enhanced performance on an explicit measure. In all likelihood, when the participants were not directed to look at the ad, it was processed perceptually, and when they were told they may be asked about the ad, it was processed conceptually. This would explain why performance was enhanced on the conceptual explicit test only when participants were directed toward the ad.

Building Upon the Past: The Future of Implicit Memory Research in Advertising

In summary, a small but promising amount of research has been conducted thus far examining implicit memory in an advertising context. This research has set the stage for the next phase of memory research, which is to apply a theoretical framework to help contextualize implicit results and drive predictions. The TAP framework will do just that, as it both explains previous results and can be used to derive future hypotheses. In the current study, specific instructions should encourage participants to encode the ads in a perceptual or conceptual manner.

Based on these manipulations, the following hypotheses can be made:

H_{1A}: For participants who encode an advertisement conceptually, there will be increased performance on an implicit conceptual memory measure compared to those who encode the advertisement perceptually as well as compared to a control group.

H_{1B}: For participants who encode an advertisement conceptually, there will be increased performance on an explicit conceptual memory measure compared to those who encode the advertisement perceptually.

H_{2A}: For participants who encode an advertisement perceptually, there will be increased performance on an implicit perceptual memory measure compared to those who encode the advertisements conceptually as well as compared to a control group.

H_{2B}: For participants who encode an advertisement perceptually, there will be increased performance on an explicit perceptual memory measure compared to those who encode the advertisements conceptually.

As mentioned above, one manipulation that is often performed in memory research (and communication research in general) is to divide attention. It is important, then, to look at attention and some of the ways it has been conceptualized.

Chapter Four: Attention

For any stimulus materials to have any effect on an individual, a necessary first step is for the message to be attended. In other words, no matter how persuasive, compelling, or impressive stimulus materials may be, if the participant does not read, watch, hear, or in some other way process them, they will have no effect. Therefore, an extraordinarily important concept to understand is attention, for without some level of attention, this present research would almost certainly fail. As an important starting point, the theoretical frameworks used to conceptualize attention will be reviewed.

Theoretical Frameworks of Attention

It is possible to think about attention in at least two separate but equally important ways. The first type of attention relates to an initial selection process wherein an individual actively or automatically selects items to process, whereas the second type relates to the continued allocation of resources in order to attend to a specific stimulus (or stimuli). A different terminology for those types of attention would be phasic attention and tonic attention, where phasic attention describes short-term changes in attention and tonic attention relates to on-going changes in attention and resource allocation.

The first type of attention involves the selection of certain stimuli among many toward which attention might be directed. In other words, if an individual is scanning the

Yahoo homepage, there will be any number of items to look at ranging from banner ads, to images, to headlines and beyond. Although it is possible to try to take in a general overview of the entire webpage, it is more likely that one's vision will focus on specific elements of the webpage and move from area to area. This process of selecting information to specifically attend to is the first way to conceptualize attention.

The second type of attention relates to the process of focusing cognitive resources on a specific task. This is typically a more ongoing and effortful process. When surveying the Yahoo homepage mentioned above, perhaps there is a link to a story that is of particular interest. After clicking on the link, one is taken to a new page that has the story but also includes other visuals that accompany the story, links to other stories, new images, and so forth. It takes cognitive resources to focus attention solely on the text of the article of interest and prevent the focus of attention from drifting to other areas. Clearly, maintaining focus is a distinct type of attention from the initial selection described first.

In a classic example from psychology that demonstrates the effects of both types of attention (Cherry, 1953), participants put on headphones that had two different messages being played—one in each ear. The participants were told that they had to "shadow" one of the messages by repeating whatever was being said. In this way, the participants were selecting or directing their attention toward that channel while ignoring the other. The results indicated that participants could tell very little about what was being said in the non-selected channel, often only being able to tell surface features (e.g., if it was a human or animal sound). Furthermore, the more difficult the shadowing procedure, the less information from the non-attended channel could be processed, often

to the point where the participants' names, swear words, and a host of other sounds would be completely missed. The implications from these early studies are twofold and relate to both types of attention: first, we have the ability to direct our attention toward one item and away from another; and second, when we focus our attention on one item, the processing of other stimuli suffers.

According to Broadbent (1958), a two-stage approach of information processing explains selective attention. In the first stage, he argued that all information from the senses is processed but only superficially and that information is put into a "sensory store." The information in the sensory store is then selected or "filtered" and sent to a limited-capacity store where it can be rehearsed to be maintained and eventually stored or where it can be forgotten. In other words, most if not all of the information on the Yahoo homepage is processed in the sensory store, but only certain information (e.g., the headline text) is then selected and filtered into the limited-capacity store to be examined further. Similarly, when listening to headphones that each have their own messages, both channels are processed superficially in the sensory store but only the channels we select to listen to are filtered into the limited-capacity store. Critical to understanding these two stages, therefore, is the determination of which attributes of stimuli create scenarios most favorable to being selected for further attention and processing.

As evidenced by the name, Broadbent's limited-capacity store is unable to hold and process unlimited information. This notion was picked up by Kahneman (1973), whose central tenet was that attention is limited in overall capacity and our ability to carry out multiple tasks depends on how many resources they demand. The idea that our attention and cognitive resources are limited was shepherded into the communication

field most eloquently by Lang (2000), whose influential limited-capacity theory is one of the most cited in all of communication research.

According to Lang (2000), people are information processors and the basic components of processing are to perceive stimuli, attend to those stimuli, and then turn them into mental representations, which can later be reproduced in the same or altered forms. Although we are all information processors, we all also have a limited and fixed pool of mental resources and attention that can be used at any given moment. Whereas certain processes occur without conscious volition, which would relate to the preattentive processing of surface features, others are controlled processes and these require selected attention and resources.

For Lang (2000), three main subprocesses relate to memory, all of which demand attention: encoding, storage, and retrieval. The encoding process relates to the attending of a specific stimulus and focusing attention and processing resources on it. This focusing of attention can be controlled based on an individual's motives or goals, or it can be automatic, such as when an orienting response occurs. An orienting response occurs whenever important, unique, novel, unexpected, or new stimuli are encountered (Lang, 2006). For instance, when scanning the Yahoo homepage, the onset of an animated advertisement might cause an orienting response to occur because the animated ad would be a new item to be processed (in fact, animated ads have been shown to cause orienting responses, see Lang, Borse, Wise, & David, 2002, though they do not always appear to do so, Diao & Sundar, 2004). Dawson, Filion, and Schell (1989) demonstrated that the orienting response causes an allocation of processing resources. In contrast, an individual's motives can cause specific stimuli to be selected, thereby making it a

controlled process. If an individual is motivated to read stories about the economy, then any headline that has a reference to the economy will be selected for further processing. In that way, all of the headlines are entering into the sensory store and being processed superficially, but only the headlines that meet the goal of this individual are being selected.

Once an item has been selectively attended and processed, it can be moved into storage. This process requires attention if it is to be stored in an effective manner. Lang (2006) conceptualizes storage as the linking of newly encoded information with previously encoded information. The more links between the new and old information, the better the storage will be. If not enough allocation of resources occurs while storage is occurring, the item will become poorly stored and potentially inaccessible. Lang argues that motivational relevance leads to the automatic allocation of resources to aid in storage.

Finally, retrieval also takes attention and demands resources because it is conceived to be an effortful process of directing a search to find specific information. Resource allocation can again occur through both controlled and automatic processes. Automatic processes are most likely to take the form of spreading activation. According to Lang (2006), memory can be considered bits of information that are linked (from storage) to each other. When one item is activated, then it also activates related and linked items thereby causing a spreading activation to occur among linked concepts.

In Lang's (2000) conceptualization, each of these processes occurs simultaneously and continuously and draws from the same pool of fixed resources. Whenever the resource demands are more than the resources available, cognitive

overload occurs. This then leads to performance suffering on one, two, or all three of the memory processes. For Lang, each of these processes relates to different memory measures and so it is possible to determine which process is being allocated the most resources based on the different measures. For encoding, Lang argues that a recognition memory measure is most appropriate. Recognition is the most sensitive memory measurement because it provides the item to be recognized to the participant and therefore provides clues that are much more evident than other memory measures. For storage, Lang recommends cued recall as the most appropriate measure as it is the next most sensitive. In cued recall, one specific piece of information is provided as a clue to help aid the recall of the item. Finally, for retrieval, Lang recommends free recall. This least sensitive memory measure indexes how well an individual can recall a piece of information without any cues.

Implications for the Present Research

It is evident through past research that only certain items are selected for further processing and the selection of these items can occur through either a controlled process (e.g., motivationally driven) or through an automatic process (e.g., an orienting response). Once an item is selected for further processing, there is only a limited capacity for allocating attention such that if resources are stressed, attention will not be properly paid and ultimately there will be no memory for the item. Therefore, in a most basic sense, both the initial selection and then subsequent processing must occur for there to be memory of a stimulus. In the present research, selection of items will occur through a controlled process as the participants will be directed to attend to an item on the screen.

According to Lang's (2000) theory, when cognitive processes are overloaded, memory performance will suffer. A common procedure for overloading participants is to divide their attention. Although there are many ways one can accomplish this goal, one relatively simple yet effective way to do this is to have participants memorize a five-digit number string before encoding occurs. Past research (Mulligan & Stone, 1999) shows this to be a successful manipulation in disrupting certain cognitive processes. The limited-capacity approach therefore would predict that whenever attention is divided, memory for the item would suffer.

In direct contrast to this approach, though, the TAP framework predicts that when attention is divided, only conceptually-based measure performance suffers whereas the perceptually-based measures remain relatively unaffected (Mulligan & Hartman, 1996). Whereas the limited-capacity framework predicts that all memory performance will suffer when attention is divided, the TAP framework predicts that only conceptually driven processes will suffer. Therefore, the following competing hypotheses are proposed:

H_{3A}: According to the limited-capacity memory framework, dividing attention at encoding will decrease the performance on any memory measure—explicit or implicit, conceptual or perceptual—compared to the performance of those who have not had their attention divided.

H_{3B}: According to the TAP framework, dividing attention at encoding will decrease later memory performance when the measure is conceptual in nature; perceptually driven measures will show no decreases in performance due to divided attention.

Although showing significant results on implicit memory measures, whether conceptual or perceptual in nature, is an important outcome for any advertising campaign, of ultimate importance for the brands that are creating those campaigns is for attitudes to improve for those products. In addition to having their brands "come to mind" first, as would be indicated by a conceptual implicit memory test, prior exposure could also lead to an increase in positive affect toward the brand. Those effects are what shall be considered next.

Chapter Five: Implicit Memory, Fluency Effects, and Attitudes

One of the key elements of this dissertation is trying to determine not only the conditions in which implicit memory performance will be enhanced within the advertising context, but also to determine if an increase in fluency as indicated by implicit memory measures will translate into an increase in overall affect toward the primed brands. The underlying assumption in fluency research is that whenever someone is exposed to a stimulus item, that item then becomes more accessible in memory. This increase in accessibility then enhances the ease with which the item can be identified—which is known as processing fluency. Past research has suggested that processing fluency is affectively positive so that when an item has increased fluency, there are generally more positive attitudes toward that item (e.g., Hansen & Wanke, 2009).

Just as cognitive processing can, according to the TAP model, be either conceptually or perceptually based, processing fluency can also be conceptually or perceptually based (Tulving & Schacter, 1990). Mirroring conceptual and perceptual processing, conceptual fluency relates to the ease with which an item comes to mind and how quickly meaning can be processed, whereas perceptual fluency reflects how easily and quickly the surface features of an item can be processed. For example, if a participant is exposed to an ad for Orbit, conceptual fluency would be reflected in how

quickly and readily that item comes to mind when the category of gum is considered, whereas perceptual fluency would be reflected in how quickly an image of Orbit could be identified (e.g., if flashed momentarily on a screen).

As is evident, the ideas of processing fluency and implicit memory are very similar. Butler and Berry (2004) highlighted that the mere exposure effect (discussed below) and implicit memory research have been conducted independent of each other yet often reference one another. They argue that because fluency effects tend to occur in situations where no reference is made to the learning episode during the test phase, the procedure can be considered an implicit memory procedure. Because of this, the mere exposure effect, and other fluency effects, can be considered an effect based on implicit memory, which in turn is rooted in an increase in perceptual or conceptual fluency.

Although the effects of perceptual fluency are well-documented and clearly affectively positive in nature (e.g., Mandler, Nakamura, & Zandt, 1987), it is much less clear how conceptual fluency interacts with affect. The little research that does exist (Lee & Labroo, 2004) suggests that conceptual fluency is potentially affectively positive and behaves in a similar manner as perceptual fluency.

A number of different effects in the literature relate to increases in fluency. Two specific ones that are related to the present research will be discussed here: the mere exposure effect and the sleeper effect. Before those are discussed, a theoretical model will be detailed that accounts for these effects.

Perceptual Fluency/Attributional Model

The perceptual fluency/attributional model, developed by Bornstein and D'Agonstino (1992, 1994), suggests that repeated exposure to a stimulus results in

increased perceptual fluency for that stimulus. That fluency, which they argue is the same fluency that enhances performance on implicit memory priming tasks, translates into an increase of positive affect. Furthermore, when people experience that increase in fluency, they do not attribute the fluency to the prior presentation of the stimulus; rather, they will generate an alternative but feasible explanation for the feeling of familiarity. In this way, they will misattribute the reason for their fluency.

For this model, Bornstein and D'Agonstino (1992, 1994) articulate the importance of awareness as a key to understanding the effects of this increased fluency—an awareness of the prior presentation can dampen or extinguish the increase of positive affect. For instance, when stimuli are presented subliminally, there is generally a robust and large increase in positive affect toward those stimuli. By definition, a subliminal presentation is one wherein the participant lacks awareness of what was seen and so a connection between that subliminal presentation and later fluency would not be possible. In contrast, for items presented supraliminally, there still may be an increase in positive affect, but that increase is typically not as pronounced as when the presentation is conducted subliminally. According to Bornstein and D'Agonstino, an awareness of the connection between presentation and fluency explains this reduction.

It is important to note, though, that Bornstein and D'Agonstino (1992, 1994) did not differentiate between conceptual and perceptual processing and how that distinction could lead to differences between conceptual and perceptual fluency. After all, their model is called the perceptual fluency/attributional model, so a consideration of how conceptual fluency plays into the picture is not entirely clear. It can be assumed, then, that when they discuss implicit memory as being the basis of fluency effects, it is most

likely implicit memory as reflected by perceptual encoding or testing. A key question that remains, then, is the relationship between conceptual fluency and affective responses.

The Mere Exposure Effect

Perhaps the most studied and discussed fluency effect is the mere exposure effect (Zajonc, 1968). The mere exposure effect refers to the increase in positive affect for a previously encountered stimulus, with the increase in affect being directly attributed to the prior exposure. According to the perceptual fluency/attributional model (Bornstein & D'Agonstino 1992, 1994), the increase in perceptual fluency caused by those prior exposures causes the increase in positive affect to occur.

In one important study, Mandler, Nakamura, and Zandt (1987) displayed ten irregularly shaped octagons for 2 milliseconds to each participant. Participants were then shown pairs of octagons, one that had been seen before and one new. Some had to indicate which octagon of the two they recognized whereas others had to indicate which they preferred. Consistent with the mere exposure effect, recognition of the octagons was performed at chance but there was a significantly above chance preference for the octagon that had been subliminally displayed.

Mandler and colleagues (1987) also divided participants into two other important groups: one that judged brightness, the other darkness. For those groups, the octagons that had been previously displayed were judged as being either brighter or darker than the octagons not seen. This is extremely important because it lends support to the perceptual fluency/attributional model, as it demonstrates that the mere exposure effect is not limited to judgments of liking or preference. Instead, this increase in perceptual fluency (and here, because the items were presented subliminally, the results can only be attributed to

perceptual and not conceptual fluency) led to a mere exposure effect in which other judgments were misattributed. In other words, judgments of brightness and darkness were not attributed to the actual source—perceptual fluency.

The Sleeper Effect

Perhaps no fluency effect has been more controversial than the sleeper effect (e.g., Pratkanis, Greenwald, Leippe, & Baumgardner, 1988). In the sleeper effect, persuasive messages from a low-reliable source do not initially change attitudes; however, after a delay, those messages are much more effective and do change attitudes (Hovland, Lumsdaine, & Sheffield, 1949). This effect is typically thought to reflect a process wherein participants remember the message but forget the source of that message. In this way, the message is initially discounted because of its source but eventually endorsed once that source is forgotten.

Anecdotally, this effect seems straight-forward. After all, it seems like a fairly common occurrence to remember having read some fact somewhere but not quite remember where that somewhere actually is. In this way, there has been a dissociation over time between memory for the source of the material and memory for the message gained from that source.

Jacoby, Kelley, Brown, and Jasechko (1989) took issue with the interpretation of the sleeper effect as being indicative that the source was forgotten though the message was not. Instead, to explain these and similar findings, Jacoby and Kelley (1987) made the distinction between using memory as an object versus using memory as a tool—a distinction first made by Polyani (1958). In conscious recall, memory is treated as an object that is to be inspected specifically for a memory that can then be described to

others. However, this is not the only way that memory can be used. Jacoby differentiates this use of memory and the use of memory as a tool. When memory is used as a tool, it is used to unconsciously influence the perception and interpretation of a current event. This distinction between memory as object versus memory as tool can be thought of as the difference between attention being placed in the past versus attention being focused in the present. When memory is an object to be inspected, attention is in the past. When memory is a tool, attention is in the present in order to solve some current problem.

Jacoby and colleagues (1989) argued that using a message and consciously recalling its source are separate acts involving different focuses of attention and different retrieval orientations. A failure to recall the source does not necessarily mean that the source has actually been forgotten; rather, it could be that there was not an attempt to recall the source when recalling the message. Unless recollection of the source is really important, the more time that passes, the more difficult recall becomes and the more likely the source will simply be neglected.

Fluency Effects and Advertising

Mere exposure and sleeper effects are just two of many different effects that can be attributed, at least in part, to an increase in fluency associated with implicit memory. Although these fluency effects have not been extensively used in advertising research, it is clear that they could be important outcomes of brand exposures.

In a typical advertising paradigm, an individual is exposed to an advertisement for some product. Although the ad is presumably intended to persuade the individual to buy the product being advertised, it can be assumed that most people tend to discount ads. In other words, in much the same way as people discount political ads because they are

coming from partisan rather than independent sources, it is likely that the messages contained in product ads would also be discounted. After all, it is unlikely that many people would consider Nike to be the unbiased source to turn to when looking for information about shoes.

Using a mere exposure procedure, the increase in fluency attributed to brand exposure through ads should lead to an increase in positive affect. However, if there is an initial awareness of where the fluency is derived from, that affect will probably be offset or eliminated. Based on the work of Jacoby, though, it is possible that after some period of time, when thinking about the product or brand, a nonanalytic strategy using memory as a tool rather than an object will be adopted and the source of the fluency will not be considered. Therefore, it is possible that a sleeper effect in advertising could be created wherein initial affect toward a brand would show no increase after ad exposure but, over time, the affect will increase as the fluency is dissociated with the ad and misattributed to generally positive feelings.

As noted throughout, there has been very little research that has examined the effects of perceptual versus conceptual fluency and how that relates to any of these fluency effects. In one of the few examples in which conceptual and perceptual fluency effects were tested together, advertisements received positive evaluations whether the ads were read or viewed in either a perceptual or a conceptual context (Lee & Labroo, 2004). In other words, conceptual and perceptual fluency operated similarly.

Based on this research, the following hypothesis and research question is posed:

H_4: Participants exposed to advertisements will have more positive attitudes toward the advertised brands than those who were not exposed to the advertisements.

H_5: Perceptual implicit memory performance will positively correlate with attitudes toward brands in the advertisements.

H_6: Conceptual implicit memory performance will positively correlate with attitudes toward brands in the advertisements.

RQ: Will conceptual or perceptual fluency mediate the relationship between exposure to an advertisement and attitudes toward the brand in the ad?

Chapter Six: Methodology

In order to test the hypotheses, a between-subjects with control groups experiment was run with a 2 (encoding) x 2 (attention) factorial design. One factor, encoding, relates to the type of encoding participants engaged in based on specific instructional manipulations; the second factor, attention, relates to the cognitive load the participants were under. The key dependent variables included conceptual and perceptual implicit memory, conceptual and perceptual explicit memory, and attitudes toward the brands. The dependent memory measures were run as between-subjects factors to ensure no cross-contamination. This design allowed for a test of the TAP framework to be performed within the advertising context. Furthermore, by having attitude measures, it could be determined whether perceptual or conceptual fluency correlated with an increase in positive attitudes.

Participants entered into a computer laboratory and first were exposed to various news websites and asked to assess their usability. Some participants viewed the websites with full attention, whereas others had a secondary task to accomplish, which served to divide their attention. After completing the website evaluations, participants took part in a distraction task that allowed them to rate website designs and layouts more generally. Participants then completed the memory measures associated with their condition,

followed by the attitude measures. Finally, participants completed an awareness questionnaire.

Participants

Two hundred forty-two participants were recruited from the research pool of the School of Journalism and Mass Communication at the University of North Carolina, Chapel Hill. Participants from this pool participated in the experiment in exchange for course credit. This sample was predominantly female (N = 198) with an average age of 20.70 (SD = 3.02).

An additional 133 participants were recruited from large, introductory communication courses at the S.I. Newhouse School of Public Communication at Syracuse University. Participants from this pool participated in exchange for extra credit. This sample also skewed female (N = 82) with an average age of 18.95 (SD = .84).

There were no significant differences between the two groups on any dependent variable. Therefore, the groups were collapsed into one group for all hypothesis testing.

Procedure

Participants entered a computer laboratory where they were randomly assigned to a computer pre-loaded with all test materials. On each computer, a Word document was open that contained links for the participants to click on that related to the different components of this research (see Appendix A for a copy of the Word document). After completing an informed consent, participants were told that they were participating in two research studies (see Appendix B for a complete script read by the facilitator). The first research study was explained as an investigation in news website design and usability. Participants would be looking at screenshots from the 21 top online news

websites in order to evaluate how each was designed. Each screenshot would be followed by questions specific to that page. Participants would then have the opportunity to design the layout of their own news website.

After completing the website evaluations, participants were told that they would also be participating in a second research study the purpose of which was to determine what brands are most popular among undergraduates. All of the instructions for both studies were contained within the Word document.

Participants then looked in the Word document and clicked on the link labeled "Study One." This link took participants to an Internet website which opened with a repeat of the general instructions about evaluating top news websites. Participants then evaluated 21 screenshots from different news websites. This was done by having instructions that asked participants to quickly find and click on various components of the website, including the embedded advertisement. A total of 15 target ads was embedded on the websites which were randomly rotated to control for order effects. An additional six buffer ads were seen before and after the target ads to reduce any effects that could be attributed to primacy or recency. Upon completion of the evaluations, the participants were instructed to close the web browser and return to the Word document.

Participants were next presented with a "website creation" task meant to mask the purpose of this study (see Appendix C for the distraction task materials). In this task, participants viewed generic versions of different website layouts and were asked to rate them on a number of different dimensions. This was followed by the participants creating a template for a news website that they believed would be easy to navigate.

Once the short "website creation" task was completed, participants continued in the Word document, where they clicked on a link labeled "Study Two." This link directed them to a new website that was visually dissimilar to the first one. There, they completed the memory measures in accordance with the condition in which they were assigned. Once all of the memory measures were completed, participants were given the attitude measures relating to the previously encountered brands.

Finally, an awareness questionnaire was administered to the participants in the implicit memory conditions. This assessed whether the participants noticed any connections between the study episode (advertisement rating) and the memory measures.

In addition to the sixteen experimental conditions, three control groups existed. The first was the attitude control group, which only completed the attitude assessments measures. The second was a control group who first completed the conceptual implicit measure and then the attitude measure. The third group completed the perceptual implicit measure and then the attitude measure. These three groups served as the baseline against which any effects were compared.

Although a great deal of past implicit memory research has used a within-subjects design wherein two "lists" of study items are created, an "A" and "B" list with one list serving as the baseline prime for each individual, this was not the case here as a between-subjects design with control was deemed more appropriate. In order to create the two A and B lists, a total of 30 embedded advertisements would have needed to be created—15 to use on each list. However, in the development of the appropriate brands discussed below, including 30 advertisements would have been too difficult as these ads needed to look as if they were actually part of the web pages. Therefore, rather than threaten the

validity of the experiment and risk tipping off too many people that the ads they were viewing were created for this project, it was decided that only one list would be created and the control group would serve as baseline.

Stimulus Materials

Stimulus materials were created in two steps. The first step was to create the advertisements that would be embedded on each news website. These ads were created using 15 of the brands determined to be appropriate for priming based on the pilot testing (see below). In addition, another six ads were created to act as fillers.

Once each ad was created, screenshots from the top news websites were created and the ads inserted. In order to do this, screen shots were taken of actual websites (e.g., usatoday.com) and imported into Photoshop. All website screen captures were taken on the same day so that the news items were similar across all websites. In Photoshop, all actual advertisements were removed from the websites. One of the created ads was then placed on the page and filler items inserted to take up any dead space left behind from the removal of the actual advertisements. The edited screenshot was then exported as a new image that appeared very similar to the actual website, only now it had one of the ads relevant to this study. Sample stimulus materials can be found in Appendix D.

Pilot Test to Determine Appropriate Brands

Before the main study was performed, it was first necessary to conduct a pilot test in order to determine appropriate brands to be used. The main reason for this is that if brands are used that have too high of a generation rate to begin with, then it would be impossible to show any sort of priming effect. In other words, if participants generate Nike as the first brand that comes to mind 95% of the time in the baseline condition, then

priming effects would be nearly impossible to establish because the maximum increase possible would be 5% (from 95 to 100), which would be unlikely to be statistically significant with the number of participants used in this research. This is why it was necessary to determine an approximate baseline condition for different brands in categories.

In order to determine these baseline conditions, 30 participants from the same University of North Carolina research pool as the main studies participated in a brand norming study. Participants were given 30 seconds to write down as many brand names (e.g., Nike) as they could for each of 61 product categories (e.g., shoes). Responses were then analyzed to see, per category, which brands appeared most often among the first, second, and third brands listed by the participants

Based on these data, 43 brands were chosen that were all well-known to the participants. Each brand was produced first when prompted between 7 and 45% of the time.

Pilot Test to Determine Word Fragments

Perceptual implicit measures have to be pilot tested in order to ensure that they, too, are not too easy or difficult to be completed. In order to establish this, word fragments were created for 85 different brands, including all 43 of the brands from the first pilot test. Another 30 participants from the same research pool were given 30 seconds to solve each word fragment. If the fragment was not solved in 30 seconds, the computer would automatically advance the participants to the next fragment. If the participants were successful in solving the fragment, they continued on to the next word as soon as the fragment was completed. Based on this pilot test, 15 brand names were

chosen that were previously determined in the first pilot to be acceptable and additionally whose word fragments were not too easily solved (see Appendix E for the list of brand names to be used).

Independent Variables

The key manipulations for this experiment related to the cognitive processing at encoding and attention. Both manipulations occurred between-subjects.

Cognitive Processing at Encoding

Cognitive processing was manipulated through specific instructions given to the participants prior to viewing each ad. In order to induce conceptual encoding of the advertisement, participants were told before viewing the ad that they were going to rate how familiar they were with the brand in the ad. After viewing the ad, participants then answered a familiarity question on a 7-point semantic differential scale (familiar-unfamiliar). This caused the participants to encode the information conceptually as it focused their cognitive processing on thinking about the brand and how familiar they are with it. Presumably, this type of processing is meaning-based.

In order to induce perceptual encoding, participants were told before viewing the advertisement to focus on how readable the brand name was in the ad. After viewing the ad, the participants indicated how readable they thought the ad was on a 7-point semantic differential (readable-unreadable). This caused participants to encode the information perceptually as it focused their attention on structural characteristics of the advertisement and brand name.

Attention at Encoding

Attention was manipulated so that the ads were encoded under full or divided attention. For the participants who encoded the stimuli at full attention, there was no specific mention of attention as they did not perform any secondary tasks. For those who encoded the materials under divided attention, a secondary task was given to the participants to complete at the same time as they were exposed to the stimuli. Past research (Mulligan & Stone, 1999) has shown that a moderately strong division of attention occurs when participants have to remember a 5 digit string of numbers. Participants therefore were told that prior to seeing each question about the website, they would be presented with a 5 digit number string (e.g., 78023). When they saw the 5 digit display, they were to memorize it and then recall it after answering the questions about the website.

Dependent Variables

There are five key dependent variables: conceptual implicit and explicit memory, perceptual implicit and explicit memory, and attitudes toward the brands presented in the ads. Because the presentation of any one of the memory measures before another would present a confound, they were run as between-subjects variables with the attitude measure following the memory measures. Additionally, there were control groups for the implicit memory measures as well as the attitude measures. A discussion of how the memory measures were calculated follows the description of each of the memory measures.

Conceptual Implicit Memory

To gauge performance on a conceptual implicit memory test, a category exemplar production task was used. Participants were told that they were going to be shown 60

product categories (e.g., batteries) and that they were to produce the first brand name that came to mind (e.g., Duracell). It was stressed that they needed to answer the questions as quickly as possible as each category would only be present for a short time. Importantly, the first 20 product categories used were not related to any of the brands previously seen. This should have helped participants get acclimated to the procedure without having any of the brands come to mind from the earlier part of the study. The order of presentation of the 15 target categories was rotated to prevent any order effects. The percentage of previously encountered brands generated served as the outcome variable (see Tables 1 and 2 for descriptive statistics related to conceptual implicit memory).

Conceptual Explicit Memory

To gauge performance on a conceptual explicit memory test, a category-cued recall task was used. Participants were given a list of product categories that corresponded to the brands previously encountered in the advertisement rating task. They were then informed that each product category related to one brand name previously encountered and to recall as many of those as possible. The percentage of correct responses served as the outcome variable (see Table 3 for descriptive statistics related to conceptual explicit memory).

Perceptual Implicit Memory

To gauge performance on a perceptual implicit memory test, a word fragment completion task was performed. In this procedure, 60 brand names were presented as word fragments (e.g., "O_b_t") that the participants had to complete ("Orbit"). These sixty brands corresponded to the 60 categories in the category exemplar production task. Fifteen of the word fragments corresponded to the previously encountered

advertisements. The participants were told to complete the fragment as quickly as possible. The percentage completed with the previously seen brand served as the outcome measure (see Tables 4 and 5 for descriptive statistics related to perceptual implicit memory).

Perceptual Explicit Memory

To gauge performance on a perceptual explicit memory test, a cued word fragment completion task was performed. In this procedure, the 15 target brand names that were presented during encoding were presented as word fragments with instructions indicating that the fragments could be completed by words that were encountered earlier. The percentage correct served as the outcome measure (see Table 6 for descriptive statistics related to perceptual explicit memory).

Calculating Memory Measures

Consistent with past memory research (e.g., Mulligan, 1999), memory performance for each type of memory measure was calculated by collapsing each participant's responses to form one overall memory variable. In the conceptual implicit memory condition, each participant's responses to the fifteen generation cues were coded as either matching the previously seen brand (=1) or not matching the previous brand (=0). In the perceptual implicit memory conditions, each participant's word fragment completion was coded as either completing the word fragment that matched the previously encountered brand (=1) or not completing the word fragment with a brand that matched the previously encountered brand (=0). The responses across the fifteen generations or word fragment completions were then collapsed to create a mean overall response. In other words, if the participant had correctly generated 5 of the 15 brands,

meaning that he or she had correctly matched 33% of the responses, his or her average conceptual memory mean score would be .33. A similar process was used for the explicit memory conditions, with the percent correctly recalled serving as the outcome measure for the conceptual explicit memory measure and the percent of word fragments correctly completed serving as the outcome measure for the perceptual explicit measure.

Attitude Toward Brands

For the attitude assessment measure, participants were given a list of 15 brand names. They then had to rate on a 7-point semantic differential scale their attitudes toward the brand on four dimensions: like-dislike, good-bad, positive-negative, and favorable-unfavorable. Past research has suggested these four dimensions are valid measures of attitudes toward brands (MacKenzie, Lutz & Belch, 1986).

The four items that related to each participant's overall attitude toward each brand were averaged to create a mean attitude toward the brand. Each individual attitude measure was reliable (all alphas above .90). The means of all 15 attitudes toward the brands were then averaged across all brands to create a single, overall mean attitude variable toward all the brands in the experiment. Complete descriptive statistics for each item, along with scale reliability numbers, can be found in Tables 7-9.

Awareness Questionnaire

After completing the implicit memory measures, participants were given an awareness questionnaire. In this questionnaire, five questions were asked that looked to identify participants who may have "caught on" to the purpose of the experiment. The five questions got increasingly specific and should have found any participants who were test aware. This is an important task as past research (Mace, 2003) has shown that those

who are test aware tend to use explicit recall strategies and show more priming than those who are test unaware. In other words, including test aware participants inflates priming results. The questionnaire can be found in Appendix F.

The responses from the 5-item awareness questionnaire were coded to determine if participants were ever aware of the connection between the implicit memory measures and the study phase. Those participants who indicated that they were unaware of any connections, as well as those who indicated that they were aware of a connection but only became aware of the connection after the awareness questionnaire began, were put into the test unaware group (=0). All others were put into the test aware group (=1).

Chapter Seven: Results

The results chapter is broken into the following sections, which are based upon the different dependent variables: conceptual implicit memory, perceptual implicit memory, conceptual explicit memory, perceptual explicit memory, and attitudes. A one-way ANOVA comparing conceptual encoding, perceptual encoding, and a control baseline condition on the conceptual memory measure was first used in order to determine whether any overall priming effects occurred such that those who were exposed to the advertisements during the webpage evaluation task produced the brands from those ads significantly more often than those who had not been exposed to the ad, which would be expected. A similar one-way ANOVA was used with the perceptual implicit memory measure, again with the expectation being that those who were exposed to the advertisements would complete the word-fragments with the brand names significantly more often than the baseline condition.

These analyses were followed with a 2 (encoding) X 2 (attention) ANOVA for both the conceptual and perceptual implicit memory measures. This test was used to determine: a) whether there were significant differences on memory measures based on how the advertisement was encoded, b) whether the participants' attention was full or divided, and c) whether there was an interaction between the two. According to the TAP

framework, it would be expected that memory performance would be enhanced when processing at encoding matches processing at recall. In other words, for conceptual memory measures, those who encoded the information conceptually should have performed better than those who encoded the information perceptually. For attention, it was unclear from past research whether dividing attention would significantly decrease all memory performance or just perceptually-based measures.

Finally, for analyses related to attitudes, bivariate correlations were used to assess whether there were any significant correlations between each type of memory performance and attitudes. Based on prior research, it is expected that perceptual fluency, as indicated by perceptual implicit memory measures, should positively correlate with attitudes. A similar result is predicted for conceptual fluency. Mediation and moderation analysis were also used to determine whether memory performance mediated or moderated the relationship between ad exposure and attitudes.

Conceptual Implicit Memory

The first hypothesis related to conceptual implicit memory (H1A) and proposed that the participants who encoded an advertisement conceptually would demonstrate increased performance on an implicit conceptual memory measure compared to those who encoded the advertisement perceptually as well as compared to a control group. In order to test this, an ANOVA was conducted wherein each encoding condition was treated as a group and contrasted with the control group, thereby creating three groups: conceptual encoding, perceptual encoding, and the control group. Awareness (test aware, test unaware) was also entered into the ANOVA to determine whether that affected

conceptual implicit memory performance, creating a 3 (conceptual encoding, perceptual encoding, control) x 2 (test aware, test unaware) analysis.

There was a significant main effect for both the type of encoding (F (2, 110) = 14.27, $p < .001$) and awareness (F (1, 110) = 6.79, $p < .01$), although not an interaction between the two ($F < 1$). According to Fisher's Least Significant Difference post hoc comparisons, both the conceptual encoding condition (M = .38, SD = .14) and the perceptual encoding conditions (M = .30, SD = .13) were significantly higher than the control condition (M = .18, SD = .10). Furthermore, the conceptual encoding condition was significantly higher than the perceptual encoding condition. These results are exactly as predicted. Looking at the means of the aware versus unaware groups, the aware group (M = .40, SD = .13) performed significantly better than the test unaware group (M = .29, SD = .15). Those who were aware, then, performed better than those who were unaware, suggesting that they were using explicit retrieval strategies to enhance their performance. In order to extinguish this inflation of results, all subsequent analyses performed with conceptual implicit memory measures only used those who were determined to be test unaware.

Accordingly, an ANOVA was again conducted, this time comparing the test unaware participants in the conceptual encoding, perceptual encoding, and control groups with how they each performed on the conceptual implicit memory measure.

A significant main effect of encoding occurred, F (2, 93) = 15.05, $p < .001$. According to Fisher's Least Significant Difference post hoc comparisons, both the conceptual encoding condition (M = .36, SD = .15) and the perceptual encoding condition (M = .29, SD = .13) were significantly higher than the control condition (M =

.18, *SD* = .10). Furthermore, the conceptual encoding condition was significantly higher than the perceptual encoding condition. Hypothesis 1A is therefore fully supported.

The next set of hypotheses that relate to conceptual implicit memory (H3A and H3B) predict that dividing a participant's attention will decrease performance on a conceptual implicit measure. These hypotheses are derived from both the limited-capacity as well as the TAP frameworks. In order to test this, a 2 (encoding: conceptual or perceptual) X 2 (attention: full or divided) ANOVA was conducted.

There was a significant main effect for both encoding (F (1, 52) = 11.69, $p < .01$) and attention (F (1, 52) = 5.32, $p < .05$), although not the interaction between the two ($F < 1$). Results indicate that those in the conceptual encoding condition (M = .36, SD = .12) performed better than those in the perceptual encoding condition (M = .27, SD = .12), which confirms the previous one-way ANOVA already performed. Results also indicate that those with full attention (M = .33, SD = .13) performed better than those with divided attention (M = .28, SD = .12). Hypotheses 3A and 3B are therefore supported for conceptual implicit memory as those in the divided attention conditions performed significantly worse than those who encoded with their full attention.

In summary, results related to conceptual implicit memory measures suggest that significant priming occurred in both encoding conditions, such that regardless of how one encoded the information, performance on the conceptual implicit memory measure was above the baseline control group. Furthermore, how the information was encoded mattered, as those who encoded the information conceptually outperformed the perceptual encoding group. This finding is consistent with the TAP framework, as matching encoding and testing processes generally enhanced performance. Finally,

dividing attention appeared to have negatively affected memory performance, consistent with both TAP and limited-capacity frameworks.

Perceptual Implicit Memory

The first hypothesis related to perceptual implicit memory (H2A) argued that participants who encoded an advertisement perceptually would demonstrate increased performance on perceptual implicit memory measures compared to those who encoded the advertisement conceptually or compared to a control group. In order to explore this, a similar 3 (conceptual encoding, perceptual encoding, control) x 2 (test aware, test unaware) ANOVA was conducted comparing performance on the perceptual implicit memory measure.

There was a significant main effect for both the condition (F (2, 114) = 4.80, $p <$ .01) and awareness (F (1, 114) = 1.79, $p <$ .01), although not the interaction between the two ($F < 1$). According to Fisher's Least Significant Difference post hoc comparisons, both the conceptual encoding condition (M = .28, SD = .15) and the perceptual encoding condition (M = .28, SD = .12) were significantly higher than the control condition (M = .17, SD = .11) for the perceptual implicit memory measure. However, the conceptual encoding condition was not significantly different from the perceptual encoding condition. Looking at the means of the aware versus unaware groups, the aware group (M = .35, SD = .14) performed significantly better than the test unaware group (M = .23, SD = .12). As with the conceptual memory measure, these results suggest that aware participants were using explicit retrieval strategies to enhance their performance. In order to extinguish this inflation of the results, all subsequent analyses performed with

perceptual implicit memory measures used only those who were determined to be test unaware.

Accordingly, an ANOVA was again conducted, this time comparing the unaware participants in the conceptual encoding, perceptual encoding, and control groups on how they each performed on the perceptual implicit memory measure. There was a significant main effect for condition, F (2, 87) = 4.65, $p < .01$. According to Fisher's Least Significant Difference post hoc comparisons, both the conceptual encoding condition (M = .25, SD = .15) and the perceptual encoding condition (M = .27, SD = .10) were significantly higher than the control condition (M = .17, SD = .11) for the perceptual implicit memory measure. However, the conceptual and perceptual encoding conditions did not differ from each other. Hypothesis 1B, then, is partially supported.

For perceptual implicit memory, Hypotheses 3A and 3B were competing, with the limited-capacity framework predicting significantly worse performance when attention was divided whereas the TAP framework predicted no differences should emerge. To test these hypotheses, a 2 (encoding) x 2 (attention) ANOVA was conducted. Results suggest that there were no main effects for either encoding ($F < 1$) or attention, F (1, 58) = 1.33, $p > .05$. These results do not support Hypothesis 3A, which argued that dividing attention would negatively affect memory performance. The results support Hypothesis 3B, though, which stated that dividing attention would cause no negative effects for perceptual memory measures.

In summary, results related to perceptual implicit memory measures suggest that significant priming occurred in both encoding conditions, such that regardless of how one encoded the information, performance on the perceptual implicit memory measure was

above the baseline control group. However, unlike with the conceptual implicit memory measure and counter to the TAP framework, there were no differences between the two encoding conditions on perceptual implicit memory performance. It was predicted that those who encoded the information perceptually would outperform those who encoded the information conceptually on a perceptual implicit memory measure. Furthermore, no differences were found relating to attention. This runs contrary to the limited capacity framework, which predicted that dividing attention would negatively affect any memory measure regardless of encoding condition, and supports the TAP framework, which predicted that dividing attention would not negatively affect perceptually driven measures.

Conceptual Explicit Memory

The first hypothesis related to conceptual explicit memory (H1B) argued that there would be increased performance on an explicit conceptual memory measure for those who encoded the information conceptually compared to those who encoded it perceptually. The other set of hypotheses related to explicit memory (H3A and H3B) were those that, as with conceptual implicit memory, argued that dividing attention at encoding would negatively impact recall on conceptually driven measures.

In order to test these hypotheses, a 2 (encoding: conceptual or perceptual) X 2 (attention: full or divided) ANOVA was run. There was a significant main effect for encoding, F (1, 49) = 6.07, $p < .05$, with those who encoded the information conceptually (M = .81, SD = .15) having performed better than those who encoded the information perceptually (M = .67, SD = .19). Hypothesis 1B is therefore supported and the results

support the TAP framework generally as it predicted that memory performance would increase when the encoding and test processes matched.

There was not a significant main effect for attention, F (1, 49) = 1.30, $p > .05$. Hypotheses 3A and 3B are therefore rejected, since dividing attention did not have a negative impact on conceptual explicit memory performance. These results are not consistent with either the limited-capacity or the TAP frameworks and are highly unusual. In order to further analyze the data to try to determine why there was not an effect when most past research suggests there should be one, another 2 (encoding) x 2 (attention) ANOVA was conducted comparing performance on the conceptual implicit memory measure—this time using only those who were test aware. In this way, the participants were presumably using explicit retrieval strategies—in many ways turning the implicit test into an explicit one. Results from this analysis indicate that there was not a main effect for attention, F (1, 28) = 2.36, $p > .05$. Again, this is highly unusual, as both the limited-capacity and the TAP frameworks would have predicted that a division of attention would have negatively impacted performance on conceptually-driven measures. A more thorough discussion of these incongruous results will take place in the following chapter.

Perceptual Explicit Memory

The first hypothesis related to perceptual explicit memory (H2B) argued that there would be an increase in performance on an explicit perceptual memory measure for those who encoded the information perceptually compared to those who encoded it conceptually. The other set of hypotheses related to perceptual explicit memory (H3A and H3B) were those that, as with perceptual implicit memory, argued that dividing

attention at encoding would either negatively impact later memory performance (limited-capacity framework) or would have no effect on performance (TAP framework).

In order to test this, a 2 (encoding: conceptual or perceptual) X 2 (attention: full or divided) ANOVA was run. There was not a significant main effect for encoding ($F < 1$). These results suggest that regardless of how the information was encoded, performance was similar on perceptual explicit memory measures. This does not support the TAP framework, although the results do mirror those found with perceptual implicit memory.

There was also no main effect for attention, $F < 1$. Therefore, dividing attention at encoding did not cause there to be any lack of performance on the perceptual explicit memory measure. These results do not support Hypothesis 3A, which suggested that dividing attention should hurt memory performance. However, these results support Hypothesis 3B, which predicted performance would not suffer when attention was divided.

Fluency and Attitudes Toward Brands

The first hypothesis related to attitudes toward the brands in the advertisements (H4) stated that those who were exposed to the advertisements would possess more positive attitudes toward the brands in the ads than those who were not exposed to the advertisements. In order to test this, an ANOVA was conducted comparing three groups: a) the true attitude control group who only answered the attitude questions, b) the other attitude control groups who performed the implicit memory measures (conceptual or perceptual) before completing the attitude questions, and c) the experimental groups. Results indicate a significant main effect, $F(2, 127) = 3.35$, $p < .05$. According to Fisher's Least Significant Difference post hoc comparisons, the experimental group had

significantly more positive attitudes (M = 4.94, SD = .57) than the true control group (M = 4.65, SD = .51). The group who completed the implicit measures first did not differ significantly from either group (M = 4.87, SD = .47). This hypothesis was, therefore, partially supported, as those who were exposed to the advertisements experimentally did have higher evaluations of the brands than a control group who did not see the advertisements; however, they did not significantly differ from the group who only completed the implicit memory measures prior to the attitude questions.

The next set of hypotheses (H5 and H6) predicted that perceptual and conceptual fluency would each correlate positively with attitudes toward the brands in the study. To test this, a bivariate correlation was conducted between memory performance (conceptual or perceptual) and attitudes. Because awareness has proven to be an important consideration, all analyses were conducted separately on the test aware and test unaware groups.

Considering first perceptual fluency, regardless of whether the participants were test unaware, test aware, or in the control group, none demonstrated any correlations between implicit memory performance and attitudes (*rs* of .11, .35, and .38 respectively, $p > .05$). These results suggest that unlike the mere exposure effect, which is traditionally thought to be driven by perceptual fluency, when making brand evaluations, perceptual fluency does not seem to have a relationship with attitudes. H5 is therefore not supported.

Considering conceptual fluency next, those who were test unaware demonstrated a moderately strong correlation between implicit memory performance and attitudes, r = .59, $p < .001$. In contrast, those who were test aware did not show any relationship

between memory performance and attitudes, $r = .05$, $p > .05$. Similarly, those who were in the conceptual implicit memory control group who also completed the attitude measures demonstrated no correlation between memory performance and attitudes, $r = .07$, $p > .05$. These results, which support H6, would suggest that conceptual fluency did correlate overall with attitudes but only if participants were unaware of the connection between the memory and attitude measures and the previous exposure to the advertisements. This important difference could suggest that an effect similar to a sleeper effect may have occurred wherein those who were aware of the source of their positive feelings were able to discount those feelings—a topic that will be returned to in the next chapter.

Using Fisher's Z to compare the correlations between conceptual and perceptual fluency and attitudes, results suggest that the correlations are significantly different from each other such that the conceptual fluency correlation is significantly stronger than the perceptual fluency correlation, $z = 3.17$, $p < .01$.

Finally, although no specific hypotheses were created for explicit measures, correlations were conducted between explicit memory performance and attitudes. First, for explicit memory performance on the conceptually driven recall test, there was no relationship between memory and attitudes, $r = .03$, $p > .05$. Next, for explicit memory performance on the perceptually driven word fragment completion test, there was no relationship between memory performance and attitudes, $r = .06$, $p > .05$. These results suggest that performance on explicit measures of memory do not have any relationship with subsequent attitude evaluations.

In summary, results would suggest that of the four memory measures, only conceptual implicit memory performance significantly correlated with attitudes. The research question explored whether implicit memory performance mediates the relationship between ad exposure and attitudes toward the brands in the ads. Because conceptual fluency among test unaware participants was the only condition that significantly correlated with attitudes, mediation and moderation analysis will only be performed with that condition.

Mediation analysis is warranted because conceptual implicit memory performance may lie in the causal sequence between ad exposure and attitudes toward the brands in the ads. Figure 1 depicts the predicted relationships. As can be seen, path *a* represents the effect of ad exposure on conceptual implicit memory performance, path *b* represents the effect of conceptual implicit memory performance on attitudes toward brands from the advertisements, path *c* represents the direct effect of exposure on attitudes, and path *c'* represents the direct effect of exposure on attitudes adjusted for conceptual implicit memory performance. The mediated effect would be the product of *a* and *b*.

Results suggest that the direct effect from advertisement exposure to attitude evaluations (*c*) was not significant, $t\ (121) = .81$, $p > .05$. Although traditional mediation analysis (Baron & Kenny, 1986) would suggest that it is necessary to demonstrate a significant main effect before any indirect effects can be discussed, recent discussions have been highly critical of this approach (see, for example, Zhao, Lynch, & Chen, 2010). Therefore, further analysis will be performed using SPSS syntax developed by Preacher and Hayes (2008) that will give not only all path coefficients, but also

bootstrapped confidence intervals for the indirect path as suggested by Zhao and colleagues.

The coefficient between ad exposure and conceptual implicit memory performance (b = .16) was significant, t (121) = 7.28, $p < .05$, which confirms previous results that suggested significant priming for those who were exposed to the advertisements. Confirming the correlation analysis is the significant path (b = 2.24) between conceptual implicit memory performance and attitudes toward the brands, t (121) = 5.86, $p < .05$. Returning to the direct effect of exposure on attitudes with memory performance taken into account (*c'),* the path (b = -.28) is now significant and negative, t (121) = -2.49, $p < .05$, which suggests a suppression effect may have been occurring that inhibited the direct effect from appearing significant.

Turning now to the indirect effect, the result of the Sobel test suggests that the mediating effect of conceptual implicit memory performance on brand attitudes was significant ($z = 4.54$, $p < .05$). Furthermore, bootstrap results for the indirect effect using 10,000 bootstrap resamples shows an indirect effect within a 95% confidence interval falling between .21 and .52, affirming the significant indirect relationship.

Although these results suggest that implicit memory may mediate the relationship between exposure and attitudes, conceptually it perhaps makes more sense for there to be a moderating relationship. In fact, it could be argued that exposure works as the moderator for memory – that is, memory may always have some sort of relationship with attitudes, but exposure or lack thereof may heighten or dampen that relationship.

In order to test for this moderating relationship, a hierarchical regression was performed with implicit memory performance as well as exposure (0=no exposure,

1=exposure) being entered in Step 1. The two-way interaction between exposure and memory performance was entered into Step 2. A significant two-way interaction would indicate the possibility of a moderating relationship.

According to the results of Step 1 (see Table 10), both exposure (B = -.42, $SE\ B$ = .15, $p < .01$) and implicit memory performance (B = 2.20, $SE\ B$ = .56, $p < .001$) predicted overall attitude performance, $R^2 = .27$, F (2, 46) = 8.56, $p < .01$. The addition of the two-way interaction (B = 2.75, $SE\ B$ = 1.18, $p < .05$) in Step 2 yielded a significant improvement, $\Delta R^2 = .08$, $\Delta F(1,45) = 5.45$, $p < .05$.

Next, simple slope analyses were performed to examine the significant memory X exposure interaction (see Figure 2). Simple slope analysis was conducted to isolate the contribution of exposure in overall attitudes, depending on the level of implicit memory performance. As the figure shows, the slope is larger for the "ad exposure" condition (B = 2.98) than the "no ad exposure" condition (B = .23).

According to subsequent one-tailed *t*-tests (see Aiken & West, 1991, p. 17), the ad exposure slope was significantly different from zero (t (45) = 2.86, $p < .05$), whereas the no exposure slope was not (t (45) = 1.72, $p > .05$). These results suggest that exposure to the ad does indeed act as a moderator enhancing the effects of implicit conceptual fluency.

Returning to the research question, it would appear that ad exposure moderates the relationship between conceptual fluency and brand attitudes. It is likely that this effect only holds for those who are unaware of the connection between their positive attitudes toward the brands and the previous ad exposure. These results suggest that the type of memory accessibility matters when interested in attitudes—in other words,

merely having a brand be accessible is not the same as having that information accessible in a conceptual manner.

Chapter Eight: Discussion

Every day, consumers are bombarded with commercial messages and advertisements. Although these messages can come from a variety of sources—ranging from the sides of buses to inserts in newspapers—one popular method of gaining brand recognition is to use advertisements embedded within websites. Past research, using explicit recall as the most common dependent variable, has suggested that memory for those ads is low. However, almost no past research in the advertising context has explore implicit memory—and those that have used implicit memory measures have done so without a theoretical framework or a recognition that there are different types of implicit memory measures.

The purpose of this research was to demonstrate the usefulness and appropriateness of implicit memory measures for communication and advertising research. Although a significant body of research in communication has used priming as the methodology (for a review, see Roskos-Ewoldsen, Roskos-Ewoldsen, & Dillman Carpentier, 2008), few have specifically used priming with an implicit memory framework. Throughout the following discussion, the argument will be made that implicit memory measures need to be embraced as an alternative, indirect method to gauge the effectiveness of mediated messages. This discussion will begin by discussing

and contextualizing the results as they relate to the TAP framework and implicit memory generally, followed by relating the results to encoding, attention and attitudes. Finally, this chapter will conclude with a discussion of some of the limitations of this study as well as a description of future research.

Implicit Memory Measures

One of the primary purposes of this dissertation was to demonstrate that by exposing participants to embedded advertisements placed on news websites, there would be significant priming such that those who encoded the advertisements would have those brands more accessible in their memories, which would translate to those brands being mentioned first more often (conceptual implicit measure) or used more often to complete word fragments (perceptual implicit measure) when compared to a control group. This is exactly what was found: regardless of whether the implicit memory measure was conceptual or perceptual in nature, significant priming occurred.

It is important to take note that significant priming occurred in both the perceptual and conceptual memory conditions. To date, the vast majority of research in the communication field has only used perceptual implicit memory measures and few have attempted to use conceptual measures. This research, using both types of measures, suggests that exposure to the same advertisement can cause both conceptual and perceptual priming to occur.

Within the TAP framework, distinctions are made between conceptual and perceptual memory measures. Although it is important to recognize that priming occurred in this current endeavor in both types of memory measures, it is also important to think theoretically about what the different types of measures mean and which could

ultimately prove to be more useful in future communication research. In other words, it is important to move beyond merely making the distinction between an explicit/direct measure and an implicit/indirect measure and recognize the important differences between measures based on how the information is being processed at recall.

Speculatively, it could be argued that conceptual implicit memory measures are more important and have higher face validity than perceptual measures, especially in the realm of advertising research. After all, a perceptual measure tends to test one's ability to distinguish structural or surface features; it is difficult to make a strong argument as to why that might be important in advertising research or everyday decision making. There are not many times when having that type of memory fluency available would seem to really make a difference.

On the other hand, it is easy to make the argument that conceptual implicit memory measures are good to use. They measure how accessible items are in memory in a more meaning-based manner than perceptual measures. In fact, in this research, the measure was specifically gauging how frequently the primed brands became the first to come to mind. If advertisers are trying to make an impact with their campaigns, being able to have a brand become the first that comes to mind would clearly be an important outcome. In these ways, conceptual implicit memory measures would seem to be more valid than perceptual measures.

It is important to note that conceptual implicit memory measures could have more face validity because the majority of communication and advertising research using implicit memory measures has tended to use perceptually driven measures. Furthermore, based on the results of this study in regards to attitudes (discussed below), it would

appear that it is conceptual and not perceptual fluency that may have a relationship with attitudes toward known brands. This further adds to the argument that when fluency is going to be assessed within a research study, it should be assessed in a conceptual manner.

Awareness and Implicit Memory

Absent from past communication research using implicit memory measures is the use of any sort of awareness questionnaire. Past research in the field of psychology has demonstrated that awareness questionnaires are valid instruments that are, if anything, conservative in nature in making the distinction between those who are test aware and those who are unaware (Mace, 2003). This distinction is particularly crucial, as evidence suggests that those who are test aware tend to use explicit memory to aid in their taking of the implicit measures, with the net effect being an increase in apparent "implicit" memory performance.

The importance of understanding awareness is made clear if we return to Jacoby and Kelley's (1987) conceptualization of memory, which maintained that memory can be used as an object or as a tool. When used as a tool, focus and attention are on the task at hand and memory works to unconsciously influence behavior. When used as an object, focus and attention are on memory itself as it is consciously searched in order to aid with the task at hand. When used as a tool, one is typically unaware of the influence of memory; when used as an object, one is aware that memory is involved.

Therefore, an indicator of how memory is being used can be demonstrated with the awareness questionnaire. If a participant is aware of the connection between ad exposure and the memory measures, then it is likely that explicit memory is being used—

that is, conscious retrieval strategies using memory as an object. If a participant is unaware, then it is likely that only implicit memory is being used and memory is serving as a tool. After all, returning to the earlier conceptualization of what "implicit" means in the context of memory measures, one of the four key components was a lack of awareness of the influence of memory, along with a lack of intentional use of memory, a lack of control in directing memory, and a high level of efficiency. Respondents who were test aware were failing in those areas, as they were intentionally and in a controlled manner directing their attention back to prior memories in order to aid in their responses.

In this present research, it was demonstrated that for both perceptual and conceptual implicit memory measures, around half of all participants were test aware and made a connection between the study episode (looking at the ads) and the memory measures. For those who were test aware, memory performance tended to be significantly higher than those who were test unaware. This pattern of results is consistent with past research (Mace, 2003). In this way, test aware participants were inflating the results such that more priming appeared to be occurring than actually was. Once those who were test aware were removed from analysis, priming decreased, although it was still significant. Maintaining significant results after aware subjects are removed may not always occur, though, as it is feasible that with those participants removed, significant priming may not have occurred.

It is important that future research within the communications field adopt some version of an awareness questionnaire. The evidence presented here suggests that past communication research using implicit memory measures may be overinflated due to awareness and the alternative explanation that explicit contamination was driving

previous results cannot be ruled out. Clearly, if implicit memory measures are going to be used in the future, awareness must be considered.

Encoding Specificity

In addition to recognizing that memory measures can be conceptual or perceptual in nature, the TAP framework also stresses the importance of distinguishing between conceptual and perceptual encoding of stimulus materials. Conceptual encoding occurs when the item is thought about during encoding in a meaningful manner, whereas perceptual encoding occurs when the item is thought about in terms of its surface features. Thinking about how familiar a brand in an advertisement is would cause conceptual processing; thinking about how readable a brand name is in an advertisement would cause perceptual processing. By thinking about a stimulus material in these different manners, different processing is argued to occur, resulting in different types of memory storage. Results from this research support the TAP framework and point to the importance of considering the type of processing engaged in encoding, as it can significantly affect the outcome measures.

The TAP framework was most evident in the conditions involving conceptual measures, whether those measures were explicit or implicit in nature. The TAP framework predicts that individuals who encode information conceptually will outperform individuals who encode information perceptually when the memory measure is conceptual. This is exactly what was found. For both implicit and explicit conceptual memory measures, those who were given the instructions that encourage conceptual encoding performed significantly better than those who were given the perceptual instructions.

Results therefore confirm that there is a need for a "match" between processing at encoding and processing at recall for conceptual memory measures in the advertising context. This is an important realization, as most research typically has used a memory measure such as recall (which is, of course, conceptually driven) without necessarily thinking about how the information was encoded. It is clear from this research that how information is encoded, even while using such a simple manipulation as the one performed here, will affect the results of the research. Accordingly, when designing messages that will be tested using memory variables, it is important to consider how the information will be encoded, as this may help contextualize and explain results.

Upon initial inspection, it would appear that the TAP framework found less support for the perceptual measures. For both the perceptual implicit and explicit tests, there were no differences in memory performance based upon how the information was encoded. Although this may appear to contradict the basic tenets of the TAP framework, the results actually make sense when approached from an understanding of how information is processed and are consistent with other, similar frameworks, such as levels-of-processing (Craik & Lockhart, 1972).

The very first stage of any information processing is a perceptual analysis. That is, when any stimulus material is analyzed, it must first pass through a perceptual "store" so that it is possible to distinguish what we are actually looking at—from an evolutionary perspective, quickly distinguishing a dangerous lion from an innocuous gazelle. It is likely, therefore, that whenever participants viewed the advertisement, they would have always encoded the information perceptually, regardless of what their specific directions were. In other words, even if they were receiving instructions to think about how

familiar the brand name in the advertisement was, the first step would have been to quickly read the brand name and process it perceptually. Only once that analysis was complete would they continue with the conceptual encoding.

Furthermore, a review of the literature would suggest that differences between encoding conditions yield varying results, with many studies not finding any significant differences on perceptual implicit memory measures based upon encoding (e.g., Challis & Brodbeck, 1992; Roediger, Weldon, Stadler, & Riegler, 1992). It is not entirely surprising, then, that there were no differences between conceptual and perceptual encoding for the perceptual memory measures. In fact, it would have been more surprising had there been no differences for the conceptual measures; however, because the conceptual measures did show significant differences based upon encoding condition, the TAP framework did generally find support in this research. As conceptual measures are probably the more appropriate measures to be used in advertising research, it is important to recognize how encoding can influence results.

In many ways, these results replicate the research of Yang and Ewoldsen (2007) discussed earlier. In their research, they used a conceptual explicit measure and a perceptual implicit measure and analyzed memory performance based upon whether the product seen in a movie was in the background, in the foreground, or part of the storyline. Speculatively, if the product was in the background or the foreground, it would have been encoded perceptually; however, if it was integrated into the storyline, it was probably encoded conceptually as attention was drawn to it and it was seen being used. This is precisely what Yang and Ewoldsen's results suggest, as participants were only able to recall those products that were integral to the storyline but had similar levels of

perceptual memory performance regardless of how the product was placed in the scene. In this way, even if the item was encoded conceptually, it was also encoded perceptually as indicated by the similar levels of implicit performance across conditions.

Yang and Ewoldsen (2007) described their results as being driven by how "noticeable" the product was in the scene, but it is also possible that the differences were based on how the products were encoded. Although this is just one alternative way to explain their results, by framing predictions and results within the TAP framework, a more theoretical account can be created that can then lead to further testing in future studies.

Attention

Based upon previous research, dividing attention during the encoding process was believed to either cause poor later recall regardless of the memory measure because of the limited capacity to process information (Lang, 2000) or, based on the TAP framework, only affect recall when the test was conceptual in nature (Morris, Bransford, & Franks, 1977). Of the four memory conditions (perceptual and conceptual implicit memory; perceptual and conceptual explicit memory), only in the conceptual implicit memory condition did a division of attention affect memory.

The limited capacity framework, then, only found support within one of the four conditions and therefore did not hold up well within this present research. In contrast, the TAP framework received significantly more support, as only the conceptual explicit memory condition did not fit within its predictions. The three other conditions were all consistent with the TAP framework; however, it is highly unusual that a division of

attention would be effective on one conceptual measure (implicit) and not the other (explicit). These results actually call into question the entire attention manipulation.

In fact, there was not an effect of attention in the conceptual implicit memory condition for those who were test aware. Approaching analysis from a different angle, it could be argued that three different conditions used conceptual measures: implicit unaware, implicit aware, and explicit. Both theoretical frameworks would have predicted that attention would negatively impact performance on those memory measures; however, results suggest it only affected those who were unaware in the conceptual implicit memory group. Two possible explanations will be mentioned here for these atypical results. The first is that this is a unique and small effect that only shows up in the unaware conceptual implicit condition. The second, and perhaps more likely, is that the significant findings are occurring because of Type I error.

Considering the first explanation—that there was a really small effect of attention that only occurred with the conceptual implicit measure—these results still do not fit with most past research, as most research has suggested that small attention manipulations tend to affect explicit but not implicit measures (Mulligan & Stone, 1995). This is not to say that there has been no past research that has found unique findings relating to divisions of attention. Recent discussions in psychology have described what has been termed the attentional boost effect (Swallow & Jiang, 2010; Swallow & Jiang, 2011). Swallow and Jiang found that memory performance can actually be equal or better when performing a secondary task. They argued that a transient increase in attention occurred when a secondary task was being performed at the same time as the primary task and that the increase in attention helps to encode the stimulus material. Although their research

procedure is dissimilar from the current one, it is still possible that a similar effect is occurring here. If future research is able to replicate these findings, then it possible that this anomaly is worth further thought. For now, it seems more likely that the second explanation—Type I error—is what happened.

A strong argument that this current manipulation of attention did not work is the large body of past research that has consistently demonstrated that this exact division of attention performed in this research causes dramatic differences for conceptually-based explicit memory measures (e.g., Mulligan, 1998). One potentially important difference between this and much past research with divided attention is that the learning that occurred in the present research was unintentional—that is, the participants were unaware that there was going to be a later memory test. Often, in divided attention paradigms, participants are informed that there is going to be a later memory test so that those in the full attention condition will have and use more cognitive resources to attempt to remember the study items compared to those in the divided attention conditions, who are allocating a great deal of resources to the secondary task. In this experiment, those in the full attention condition may not have processed the advertisements more than those in the divided attention condition because they were not expecting to have to remember the information later.

Another plausible explanation for this lack of effect is that dividing attention task simply was not sufficient because the primary task involved specific instructions that the participants had to follow. That is, the participants were told to think about the advertisement in a particular manner (conceptually or perceptually). Presumably, the participants generally followed the directions and were able to perform the relatively

simple task of rating a brand's familiarity or ease of reading, enough so that the information was encoded to the level required to get significant priming. Having instructions did, in effect, override the attention manipulation.

In retrospect, the results as they relate to attention are not entirely surprising. Having the participants view the material in an unintentional learning design wherein they also have instructions directing them to encode the information in a very particular manner combined to reduce and extinguish any attention effects. Although there did appear to be an effect for the conceptual implicit measure for those who were unaware, this result is likely a Type I error and not truly indicative of an interesting effect. As will be discussed below, this is not to say that these effects are not possible to get, and future research should include a different procedure.

Attitudes and Fluency

Perhaps the most important finding of this research outside of demonstrating the usefulness of implicit memory measures within the advertising context relates to the relationship between memory fluency and attitudes. According to the MODE model (Fazio, 1990), automatically activated attitudes can determine behavior when there is a lack of motivation or opportunity. As discussed earlier, many everyday consumer decisions lack motivation to perform great cognitive analysis. Because of this, unconscious attitudes are likely to play an important role in purchase decisions. Understanding the processes that partially account for those attitudes is an important contribution of this research.

Bornstein and D'Agostino's (1992, 1994) perceptual fluency/attributional model predicts that fluency is affectively positive as long as participants are unaware of the

source of the fluency. This model can be used to explain the mere exposure effect (Zajonc, 1968) wherein the simple act of being exposed to stimuli is enough to cause a subsequent increase in positive affect toward the stimulus materials. Most of this research, though, has been conducted using stimuli that are novel to the participants. For instance, Zajonc showed participants Chinese symbols and then later asked participants to affectively evaluate those as well as previously unseen symbols with the results being that the previously encountered Chinese symbols were generally liked more despite the participants having no ability to recall which they had seen.

Zajonc's (1968) mere exposure effect fits in nicely with the perceptual fluency/attributional model. Because the Chinese symbols are unknown to the participants, the fluency that is gained is perceptual in nature, as only surface feature analysis is really being done on the objects. Therefore, it would seem that increases in perceptual fluency lead to increases of positive affect. Unclear from the past literature, though, was the relationship between conceptual fluency and affect.

The present research was unique in that it involved known and familiar brands, as opposed to abstract objects such as Chinese symbols or novel brand names, which is what most past consumer research has typically used in order to investigate the mere exposure effect. Results from this research suggest that when it comes to fluency and attitudes, conceptual fluency is important and contributes significantly to changes in affect, whereas perceptual fluency does not. The lack of significance for the perceptual fluency was a bit unexpected due to the research that has emphasized its importance. However, because the evaluations in this present research were conducted with known brands, it is

possible that a change in perceptual fluency is not sufficient to cause any change in attitudes.

These results conform well with Jacoby and Kelley's (1987) conceptualization of memory being capable of being used as an object or as a tool. When used as a tool, the focus is on the present task at hand and memory works to unconsciously influence behavior. In the present research, those who treated memory as a tool focused on the attitude questions only and their memory—with increased conceptual fluency—guided their judgments. On the other hand, those who were aware of the connection between the tasks used memory as an object to be searched, helping them to understand the source of their conceptual fluency, which in turn helped to discount any increase in positive affect.

The correlation between conceptual fluency and attitudes found in this study suggest that Bornstein and D'Agnostino's (1992) model could be renamed and conceptualized, dropping the perceptual aspect and focusing instead on fluency and attribution. After all, the results from the conceptual aspect of the experiment fit well with their model.

These results also further corroborate the importance of conceptually driven implicit memory measures. As discussed above, it makes sense that conceptual implicit measures would be a more important outcome variable, as it is hard to imagine a time when being able to perceptually identify a word faster would really be that crucial. Having only conceptual fluency correlate with attitudes would further demonstrate that they are the more appropriate implicit memory measure to be using, at least in consumer research.

The importance of this conceptual fluency becomes even greater when looking at the correlations between attitudes and all of the other memory measures. No other memory measure, whether explicit or implicit in nature, correlated significantly with attitudes. This is particularly important because conceptual explicit memory performance, which would also relate to a type of conceptual fluency, did not correlate with attitudes. Conceptual explicit measures are by far the most common in advertising and communication research, yet these also demonstrated no relationship with attitudes.

Part of this null effect for explicit conceptual fluency could lie with the fact that participants were aware that they had been exposed to advertisements of these brands earlier in the experiment. This could have two possible effects. One, it could cause general annoyance by the participants in having to do an attitude measurement for brands they just saw and therefore rate the brands slightly lower than they would have otherwise. Similarly, they may attempt to discount their attitudes toward the brands because of that previous exposure. In either case, they would counteract whatever positive gains may have occurred due to ad exposure by rating the brands less than they would have if they had been unaware.

Indeed, there is some support for this idea, as it would appear that an effect similar to the sleeper effect may have occurred. In a typical sleeper effect paradigm, participants are given arguments or information from a low credibility source. Over time, they forget the source and only remember the arguments, which results in their beginning to believe the arguments. This is contrasted with when they are aware of the source, in which case they are not persuaded by the messages. Although time is typically seen as an important element of the sleeper effect, Jacoby, Kelley, Brown, and Jasechko (1989)

argued that it was not that time caused participants to forget the source; rather, time caused participants to not think back to the source and rather just use memory as a tool to influence attitudes. In that way, the sleeper effect can be thought of as being driven by awareness rather than memory decay.

With that in mind, a similar effect could have occurred here. For conceptual implicit fluency and attitudes, the correlation was strong for those who were test unaware, whereas there was no correlation for those who were test aware. This suggests that when the participants were aware of the connection between the attitude questions and the ad exposure, they would discount any gains in positive affect associated with the brands. A sleeper effect, then, is being seen, as only for those who were not aware of the connection—that is, those who were not thinking of the source of the message and were therefore using memory as a tool rather than an object—was a correlation shown between fluency and attitudes.

After having conducted the mediation and moderation analysis, it was clear that there is an interesting and complex relationship among exposure, conceptual fluency, and overall attitudes. Results of the mediation analysis would suggest that the effect of advertisement exposure on attitudes was significantly mediated by implicit conceptual fluency. In other words, the effect of advertisement exposure on attitudes worked through implicit memory such that ad exposure influenced conceptual implicit memory performance, which in turn influenced attitudes toward the brands in the ads.

Results from the mediation analysis also seemed to detect a suppression effect. The direct effect of ad exposure on attitudes was not significant when implicit memory was not taken into account; however, with the effects of implicit memory added to the

equation, the path between ad exposure and attitudes became significant—and negative. In other words, once the effect of advertising exposure working through implicit memory to affect attitudes was taken into account, the remaining effect of ad exposure on attitudes was negative. In essence, the positive effect of ad exposure on attitudes working through implicit memory and the negative effect of ad exposure on attitudes cancel each other out when not specifically parsed out, which is why the main effect was not initially significant.

It is interesting that exposure to an ad actually led to more negative attitudes toward the brands in the ad. Speculatively, it would appear that asking participants to participate in some sort of "brand awareness" task (either the brand generation or word fragment completion) followed by a set of attitude measures created a scenario wherein participants rated brands generally more negatively. However, this effect was not large enough that the fluency attributed to the previous exposure could not still play an important role in causing more positive attitudes.

Upon reflection, although the mediation analysis is significant and makes sense, it is possible that rather than conceptual fluency mediating the relationship between exposure and attitudes, exposure is moderating the relationship between conceptual fluency and attitudes. According to regression analysis, this case could certainly be made. Without any exposure to the advertisement, there were no differences in attitudes between those low in fluency and those who were high. However, for those who were high in fluency, there were significant differences such that increases in conceptual fluency led to increases in positive attitudes. In this way, the presence or absence of the advertisement is moderating the relationship between conceptual fluency and attitudes.

Therefore, it would appear that conceptual fluency, as indicated by performance on a conceptual implicit memory test, significantly correlates with attitudes and is moderated by ad exposure. This relationship can only be found for conceptual implicit memory; perceptual implicit memory and all explicit measures showed no relationship with attitudes. This further builds the case that future research should begin to adopt or at least consider using conceptual implicit memory measures.

Limitations and Future Research

Although every effort was made to ensure the best possible design, a number of limitations should be acknowledged. The first relates to the nature of the participants themselves. The sample was entirely composed of undergraduate students and was predominately female. Although there is no reason to believe that the processing effects that were being investigated in this research should be age or gender specific, it would still be desirable to have a more diverse sample. By using two different populations of undergraduate students, it was at the very least possible to say that the results are not location specific. Future research would do well to include a wider range and variety of participants.

The number of participants, at times, also caused issues. Although it was a sizable overall group, once the participants were divided into their respective conditions, there were only about 15 to 20 individuals per cell. This number became even smaller once those who were test aware were removed. It would have been preferable to have a few more participants in order to increase the chances of always finding significant differences.

Another potential limitation relates to the artificial nature of certain components of the research design. The first of these issues is that the websites at which participants were looking were only screenshots. Although these were screenshots from actual websites, using screenshots still creates an artificial web environment. It is, obviously, unusual to look at a website and not be able to click on any of the links or be able to scroll down the page. Future research, when looking to use online advertisements, would be greatly served by creating environments that are most like what users experience in everyday life.

A second artificial aspect of this research is that the encoding manipulations were caused entirely by instructions. Although this appeared to work well, it is an artificial manipulation. After all, individuals are never given instructions on how to look at a webpage whenever they are surfing the internet on their own time.

Finding ways to manipulate the formal structure of the advertisement in order to induce different types of processing is one major line of future research. In advertising research, the ultimate goal is to establish the most effective ways to persuade the target audience. Although it would be nice to be able to literally tell the audience how to encode a message, that is never going to happen. Instead, it is possible to try to explore ways to change the features of the message in order to induce the type of processing in which you are interested.

Thinking first about advertisements embedded on websites, a number of different formal features could be manipulated in order to attract attention to the ad so that it is encoded. One popular way is to have the advertisement contain animation. Past research has suggested that animated ads lead to better recall of ad content (Li & Bukovac, 1999).

Therefore, future research could vary the level of animation on an embedded ad in order to determine if animation presence can change both whether and how the advertisement is encoded, which should translate as differences on memory measures.

The degree to which the advertisement is tailored to the specific individual as well as how well it fits with the website could also be important manipulations. Past research has suggested that individuals may respond more favorably to advertisements when the ads activate in-group salience (Forehand, Deshpande, & Reed, 2002) and participants prefer websites that are highly personalized (Kalynaraman & Sundar, 2006). These both could be important areas for future research. For instance, for the undergraduate students at Syracuse University, it is possible that they would pay more attention and encode differently an ad based on the degree to which it was making them feel personally connected (e.g., generic ad—no connection; ad to college students—some connection; ad to Syracuse students—high connection).

Similarly, relevancy has been shown to be important in attitude formation for internet search portals (Kalyanaraman & Ivory, 2009). It is possible, then, that if the ad is relevant to what participants are looking for or relevant to the webpage more generally, attitudes could be more favorable toward the brand than when the ad is not congruent. Varying the level of congruence, then, might be another formal feature that could be manipulated.

Of course, embedded advertisements on websites are but one vehicle for delivering an ad. Future research could explore how different media are able to differentially have information encoded. Are the results of the product placement studies mentioned above truly being driven by different types of encoding of the products?

Using both a conceptual and a perceptual implicit memory measure might begin to investigate that question.

In an interesting recent study looking at memory for television commercials, Brasel and Gips (2008) used eye-tracking software to determine where viewers of television were looking when fast-forwarding through commercials. Their results suggest that viewers pay considerable attention while fast-forwarding and that their attention is focused on the center of the screen. This makes sense: When fast-forwarding through commercials, individuals have to pay careful attention to the screen in order to hit "play" when the regular program returns. The research of Brasel and Gips suggests that having brand information centered on the screen would operate in a similar way, as the simple ads used in the present research and could positively affect attitudes, presumably due to an increase in fluency. Future research could determine whether fast-forwarding through commercials but having a clearly visible brand logo would increase the conceptual or perceptual fluency of viewers.

Of similar interest could be the recent introduction by Hulu.com to have the option for individuals to rate how "relevant" the ad was that was viewed before watching any of its content. Advertisements on services like Hulu are unique in that they are short and have to be watched before the main content can be viewed. In an effort to make the commercials more personal, Hulu added the "relevant" measure so that the site can only show commercials that the viewer feels are relevant to his or her life. However, results from this present research would suggest that making a simple relevancy judgment, which is conceptual in nature, would mean that the brand was encoded conceptually. Although having this option to rate the ad might have been intended to tailor messages to

each audience member, a potentially stronger outcome might be that it increases the conceptual fluency of the brand, which in turn may influence attitudes. Future research could explore the effectiveness of those types of ads.

Another important research question that would build on the current results would be to explore whether there are specific mode effects. Research in cognitive psychology has typically shown that priming results are mode specific (Roediger, 1990), meaning that receiving a message via audio does not translate to priming in a more visual setting. It could be important, then, to determine what the most effective media outlet would be for an ad's message. If someone hears an ad in a car right before going into the grocery store, is that more or less effective than simply seeing a poster for the same brand as that individual walks into the store? It is possible that visual ads would translate into much stronger priming—a topic worth exploring.

By continuing to vary the type of encoding, future research could also continue to explore the differences between conceptual and perceptual fluency and whether and when one better predicts attitudes. This present research suggests that conceptual fluency mediates the relationship between ad exposure and attitudes; however, prior research outside the advertising context has found perceptual fluency to be important. Future research could continue to determine when different types of fluency are important.

Also important to investigate is how long the prime can last. Past research investigating implicit memory performance has suggested that the durability of the cognitive prime is much longer than a typical affective prime. In fact, implicit memory measures have shown enhanced performance after an entire week has passed (Tulving,

Schacter, & Stark, 1982). An interesting question, then, is to see how long a prime with a known brand would last.

This question is particularly important when thinking about the many messages an individual receives in the course of a day. Future research could explore what Bargh (2006) has termed "second generation" priming questions. If we know that showing the ad for Nike or Adidas primes those brand names, what happens when both are shown to participants? In other words, which "prime" wins? Or would they simply cancel each other out?

The answer to that question could, in part, rely on various moderators that could play an important role in determining the effectiveness of a prime. For instance, familiarity has been used as a moderator in past advertising research (Coates, Butler, & Berry, 2006). Could brand familiarity moderate the effectiveness of the prime, therein setting up a mediation-moderation model of advertising effectiveness?

A final limitation and area for future research that obviously must be mentioned relates to attention. The attention manipulation in this present research almost entirely failed to operate as anticipated. This failure was, presumably, due to the fact that the attention division task could not override the instructions that participants were following. By not having an attentional divide, some key hypotheses were not able to be fully addressed.

Future research should return to explore attention further. This could be done in two ways: a) research that explores ways to capture attention, and b) research that continues to investigate the effects of dividing attention on encoding and later memory performance. The former issue has been discussed above, as changing the formal

features of an ad or website presumably is an attempt to change the degree of attention paid to an advertisement. The latter exploration of the effects of divided attention should not be too difficult knowing to avoid the current missteps.

It is possible that the simple task of removing the encoding manipulation and keeping the 5-digit recall manipulation would be sufficient to divide attention. Additionally, it is possible that creating two groups, an intentional and an unintentional memory group, would provide the necessary manipulation as has been done so often in the psychology field.

Another task that could prove an effective way to divide attention is to create a concurrent task that must be completed at the same time as the task of interest. A common example is to create a monitoring task wherein participants are constantly monitoring a second channel in order to detect changes. Participants could monitor a second screen that displays digits that are constantly changing with the participants having to hit a key each time the number is odd. This forces the participant to pay significant attention to the secondary task at the cost of the primary task. Creating a second task like this would ensure that attention is being taken away from the primary task of looking at the advertisements. This could be particularly effective if combined with the intentional/unintentional manipulation mentioned above.

Another approach that could prove interesting is to not give specific instructions to the participants but instead use eye tracking software to determine the amount of time and presumably attention that was paid to an advertisement. In this way, an attempt could be made to use attention more as a continuous variable in order to determine what the relationship is between amount of attention and memory measures.

Finally, future endeavors could also use behavioral measures as the key dependent variable. Although it is nice to be able to demonstrate that implicit memory performance correlates with attitudes, an even better outcome—especially from the perspective of advertising—is to demonstrate that there could be actual changes in behavior. Although the designs of these types of experiments can be tricky, behavioral outcomes have been used in consumer behavior research in the past (e.g., Strauss, Doyle, & Kreipe, 1994) and so trying to determine the relationship between fluency and behavior could be fruitful.

Conclusion

When thinking about what influences everyday purchase decisions, many possible factors could get someone to pick Orbit out of the sea of gum possibilities. One thing clear from past research, though, is that when motivation is low to carefully think about the decision, automatically activated attitudes tend to carry a lot of influence (Fazio, 1990). It is important to try to determine what processes underlie those automatically activated attitudes and how they can be changed.

Based on the results from this research, one pathway to investigate is the mediated relationship between ad exposure and attitudes, with conceptual fluency acting as the mediator. If increases in conceptual fluency translate into more positive attitudes, it would suggest that understanding the best and most efficient way to increase that fluency would be an effective strategy for marketers and advertisers to explore. This research has only begun to look into these issues. Future research will build upon these results by further investigating the role of perceptual and conceptual fluency within different communication settings.

Tables

Table 1

Descriptive Statistics for Implicit Conceptual Memory Measures in Experimental Groups

Brand	M	SD	Skewness	Kurtosis
Levis	0.42	0.50	0.33	-1.94
Caribou	0.14	0.35	2.16	2.71
Ashley	0.32	0.47	0.79	-1.40
Scope	0.38	0.49	0.53	-1.76
Jared	0.35	0.48	0.63	-1.64
Staples	0.55	0.50	-0.19	-2.01
Swatch	0.27	0.45	1.04	-0.94
Dial	0.25	0.44	1.17	-0.63
Verizon	0.61	0.49	-0.47	-1.82
Orbit	0.48	0.50	0.09	-2.04
Chase	0.11	0.32	2.48	4.23
Payless	0.36	0.48	0.58	-1.71
Enterprise	0.33	0.47	0.74	-1.49
Seventeen	0.23	0.42	1.32	-0.25
Universal	0.36	0.48	0.58	-1.71
Overall	0.34	0.14	0.28	-0.22

Note: Each variable was calculated as a percent of the responses that generated each brand name first, with a possible range of 0 (=brand never generated first) to 1 (=brand always generated first). $N = 91$.

Table 2

Descriptive Statistics for Implicit Conceptual Memory Measures in Control Group

Brand	M	SD	Skewness	Kurtosis
Caribou	0.21	0.41	1.48	0.20
Dial	0.13	0.34	2.27	3.33
Jared	0.16	0.37	1.95	1.92
Orbit	0.11	0.31	2.68	5.46
Ashley	0.13	0.34	2.27	3.33
Chase	0.18	0.39	1.70	0.93
Enterprise	0.29	0.46	0.97	-1.13
Levis	0.47	0.51	0.11	-2.10
Payless	0.37	0.49	0.57	-1.77
Scope	0.32	0.47	0.83	-1.39
Seventeen	0.11	0.31	2.68	5.46
Staples	0.21	0.41	1.48	0.20
Swatch	0.08	0.27	3.25	9.05
Universal	0.26	0.45	1.12	-0.79
Verizon	0.37	0.49	0.57	-1.77
Overall	0.18	0.10	0.33	-0.41

Note: Each variable was calculated as a percent of the responses that generated each brand name first, with a possible range of 0 (=brand never generated first) to 1 (=brand always generated first). $N = 27$.

Table 3

Descriptive Statistics for Explicit Conceptual Memory Measures in Experimental Groups

Brand	M	SD	Skewness	Kurtosis
Levis	0.74	0.44	-1.13	-0.75
Orbit	0.76	0.43	-1.25	-0.46
Payless	0.70	0.46	-0.92	-1.20
Universal	0.87	0.34	-2.27	3.27
Jared	0.69	0.47	-0.82	-1.38
Swatch	0.57	0.50	-0.31	-1.98
Enterprise	0.50	0.50	0.00	-2.08
Ashley	0.93	0.26	-3.35	9.55
Scope	0.76	0.43	-1.25	-0.46
Dial	0.74	0.44	-1.13	-0.75
Caribou	0.83	0.38	-1.84	1.44
Verizon	0.83	0.38	-1.84	1.44
Staples	0.57	0.50	-0.31	-1.98
Chase	0.65	0.48	-0.64	-1.66
Seventeen	0.93	0.26	-3.35	9.55
Overall	0.73	0.19	-0.71	-0.06

Note: Each variable was calculated as a percent of the respondents who correctly recalled each brand as being advertised earlier, with a possible range of 0 (=brand never correctly recalled) to 1 (=brand always correctly recalled). $N = 53$.

Table 4

Descriptive Statistics for Implicit Perceptual Memory Measures in Experimental Groups

Brand	M	SD	Skewness	Kurtosis
Levis	0.37	0.48	0.56	-1.72
Orbit	0.65	0.48	-0.65	-1.61
Payless	0.23	0.43	1.27	-0.39
Universal	0.59	0.49	-0.38	-1.90
Jared	0.18	0.39	1.66	0.77
Swatch	0.01	0.10	9.90	98.00
Enterprise	0.48	0.50	0.08	-2.04
Ashley	0.16	0.37	1.85	1.45
Scope	0.38	0.49	0.51	-1.77
Dial	0.18	0.39	1.66	0.77
Caribou	0.05	0.22	4.14	15.49
Verizon	0.27	0.44	1.08	-0.85
Staples	0.17	0.38	1.75	1.09
Chase	0.24	0.43	1.20	-0.56
Seventeen	0.30	0.46	0.89	-1.23
Overall	0.28	0.14	0.30	-0.12

Note: Each variable was calculated as a percent of the responses that correctly solved the word fragments, with a possible range of 0 (=no correct word fragment completions) to 1 (=all word fragments correctly completed). $N = 88$.

Table 5

Descriptive Statistics for Implicit Perceptual Memory Measures in Control Group

Brand	M	SD	Skewness	Kurtosis
Levis	0.15	0.36	2.04	2.29
Orbit	0.55	0.51	-0.19	-2.09
Payless	0.09	0.29	2.98	7.34
Universal	0.55	0.51	-0.19	-2.09
Jared	0.21	0.42	1.48	0.19
Swatch	0.00	0.00	.	.
Enterprise	0.36	0.49	0.59	-1.76
Ashley	0.09	0.29	2.98	7.34
Scope	0.33	0.48	0.74	-1.55
Dial	0.15	0.36	2.04	2.29
Caribou	0.03	0.17	5.74	33.00
Verizon	0.27	0.45	1.07	-0.91
Staples	0.15	0.36	2.04	2.29
Chase	0.21	0.42	1.48	0.19
Seventeen	0.22	0.43	1.46	0.14
Overall	0.17	0.11	0.81	0.67

Note: Each variable was calculated as a percent of the responses that correctly solved the word fragments, with a possible range of 0 (=no correct word fragment completions) to 1 (=all word fragments correctly completed). $N = 28$.

Table 6

Descriptive Statistics for Explicit Perceptual Memory Measures in Experimental Groups

Brand	M	SD	Skewness	Kurtosis
Levis	0.64	0.49	-0.58	-1.72
Orbit	0.82	0.39	-1.70	0.91
Payless	0.38	0.49	0.50	-1.82
Universal	0.71	0.46	-0.95	-1.15
Jared	0.38	0.49	0.50	-1.82
Swatch	0.11	0.31	2.58	4.82
Enterprise	0.64	0.49	-0.58	-1.72
Ashley	0.22	0.42	1.40	-0.03
Scope	0.65	0.48	-0.67	-1.61
Dial	0.51	0.50	-0.04	-2.08
Caribou	0.18	0.39	1.70	0.91
Verizon	0.45	0.50	0.19	-2.04
Staples	0.49	0.50	0.04	-2.08
Chase	0.25	0.44	1.16	-0.68
Seventeen	0.55	0.50	-0.19	-2.04
Overall	0.48	0.19	-0.21	0.62

Note: Each variable was calculated as a percent of the respondents who correctly solved the word fragment, with a possible range of 0 (=brand never correctly recalled) to 1 (=brand always correctly recalled). $N = 53$.

Table 7

Descriptive Statistics for Attitude Measures in Experimental Groups

Brand	M	SD	Skewness	Kurtosis	alpha
Orbit	6.06	1.25	-1.81	3.78	0.99
Payless	3.88	1.52	0.06	-0.54	0.96
Universal	6.01	1.04	-1.12	1.17	0.97
Jared	4.22	1.46	0.01	-0.31	0.97
Swatch	4.65	1.28	0.03	-0.34	0.98
Enterprise	4.69	1.14	0.18	-0.12	0.97
Ashley	3.96	1.24	-0.13	0.50	0.98
Dial	4.81	1.41	-0.50	0.00	0.97
Caribou	5.13	1.63	-0.81	0.03	0.97
Verizon	5.46	1.60	-0.94	-0.03	0.98
Staples	5.39	1.39	-0.95	0.53	0.98
Chase	4.61	1.36	-0.09	0.12	0.99
Levis	4.83	1.43	-0.36	-0.31	0.96
Seventeen	4.87	1.71	-0.70	-0.36	0.98
Scope	5.25	1.33	-0.58	-0.04	0.98
Overall	4.95	0.60	0.26	0.63	

Note: Each attitude mean is the average of four attitude measures that are measured on 7-point scales, with scores ranging from 1 (= extreme negative evaluation of brand) to 7 (extreme positive evaluation of brand). Alphas are the Cronbach's alpha for the four items that make up each individual mean. $N = 285$.

Table 8

Descriptive Statistics for Attitude Measures in Control Group (no memory measures completed)

Brand	*M*	*SD*	*Skewness*	*Kurtosis*	*alpha*
Orbit	5.49	1.30	-0.58	-0.79	0.96
Payless	3.82	1.47	-0.47	-0.74	0.95
Universal	5.46	1.14	-0.52	0.28	0.96
Jared	4.29	1.38	-0.22	0.24	0.97
Swatch	4.46	1.39	0.55	-0.31	0.98
Enterprise	4.40	1.06	0.28	0.45	0.96
Ashley	3.92	0.63	0.19	4.66	0.91
Dial	4.81	1.31	-0.36	-0.26	0.97
Caribou	5.16	1.44	-0.19	-1.03	0.96
Verizon	5.18	1.63	-0.75	-0.29	0.98
Staples	4.99	1.10	-0.61	0.31	0.96
Chase	4.03	1.26	-0.16	0.68	0.98
Levis	4.73	1.24	-0.70	0.23	0.96
Seventeen	3.99	1.66	-0.06	-0.91	0.97
Scope	5.01	1.42	-0.66	0.51	0.96
Overall	4.65	0.51	-0.61	0.69	

Note: Each attitude mean is the average of four attitude measures that are measured on 7-point scales, with scores ranging from 1 (= extreme negative evaluation of brand) to 7 (extreme positive evaluation of brand). Alphas are the Cronbach's alpha for the four items that make up each individual mean. $N = 35$.

Table 9

Descriptive Statistics for Attitude Measures in Control Group (implicit memory measures completed prior)

Brand	*M*	*SD*	*Skewness*	*Kurtosis*	*alpha*
Orbit	5.94	1.23	-1.24	1.22	0.96
Payless	3.47	1.62	0.22	-1.00	0.95
Universal	6.03	1.12	-0.84	-0.76	0.97
Jared	4.48	1.60	-0.01	-0.53	0.99
Swatch	4.50	1.40	-0.08	-0.63	0.97
Enterprise	4.70	1.19	0.27	0.01	0.96
Ashley	3.92	1.06	0.58	2.10	0.99
Dial	4.49	1.62	-0.07	-0.51	0.99
Caribou	3.66	1.12	-0.75	0.42	0.97
Verizon	5.66	1.68	-1.48	1.77	0.97
Staples	6.15	0.91	-0.79	-0.17	0.98
Chase	5.12	1.54	-0.55	0.13	0.98
Levis	4.83	1.70	-0.35	-0.79	0.98
Seventeen	4.89	1.90	-0.56	-0.94	0.97
Scope	5.27	1.20	-0.34	0.35	0.94
Overall	4.87	0.47	-0.46	1.79	

Note: Each attitude mean is the average of four attitude measures that are measured on 7-point scales, with scores ranging from 1 (= extreme negative evaluation of brand) to 7 (extreme positive evaluation of brand). Alphas are the Cronbach's alpha for the four items that make up each individual mean. $N = 285$.

Table 10

Summary of Hierarchical Regression Analysis for Variables Predicting Overall Attitudes Toward Brands (N=49)

	Step 1			Step 2		
Variables	*B*	*SE B*	β	*B*	*SE B*	β
Block 1						
Memory Performance	2.20	.56	.55*	.23	.99	.06
Exposure	-.42	.15	-.38*	-1.05	.31	-.95*
Block 2						
Memory X Exposure				2.75	1.18	.95*

Note. Step 1: $R^2 = 0.27$, F (2, 46) = 8.56, $p < .01$. Step 2: $\Delta R^2 = .08$, ΔF (1, 45) = 5.45, $p < .05$.

*$p < .05$

Figure Captions

Figure 1. Mediation model proposed where *a* represents the effect of exposure on conceptual implicit memory performance, *b* represents the effect of conceptual implicit memory performance on attitudes toward brands from the advertisements, *c* represents the direct effect of exposure on attitudes, and *c'* represents the direct effect of exposure on attitudes adjusted for conceptual implicit memory performance. The mediated effect would be the product of *a* and *b*.

Figure 2. Results of simple slope analysis exploring the significant memory X exposure interaction predicting average attitudes toward brands. Exposure coded as 0 = no ad exposure, 1 = ad exposure. Memory entails participants' performance on conceptual implicit measures with a possible range from 0 = no implicit conceptual memory for brands to 1 = total conceptual memory for brands. Lines anchored at minimum (= 0) and maximum (= 1) exposure scores.

Figure 1

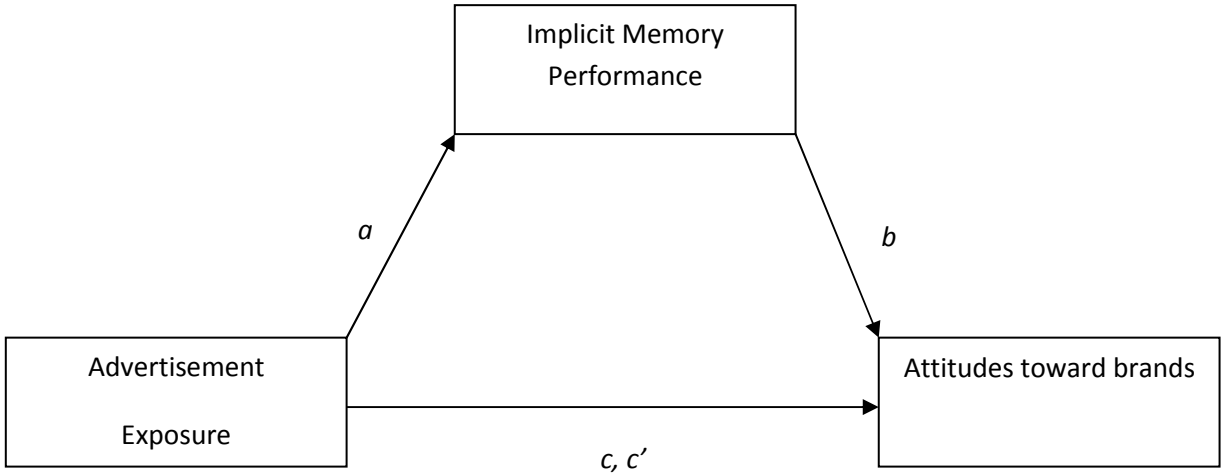
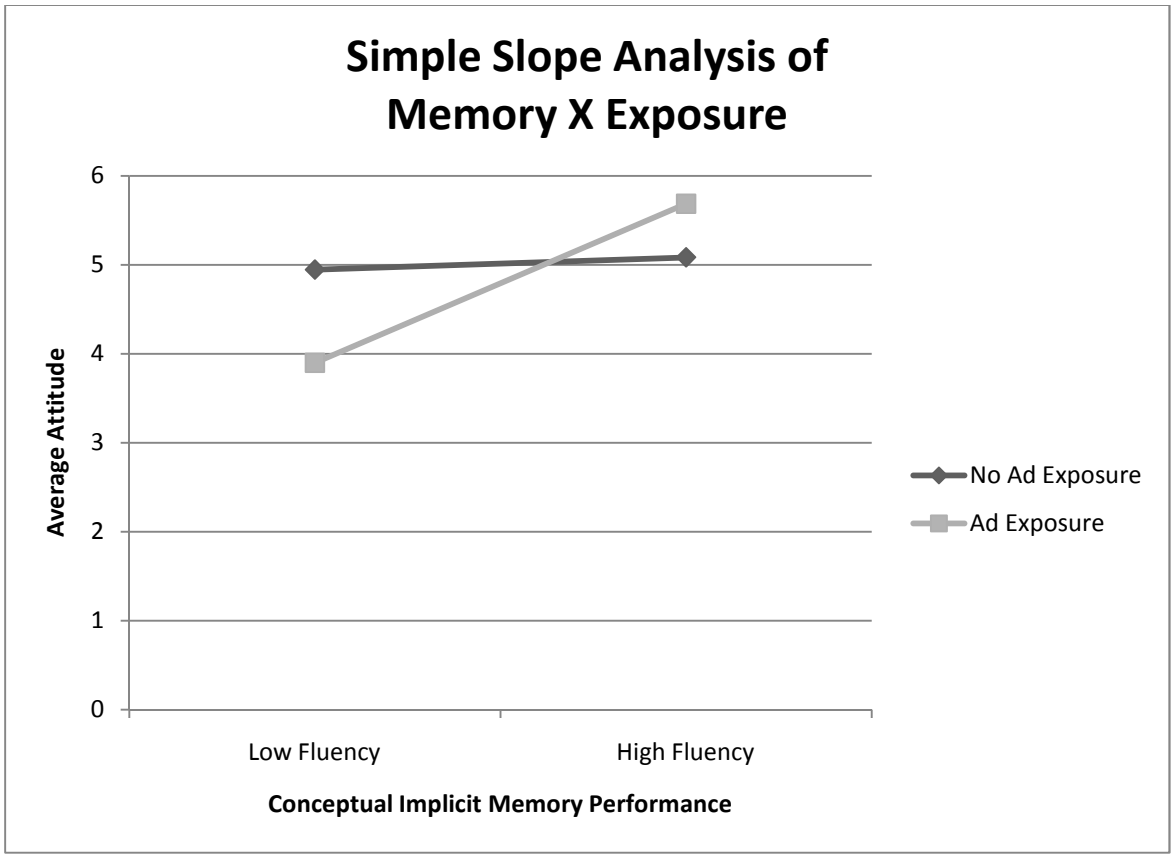

Implicit Memory
Performance
a
b
Advertisement
Exposure
Attitudes toward brands
c, c′

Figure 2


Simple Slope Analysis of Memory X Exposure
6
5
4
3
2
1
0
Average Attitude
Low Fluency
High Fluency
Conceptual Implicit Memory Performance
No Ad Exposure
Ad Exposure

Thank you for participating in our studies. To make sure we keep track of your data while protecting your confidentiality, we'll assign you an ID Number for the course of this study. You will be asked to enter it into a both questionnaires. **Please only enter this ID number, not your PID, onyen, etc.**

Your participant ID is:

Please read and sign the consent forms for all studies and turn them over and place them next to your computer.

Once you have signed the consent form please STOP here. Wait until the experimenter has told you to begin the studies before scrolling down.

STUDY 1:

News Website Usability

The first study you will be participating in is looking to investigate how well different news websites are designed. Specifically, we are interested in how focusing on different types of tasks while looking for specific features on a website impacts your views of them.

To access this study, please click on the following link. Once you have completed the survey, you will be instructed to return to this document for further instructions.

[SURVEY LINK HERE]

Next, you will have the opportunity to design your own news website layout. Open on this computer is an Adobe Illustrator file with your participant ID number as the name of the file. Please click on that open file

that can be found on the task bar below and follow the instructions on that screen. Once you have completed that task, you can return to this document to scroll down to the final research study.

DO NOT CONTINUE TO THE NEXT STUDY UNTIL YOU HAVE COMPLETED THE TASK IN ADOBE ILLUSTRATOR!!

STUDY 2: Brand Attitudes

The second study you will be participating in today is looking to investigate what brands college students are most familiar with as well as your attitudes toward a few important brands. Please click on the following link, which will take you to the survey:

[SURVEY LINK HERE]

Thank you very much for your participation. This is the end of the survey. Please gather your possessions and exit quietly, remembering to sign your name on the participation sheet found at the front of the classroom before leaving.

Appendix B

Script for Research Facilitator

Thank you for being here today. You are about to take part in two separate research studies. The first is going to be getting your opinions about the layouts of different news websites. The second is going to be looking at how popular different brands are among college students. Before we begin, the first thing you need to do is read through and sign the informed consent form that was at your desk when you sat down. Please carefully read through this form and, if you have no questions, sign the form. By signing the form, you are indicating that you have read it, have no questions, and are willing to participate. Does anyone have any questions about this?

[Once everyone has signed the consent form, continue:]

Thank you. I am now going to tell you a little about the studies you are participating in so you will know what to do. On each computer right now is an open Word document. In this Word document, you will find instructions and embedded links for what you are going to do.

In a moment, when you are instructed to begin, you will open the Word document and click on the link labeled "Study One." That link will open a Web browser, which will contain the first part of the first study that you are completing. In that Web browser, there will be instructions as to what you should do. Briefly, you will be looking at different websites and assessing their overall usability.

Once you are completed with the first part of the study, the instructions on the screen will tell you to close the Web browser and return to the Word document. There, you will find instructions for the second part of the first study. That will entail using the open Adobe Illustrator document that's on the computer right now to design your own news website layout.

Once you have completed your design, you will return to the Word document where you will find a link to the second study being conducted today. Like the first one, it will open in a Web browser and have instructions on what you will be doing. Please read the instructions carefully and answer all the questions the best you can.

If at any point, you have any questions, raise your hand and I will come over as quickly as possible. Otherwise, if there are no other questions, you are free to begin.

Appendix C

General Procedure for the Distraction Task:

Thank you very much for your responses so far.

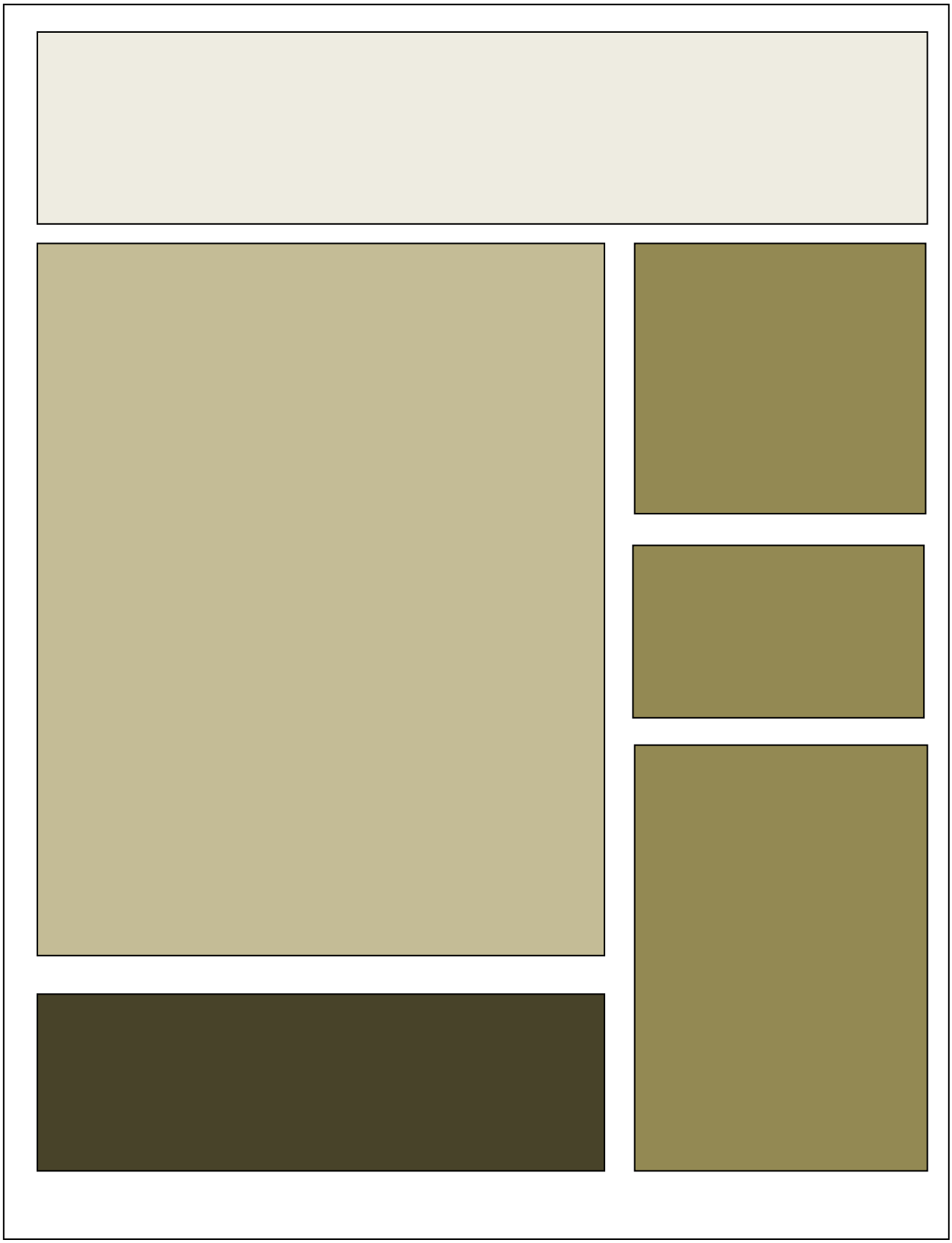
On the next few pages, you will find five different generic layouts for news websites.

Please look at each layout and assume that the layout you are looking at is a ***news*** website.

After looking at the layout, please answer the questions about it that can be found on the page after.

Raise your hand if you have any questions about this task. Otherwise, feel free to continue.

LAYOUT ONE



QUESTIONS FOR LAYOUT ONE:

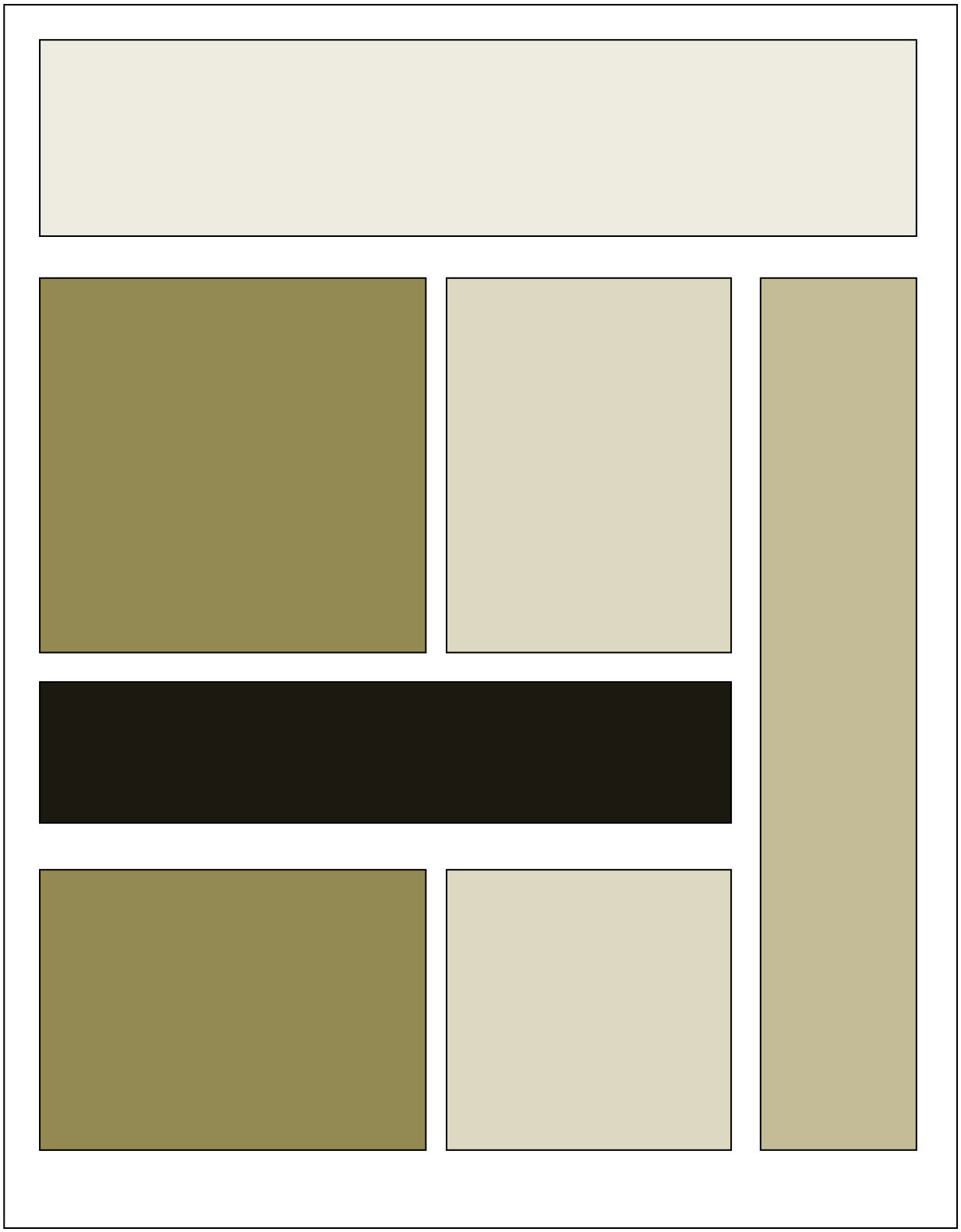
Overall, how visually appealing did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how “busy” did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how easy to navigate do you think a news website with that layout would be?						
1	2	3	4	5	6	7

How similar was this layout to other news websites that you’ve used?						
1	2	3	4	5	6	7

LAYOUT TWO



QUESTIONS FOR LAYOUT TWO:

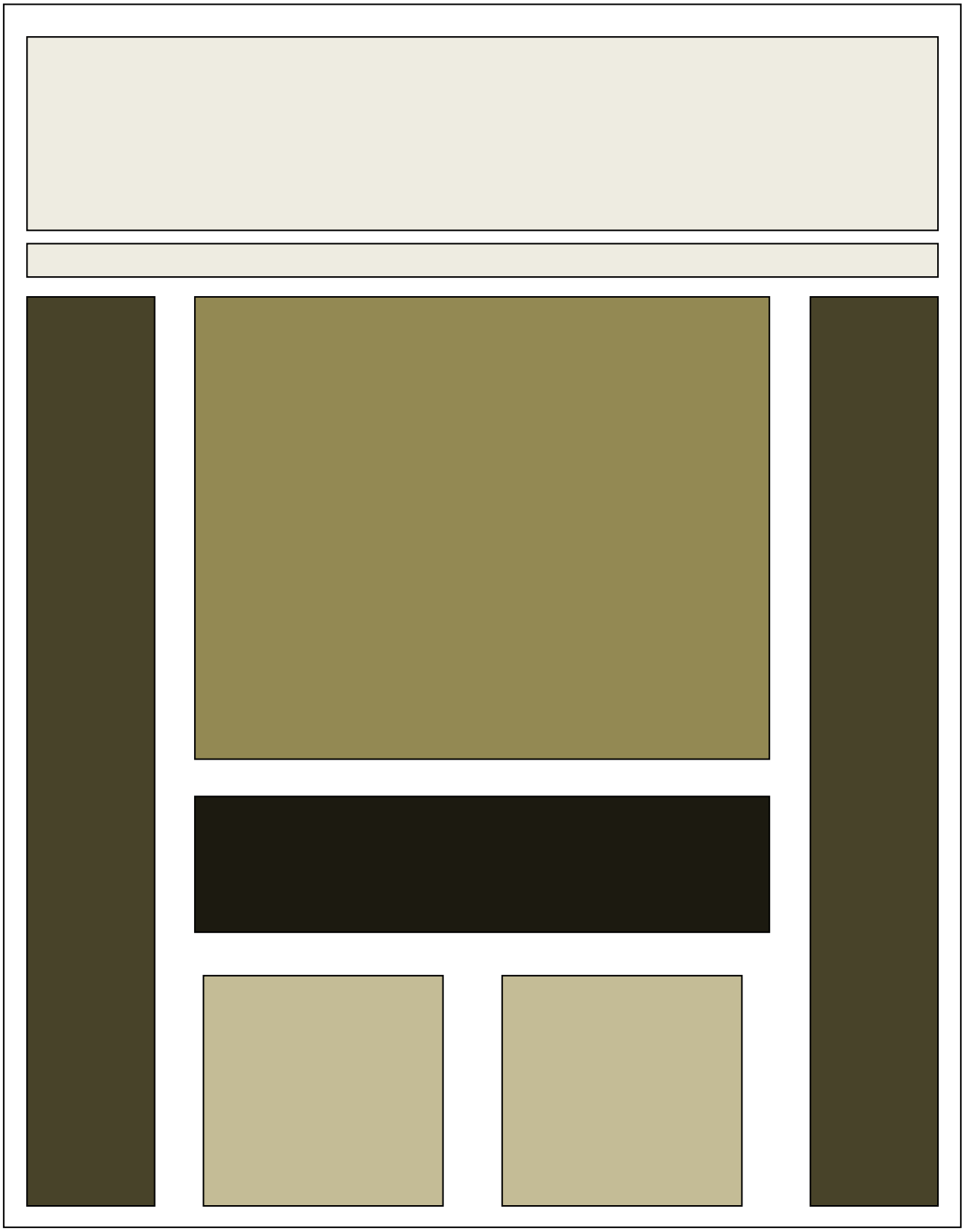
Overall, how visually appealing did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how “busy” did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how easy to navigate do you think a news website with that layout would be?						
1	2	3	4	5	6	7

How similar was this layout to other news websites that you’ve used?						
1	2	3	4	5	6	7

LAYOUT THREE



QUESTIONS FOR LAYOUT THREE:

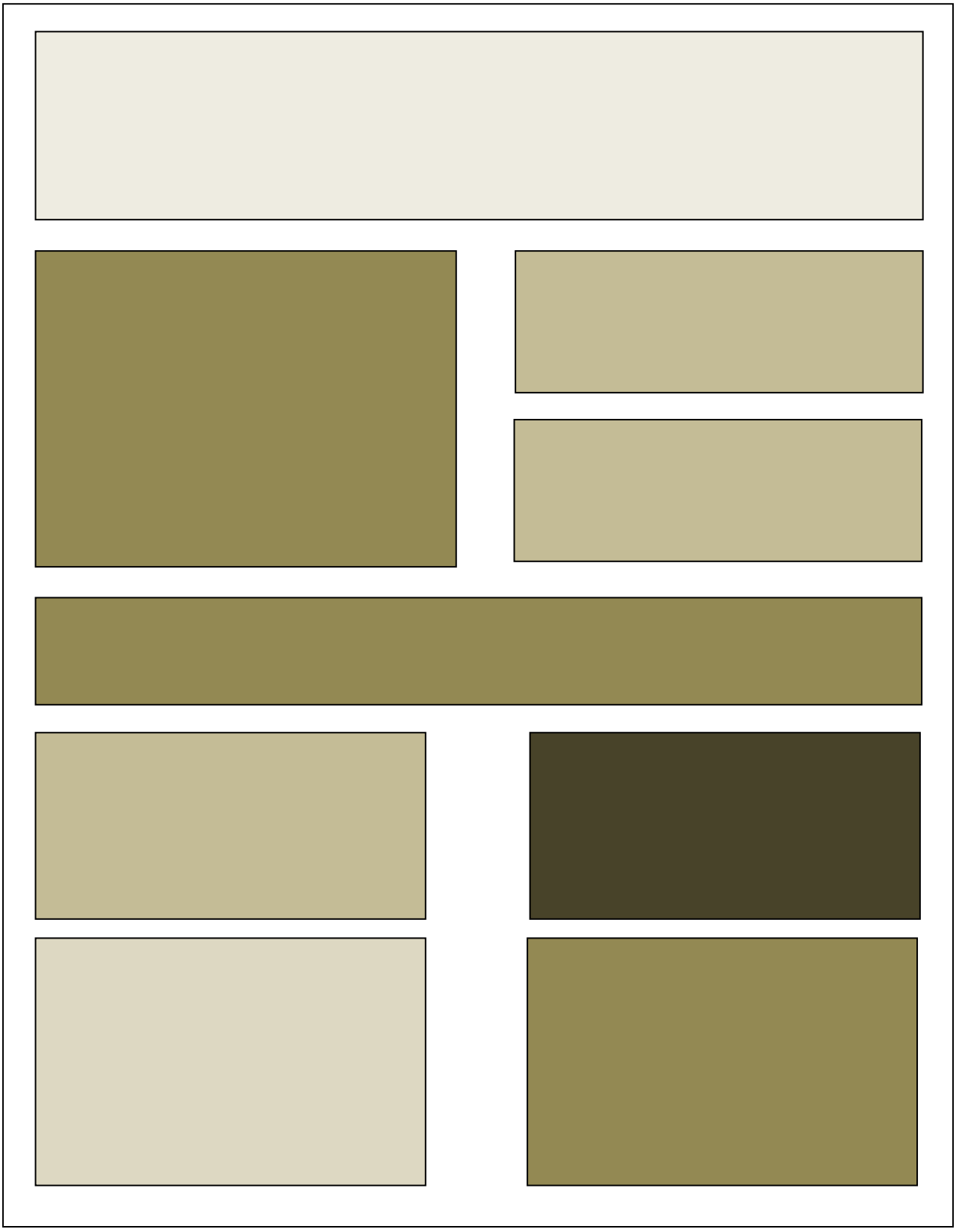
Overall, how visually appealing did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how “busy” did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how easy to navigate do you think a news website with that layout would be?						
1	2	3	4	5	6	7

How similar was this layout to other news websites that you’ve used?						
1	2	3	4	5	6	7

LAYOUT FOUR



QUESTIONS FOR LAYOUT FOUR:

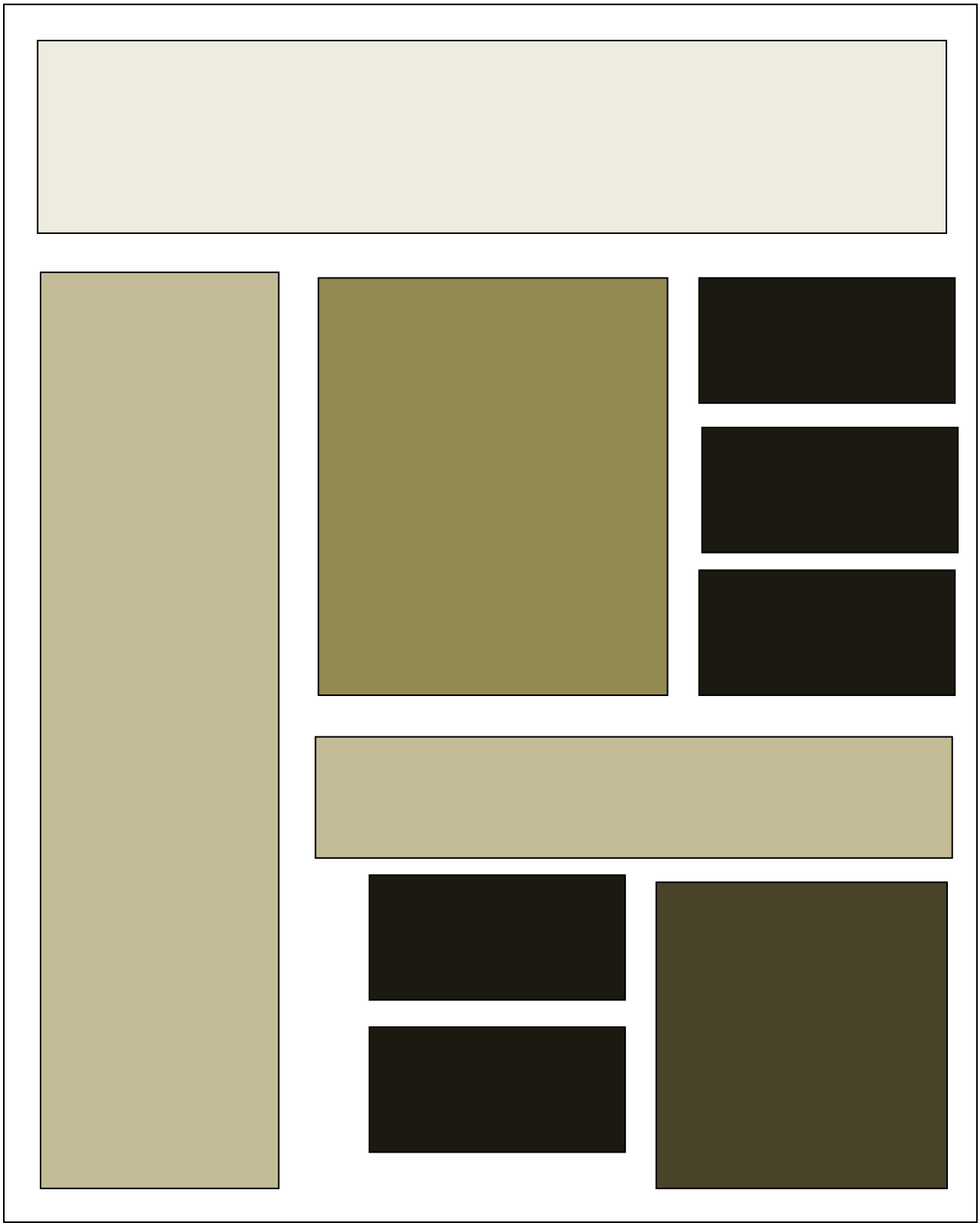
Overall, how visually appealing did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how “busy” did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how easy to navigate do you think a news website with that layout would be?						
1	2	3	4	5	6	7

How similar was this layout to other news websites that you’ve used?						
1	2	3	4	5	6	7

LAYOUT FIVE



QUESTIONS FOR LAYOUT FIVE:

Overall, how visually appealing did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how “busy” did you find this layout to be?						
1	2	3	4	5	6	7

Overall, how easy to navigate do you think a news website with that layout would be?						
1	2	3	4	5	6	7

How similar was this layout to other news websites that you’ve used?						
1	2	3	4	5	6	7

Thank you!

Next, you will have the opportunity to design your own news website layout. Open on this computer is an Adobe Illustrator file with your participant ID number as the name of the file. Please click on that open file that can be found on the task bar below and follow the instructions on that screen. Once you have completed that task, you can return to this document to scroll down to the final research study.

Appendix D

Sample Stimulus Materials

Sign In Register Now Subscribe Mobile Multimedia Today's Paper Going Out Guide Jobs Cars Real Estate Rentals Classifieds

NEWS LOCAL POLITICS OPINIONS SPORTS Business Arts & Living Search The Washington Post

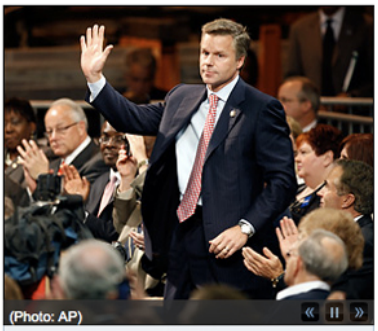
The Washington Post

Hot Topics Sen. Jon Kyl Facebook Chris Lee Verizon iPhone Hosni Mubarak NFL labor talks Carolyn Hax

Thursday, February 10, 2011 MARKET PULSE: DJIA -0.26% S&P 500 -0.10% NASDAQ -0.07%

Sports | Hamilton: Time for NHL to get tough

Mubarak to talk amid reports he will cede power


(Photo: AP)

CIA's Panetta: A strong likelihood Mubarak will step down tonight

Much uncertainty remains, as civilian and military officials make conflicting statements; but military seems to be taking a leading role.

» C. Whitlock, E. Londoño and L. Fadel | 1:22 p.m. ET

- Panetta defends reports of volatile situation
- Timeline | Fact Checker: Follow the money

Egypt minister denies Mubarak will quit

» Melissa Bell | Live updates | 1:07

- LIVE: Crowds react to news
- Post reporter: 'Elation' in Cairo
- Full coverage of Egypt turmoil

Congressman resigns in online flap

"I regret the harm that my actions have caused my family, my staff and my constituents," Rep. Chris Lee (R-N.Y.) says in a statement.

Bachmann calls for unity at CPAC

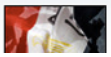
» Amy Gardner

- Johnson: 'Culture of entitlement'
- Where are the real leaders?
- Full coverage | Live, NOW

GOP seeks to cut billions in budget

OPINIONS

CIA's dilemma in Egypt



Ignatius: Its fight against al-Qaeda

MOST READ | MOST VIEWED VIDEOS | MOST E-MAILED

Appendix E

List of Brands to be used in study

Brand (category)	% Produced First in Category Exemplar Task	% Completion of Word Fragment
Southwest (airlines)	21	13.3
Payless (shoe stores)	21	16.7
Jared (jewelers)	21	10
Camel (cigarettes)	21	23.3
Levis (jeans)	21	16.7
Seventeen (magazine)	14	16.7
Shell (gas station)	7	23.3
Enterprise (rental car)	14	26.7
Ashley (furniture)	7	6.67
Dial (soap)	4	33.3
Caribou (coffee)	7	13.3
Chase (credit card)	7	23.3
Staples (office supply)	45	23.3
Orbit (gum)	21	56.7
Scope (mouthwash)	31	20

Appendix F

Awareness Questionnaire

Question 1:
What do you think the purpose of this task was?

Question 2:
When you were producing examples to the categories, did you think there was anything unusual about the categories or the examples that you produced?

Question 3:
Did you notice any connection between the companies/products you rated a few minutes ago in the other room and the task you just performed? If so, what did you notice?

Question 4:
If you were aware of a connection between the products/companies you rated earlier and the task you just performed, were you aware of this connection when you were producing the examples, or did you only become aware of it after I began to ask you these questions?

Question 5:
If you noticed that some of the product categories corresponded to the companies presented earlier, did you intentionally try to use words from the earlier part of the experiment as examples for the presented categories?

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