AUTOMATIC ATTITUDE ACTIVATION:
STUDIES ON PROCESSING AND EFFECTS OF ALCOHOL ADVERTISEMENTS
AND PUBLIC SERVICE ANNOUNCEMENTS.

DISSERTATION

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the Degree Doctor of Philosophy in the Graduate
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By

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* * * * *

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ABSTRACT

A two part investigation was conducted looking at how individuals process alcohol advertising and public service messages in automatic, pre-conscious ways. In study 1, participants were exposed to either (a) alcohol product advertisements, (b) alcohol PSAs featuring visual reference to alcohol use and positive affective appeals, (c) alcohol PSAs with no visual reference to alcohol use and negative affective appeals, or (d) non-alcohol product advertisements (control condition). Results suggest that the positively-valenced alcohol PSAs that show alcohol being consumed in the messages resulted in more positive automatically-activated evaluations of alcohol than exposure to the negatively-valenced PSAs with no visual reference to alcohol consumption, or the control advertisements. Thus, such messages may inadvertently automatically-activate positive evaluations of alcohol from memory. These effects increased the more individuals enjoyed the messages. These findings are concerning because once activated, these implicit evaluations were shown to predict increased willingness to participate in drinking games until the point of intoxication. Thus, study 1 suggests that developers of alcohol PSAs should be careful not to include cues that may automatically-activate positive evaluations of alcohol from memory. Study 2 used the same design as study 1, but used an alcohol memory association measure rather than an implicit attitude measure to address concerns about using existing implicit measures to assess priming effects of mediated messages. Results were mostly consistent with study 1 and suggest that existing
implicit measures can be appropriately used to assess priming effects of messages.
Dedicated to:

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My advisors for challenging me and providing guidance over the years.

My friends outside of academia for always being there when I needed to relax and take a break.
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CHAPTER 1

GENERAL LITERATURE REVIEW

This dissertation consists of two studies intended to test and articulate how individuals process substance use health messages, and how such messages exert influence. An emphasis is placed on the importance of considering message processes and outcomes that occur spontaneously and automatically, with limited consciousness on the part of the message recipient, rather than those that occur through deliberative, reasoned, and fully conscious processes. Specifically, the proposed studies investigate whether messages automatically-activate attitudes toward substances, and whether such activation influences subsequent judgments, perceptions, and decisions.

Introduction

There is a wealth of research on automatically-activated attitudes in the social psychological literature. This research has greatly contributed to our understanding of attitudes, particularly regarding when and how attitudes guide behavior. Mass media researchers have only recently begun to distinguish between automatically-activated attitudes and deliberatively constructed and/or retrieved attitudes (see Roskos-Ewoldsen, 1997; Shrum, 2002). Much of the work in the field has investigated how messages exert influence by changing the strength and valence of attitudes. The measures used in these
studies have assessed what we know today are deliberative attitudes, rather than automatic attitudes. I propose that by looking at both automatic and deliberative components of attitudes (rather than deliberative attitudes only), mass media researchers can gain a better understanding of the mechanisms through which media messages exert influence, and the situations in which such influence may be potentially magnified.

An investigation of automatic message processes is relevant to various types of communication contexts in which conscious, deliberative processing of messages is unlikely. As noted by authors such as Petty and Cacioppo (1984), individuals often lack motivation and opportunity to thoughtfully process advertising messages such as those being investigated in the present studies. Greater efforts are needed to investigate how, and through what mechanisms, advertising and other messages influence people through automatic, non-deliberative processes. There is also emerging evidence that this sort of investigation will help us better understand how messages influence risky behaviors, as research suggests that decisions to engage in such behaviors are often spontaneous, rather than planned and deliberative (see Stacy, 1997).

The present investigation has the potential to contribute to a growing body of literature in communication emphasizing the role of automatic processes arising through attitude accessibility and activation. Specifically, this work is consistent with Shrum’s (2002, 2009) work on media cultivation, which is based on two central premises. First, Shrum proposes that individuals do not search their memory for all relevant information when constructing a judgment. Rather, once they have sufficient information, they will make a decision, or act. Second, the information that comes to mind most readily is most likely to be used. The present investigation is also based on the notion that readily
available information (in the form of an automatically activated attitude) will have the potential to influence perceptions and decisions. This work is also consistent with Slater’s (2006) call for communication researchers to consider the potentially important role of attitude accessibility in message processing and effects.

This investigation also has the potential to contribute to our understanding of media priming. Network models of memory have been offered as an explanation for priming effects. Specifically, it has been proposed that exposure to mediated messages can temporarily increase the accessibility of a concept in memory (Roskos-Ewoldsen, Roskos-Ewoldsen, & Carpentier, 2009). Although there is ample evidence that priming effects exist (see Berkowitz, 1984; Dixon, 2006; Holbert & Hansen, 2006; Price & Tewksbury, 1997), communication scholars have not fully articulated the mechanisms through which priming effects emerge. The present studies are a preliminary effort to investigate automatic attitude activation as a mechanism for priming effects. It is also an effort to understand when priming effects are likely to emerge, and to investigate some potential spontaneous outcomes of priming.

Finally, the emphasis on advertisement evaluations as a moderator of automatic attitude activation can contribute to the attitude toward the advertisement literature, which proposes that repetitive exposure to enjoyable advertisements can lead to more favorable brand and product evaluations (see MacKenzie, Lutz, & Belch, 1986; Mitchell & Olson, 1981; MacKenzie & Lutz, 1989), and more favorable evaluations of issues advocated in PSAs (Nan, 2008). Previous research has looked at the role of attitude toward the advertisement in the development of fully conscious, deliberative brand,
product, and issue attitudes, whereas the present study investigates their role in the development of automatic attitudes.

From a health communication perspective, this research has several important implications. First, an understanding of automatic message processes and outcomes will help us understand how advertising messages encourage risky, or unhealthy behaviors (see Goldberg, 2003; Kelly, Slater, & Karan, 2002). Second, it will help us create more effective health promotion messages. Third, it will help us better understand why and how some health promotion messages fail, or worse, backfire (see Cho & Salmon, 2003; Salmon & Atkin, 2003) by investigating how seemingly harmless visual cues can produce unintended message responses and outcomes. A strength of this investigation is that it makes an effort to work across various theories of message processing, message effects, and behavior change. Both Cappella (2006), and Slater (2006) emphasize such theory development efforts as critically important to the field of communication, and particularly the subfield of health communication.

As noted by Slater (2006), social psychological research on automatic attitude activation may be particularly useful to media scholars. However, nearly all of the research on the topic of automatic attitudes has been conducted by social psychologists who have taken little interest in media messages. Thus, communication scholars lack a clear understanding of how real world messages activate automatic attitudes, and how automatic attitudes influence message processing and outcomes. We know little about the potential influence such attitudes may have on judgments and behavior in a real-world (rather than laboratory) context via message exposure. Thus, the proposed studies will be conducted in a more applied context (investigating actual mediated messages) in order to
better inform our understanding of message processing of television advertisements. These studies are an initial step in a larger research program that ultimately seeks to understand how both automatic and deliberative processes influence message outcomes.

Automatic Attitude Activation: Definitions and Implications

There appears to be some disagreement and even confusion in the social psychological literature about what is meant by automatic attitude activation. Thus, for clarification purposes, I will briefly outline the origins of the research on this construct, and offer a definition. According to Fazio (1990), social psychologists gained an interest in automatically-activated attitudes during a period in which the field was heavily questioning whether attitudes were even a useful construct. The evidence was conflicting, as some studies suggested that there was no relationship between attitudes and behavior, and others suggested that attitudes could be strong predictors of behavior (Fazio & Roskos-Ewoldsen, 2005). Accordingly, in 1981, Fazio and Zanna called for social psychologists to seek to identify when and how attitudes guide behavior, not whether they do or do not guide behavior. One particular characteristic of attitudes that greatly contributes to the attitude-to-behavior relationship is attitude accessibility, or the degree to which an attitude is automatically-activated from memory.

Attitude Accessibility

Accessibility simply refers to the ease with which an attitude comes to mind (Fazio, 1990; Fazio, Powell, & Williams, 1989; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Some attitudes are activated easily upon encountering an attitude object, meaning that they are activated spontaneously without conscious effort on the part of the individual. For example, when many individuals come across an object such as a
cockroach, they have an immediate negative evaluative response. This response is activated automatically, beyond the individual’s control (Fazio & Roskos-Ewoldsen, 2005). Other attitudes, however, are not readily accessible from memory and require a great deal of deliberation and conscious effort to retrieve. When asked about an attitude that is not readily accessible, individuals have to think extensively about their evaluation of the object in order to respond. If no existing evaluation exists, the individual will construct an attitude on the spot (Fazio et al., 1986).

This discussion leads to the notion of attitudes existing along an attitude/non-attitude continuum (Fazio et al., 1986). At the non-attitude end of the continuum, no a priori evaluation of the object exists, possibly because the individual has not encountered the object before. Moving along the continuum, attitude accessibility increases. At the other extreme end of the continuum is a well-learned, highly accessible attitude that has strong potential to be automatically-activated from memory upon encountering the attitude object. Thus, from this perspective, an attitude is by definition, the association between an object and one’s evaluation of that object (Fazio, 1990). As noted by Fazio et al. (1986), evaluation is used in a broad sense and could refer to relatively “hot” affect (e.g., if the object is associated with a strong emotional response), or it could refer to a relatively “colder” evaluation (e.g., a more cognitively based judgment of affect, such as favorability or unfavorability). Regardless of whether the evaluation is hot or cold, the likelihood of it being automatically-activated from memory depends on the strength of the association between the object and the evaluation of that object.

Attitude strength should not be confused with attitude extremity, which refers to the valence of the attitude. Strength simply refers to how well-learned the attitude is. For
attitudes that are well-learned, there will be a strong link between the object and one’s evaluation of that object regardless of the valence of that evaluation. For attitudes that are not well-learned, there will be a weak link between the object and evaluation, the most extreme example being a non-attitude (which has no object-evaluation link). It should be noted, however, that there is a general tendency for extreme attitudes to be more accessible from memory than less extreme attitudes (Roskos-Ewoldsen & Fazio, 1992).

*The Influence of Automatic Attitude Activation on Behavior*

As mentioned previously, interest in automatic attitude activation, or attitude accessibility, arose due to an interest in being able to better articulate when attitudes influence behavior. Fazio’s (1990) MODE model addresses this issue by articulating when and how deliberatively retrieved and/or constructed attitudes will influence behavior and when and how automatically-activated attitudes will influence behavior. The MODE model builds directly on the early work on attitude accessibility and proposes that attitudes may guide behavior through either spontaneous or deliberative processes. MODE stands for motivation and opportunity as determinants of whether the attitude-to-behavior relationship will emerge primarily through a spontaneous or deliberative process. According to this model, there are three types of attitude-to-behavior processes: (a) automatic, (b) mixed (automatic and deliberative), and (c) deliberative. A brief discussion of each follows.

According to the MODE model (Fazio, 1990), the initiation of the attitude-to-behavior process (whether it occurs through spontaneous or more deliberative processes) depends on the attitude being activated from memory. Attitudes can be activated as a result of a number of situational cues (e.g., media exposure, contextual cues), or they can
be activated simply upon seeing the object if the object-evaluation link is sufficiently strong (also referred to as chronic accessibility). When a strong link between the object and evaluation exists in memory and the evaluation is automatically-activated, either automatic or mixed processes are possible.

Fazio’s (1986) attitude-to-behavior process model is the basis of the automatic process in the MODE. Fazio (1986) proposes that attitudes are capable of guiding behavior even when individuals do not actively deliberate or reflect on their attitudes. For example, consider the attitude object of “cockroach” again. As noted above, for many, an encounter with this object will automatically-activate a negative evaluation due to a strong link between the object and evaluation in memory. As noted by Fazio and Roskos-Ewoldsen (2005), when individuals encounter a cockroach, they probably do not deliberate about their evaluation of the object or think carefully about the most appropriate behavioral response. If they engaged in such cognitive processing, the cockroach would disappear before any action could be taken.

According to Fazio’s (1986) process model, in such a situation, the individual’s automatically-activated negative attitude would define the situation as unpleasant. Once activated, this attitude acts as a filter through which the individual views the object. This can result in a biased perception that is consistent with the valence of the attitude. If individuals lack motivation and opportunity to deliberate on the automatically-activated attitude, they will respond automatically by acting on the impulse (Fazio, 1986). This results in a spontaneous attitude-to-behavior process in which individuals do not deliberate on their decisions or engage in a reasoned process as outlined by the TRA (see Fazio, 1989 for an example).
In some situations, mixed automatic and deliberative processes emerge in which individuals “override” the influence of their automatically-activated attitudes and evaluate the situation more extensively. In order to do so, however, they must have adequate motivation. As noted by Fazio (1990), highly consequential behaviors are likely to motivate a reasoned and deliberative analysis. Additionally, fear of making an invalid decision tends to motivate individuals to think carefully about their attitudes and the appropriate course of action (Schuette & Fazio, 1995). Although motivation to deliberate on one’s attitudes and the potential consequences of certain actions is necessary in order for the attitude-to-behavior relationship to be deliberative in nature, opportunity to do so must also exist. For example, sometimes situations require that individuals make quick decisions, thus denying them of the opportunity to engage in a reasoned analysis. In such situations, opportunity may not exist because the individual simply does not have the ability to deliberate (Fazio, 1990).

The deliberative process described in the MODE model is based on Ajzen and Fishbein’s (1973, 1980) Theory of Reasoned Action (TRA). As indicated by its name, the TRA proposes that individuals consider the implications of their behavior when determining a course of action. Through this reasoned process, individuals deliberate on their attitudes and perceptions of norms and eventually develop a behavioral intention, which is an immediate precursor to behavior. Thus, the TRA assumes that attitudes guide behavior through a conscious and deliberative process in which individuals consider their attitude toward an object and make a behavioral decision.

The final potential attitude-to-behavior process is strictly deliberative in nature and is based on the TRA. It is consistent with the mixed process described above, but
does not originate with an automatically-activated attitude. This may occur when individuals do not have attitudes that are sufficiently strong and therefore capable of automatic activation. In such situations, individuals either deliberatively retrieve their attitudes or construct them on the spot. This process requires adequate motivation and opportunity. The resulting behavior is deliberative and planned.

Thus, to summarize, the MODE model (Fazio, 1990) proposes that automatically-activated attitudes will exert relatively strong influence on behavior when individuals lack motivation and/or opportunity to deliberate on what has been activated. Such behaviors will be relatively spontaneous in nature, reflecting to some extent, an uncontrolled response. If, on the other hand, individuals have sufficient motivation and opportunity to deliberate, they will be able to override their automatically-activated attitudes (and the biases such attitudes tend to elicit) and will go through a more reasoned process as outlined by the TRA in determining how to act in a given situation. In other situations, however, individuals simply do not have strong enough attitudes capable of being automatically-activated and therefore, effortfully retrieve or construct their attitudes. The resulting behavior is deliberative in nature.

The Emergence of “Implicit” Attitudes

The terms implicit and explicit attitudes also appear in the literature on attitude accessibility and activation. For reasons outlined below, I prefer to use the terms automatic and deliberative, rather than implicit and explicit. I will briefly outline the origins of these terms and explain my concerns with the use of them in the literature.

During the late 1990s and the early 2000s, the term implicit attitude appeared in the social psychological literature. Fazio’s work on accessibility and the spontaneous
attitude-to-behavior process has been influential in shaping the literature on implicit
attitudes. A widely cited piece (ISI citation count = 575) that may have prompted a
wealth of literature on this topic was published by Fazio, Jackson, Dunton, and Williams
(1995). The piece outlined a new unobtrusive measure of racial attitudes that assessed
automatic activation. What was particularly compelling about this piece was that it
demonstrated that individuals’ responses to the new unobtrusive measure, which tapped
automatically-activated attitudes, differed markedly from their responses to a self-report
traditional measure of racial attitudes. This was particularly true among individuals with
very negative automatically-activated attitudes toward Blacks, but very strong motivation
to control prejudiced reactions. In terms of the attitude-to-behavior relationship,
consistent with the MODE model, individuals who were motivated to control their
prejudiced reactions were able to override the influence of their automatically-activated
attitudes toward Blacks and act in a non-prejudiced way that was consistent with their
self-reported attitudes.

Results of this study led to questions regarding which measure was getting at the
“real” attitude. However, as noted by Fazio and Olson (2003), in asking this question, we
need to specify what we mean by “real.” If we define the real attitude as the one that
predicts behavior, then both deliberative self-reported attitudes and automatically-
activated attitudes (such as those measured by Fazio et al.’s, 1995 priming measure) are
“real” attitudes. Rather, the more important issue is to consider when, and through what
processes such attitudes guide behavior.

Following Fazio et al.’s (1995) influential piece, many social psychologists
developed other unobtrusive measures of attitudes in order to address questions of how to
assess “real” attitudes and to understand discrepancies among these so-called implicit (automatically-activated) and explicit (deliberative) attitudes (including Greenwald, McGhee & Schwarz, who developed the Implicit Association Test in 1998). As noted by Fazio and Olson (2003) “despite incredible activity, research concerning implicit measures has been surprisingly atheoretical. It largely has been a methodological, empirically driven enterprise” (p. 301). This emphasis on methodology rather than theory seems to be one of the reasons Fazio and Olson (2003) express concern over the terms “implicit” and “explicit.” The authors note that the terms were imported from cognitive psychology, and specifically the work on implicit and explicit memory. According to this literature, individuals display implicit memory when their behavior on a task suggests that they were influenced by a prior event, even though they have no explicit memory of that event. By using the terms implicit and explicit to refer to attitudes, there is an assumption that individuals have no awareness of their “implicit” attitudes. On the contrary, research suggests that automatically-activated (or “implicit”) attitudes may be consciously known (i.e., people may experience a gut reaction when such attitudes are activated), but that they are unaware of the processes that produce them. This characteristic is referred to as “preconscious,” rather than “unconscious” (Jordan, Logel, Spencer, Zanna, & Whitfield, in press).

A second potentially concerning issue with using the terms implicit and explicit to refer to automatically-activated vs. deliberative attitudes is that it suggests that individuals have dual attitudes toward the construct of interest, meaning that implicit and explicit attitudes are distinct constructs (clearly countering the MODE model, which suggests that we have a single attitude toward a given construct that can be expressed
through automatic or deliberative processes). However, there are social psychologists who propose that implicit and explicit attitudes exist separately in memory, presumably in distinct memory systems. Such scholars take a dual systems approach to understanding this phenomenon (not to be confused with a dual process approach such as the MODE). For example, Wilson, Lindsey and Schooler (2000), propose that both implicit and explicit attitudes exist separately in memory. Similarly, Smith and DeCoster (2000) propose a model of dual attitudes, which suggests that implicit attitudes reside in a slow-learning memory system and explicit attitudes reside in a fast-learning system. The slow learning system is based on cumulative experience with the attitude object and operates in a rapid and automatic way. The fast learning system is based on newly learned and rapidly represented information. It operates in a more deliberative and reasoned way.

However, as noted by Fazio and Olson (2003) dual systems proponents have failed to convincingly support the notion that implicit and explicit attitudes exist in separate memory systems. Many of the findings reported by such researchers could be just as easily explained from the MODE perspective. For example, Rydell and McConnell (2006) propose that their finding that explicit attitudes changed dramatically with the introduction of counter-attitudinal information and implicit attitudes did not is evidence for a dual memory systems model of attitudes. However, the MODE model can also adequately explain these findings by proposing that with adequate motivation and opportunity to deliberate, individuals will think carefully about all the information they have about an attitude object (which would include the recently acquired counter-attitudinal information) and construct an attitude. When individuals lack motivation and opportunity to deliberate (as in the case of an implicit measure), they will not be able to
consider the newly learned information and will therefore express what is automatically-activated from memory. Thus, it seems that some dual systems proponents are simply offering a new way of interpreting discrepancies between implicit and explicit measures of attitudes without empirically providing evidence that these mechanisms are at work. Without such evidence, I will not use dual systems models as a theoretical framework in my own research.

Instead, following the guidelines of Fazio and Olson (2003), I will use the MODE model as a theoretic framework. Additionally, given the arguments provided by Fazio and Olson (2003), I view it as appropriate to refer to implicit and explicit measures of attitudes, but not to refer to the attitudes themselves as implicit or explicit. Rather, it seems more appropriate to refer to what these measures are tapping as automatically-activated attitudes and deliberative attitudes.

Automatic Attitudes: Message Processing and Effects

If attitudes operate through the processes outlined by the MODE model, it seems necessary to consider the role of both automatic and deliberative attitudes when studying processing and effects of mediated messages. Specifically, communication researchers should consider how existing automatic and deliberative attitudes influence message processing and outcomes, and how messages influence both automatic and deliberative attitudes.

Although the MODE model is a useful theoretical framework for understanding when automatic attitudes are likely to be influential, it is not a persuasion model and therefore does not address issues of message processing. Thus, the MODE model explains how automatic attitudes influence behavior, but does not provide any insight as
to how messages activate such attitudes and how message processing occurs at an automatic, non-deliberative level.

The Elaboration Likelihood Model of persuasion (ELM, Petty & Cacioppo, 1986) explains how message processing can occur though central (thoughtful) or peripheral processing (heuristic). This in some ways mirrors the discussion of automatic vs. deliberative processing, as effortful and deliberative processing will only occur when individuals are both motivated and able to process. However, the model is of limited utility for helping us understand the mechanisms through which media messages activate existing attitudes from memory, as the ELM emphasizes attitude change (transient or long-lasting) rather than attitude activation. Additionally, although the model clearly articulates the situations in which individuals are likely to process messages centrally and thoughtfully, and when they are likely to processes them more peripherally, it does not fully articulate the mechanisms through which these processes emerge. Given the conceptualization of peripheral processing, there seems to be some overlap with the concept of automatic attitude activation. The model, however, does not specify such a potential mechanism.

Transactive Model of Attitude Accessibility

Although the MODE model and ELM are of great use to communication scholars, each model has its limitations as noted above. Addressing some of these issues is Roskos-Ewoldsen’s (1997) transactive model of attitude accessibility. Roskos-Ewoldsen’s work on message processing and automatic attitudes has emphasized the role of such attitudes in attracting attention. Previous research has provided evidence that accessible attitudes attract attention toward objects in uncontrolled and automatic ways (Roskos-Ewoldsen &
Thus, Roskos-Ewoldsen (1997) has applied this work on the orienting value of accessible attitudes to the realm of persuasion, noting that attention is essential in the persuasion process (McGuire, 1968). Specifically, Roskos-Ewoldsen (1997) proposes a transactive model of attitude accessibility (see also Arpan, Rhodes, & Roskos-Ewoldsen, 2005; Roskos-Ewoldsen, Arpan-Ralstin, & St. Pierre, 2002).

The model proposes that four factors will influence accessibility: (a) frequency of activation, (b) cognitive elaboration, (c) recency of activation, and (d) expectation that the individual will need to evaluate the object in the future. Unique to this model is the proposition that attitude accessibility automatically orients attention to the message, which may encourage both biased and motivated processing (Roskos-Ewoldsen, 1997). More specifically, in some situations, accessible attitudes can signal that the topic being addressed in a message is important and should be attended to and elaborated on. In this way, accessible attitudes encourage motivated processing, and can influence deliberative behaviors. In other situations, however, accessible attitudes attract attention to messages, but encourage reinforcement of existing attitudes. Through this process, the automatically-activated attitude skews our perceptions of messages and situations in favor of the valence of that attitude. It is through this process that accessible attitudes influence spontaneous behaviors (Arpan et al., 2007).

**Media Priming**

Another area of literature that could potentially inform our understanding of the mechanisms through which media messages activate automatic attitudes is the media priming literature (see Iyengar, Peters, & Kinder, 1982; Kosicki, 2002; Roskos-Ewoldsen, Klinger, Roskos-Ewoldsen, 2007; Roskos-Ewoldsen, Roskos-Ewoldsen, Roskos-Ewoldsen,
Carpentier, 2002). Consistent with the work on attitude accessibility, network models of memory have been used to explain media priming. Such models assume that information is stored in memory in the form of “nodes,” with each node representing a concept. Related nodes are connected through associative pathways. When a node reaches a certain activation “threshold,” it fires, potentially activating other connected nodes (Roskos-Ewoldsen et al., 2007).

The extent to which priming occurs depends on both intensity and recency of the priming event. Intensity can refer to the frequency of the prime (e.g., a single vs. repetitive exposure), and recency simply refers to the amount of time between the prime and the measurement of its effect. Social psychological research suggests that more frequent and recent primes should produce stronger effects (Roskos-Ewoldsen et al., 2002). However, a recent meta-analysis conducted by Roskos-Ewoldsen et al. (2007) provided mixed support for these propositions. Specifically, the authors found only partial support that intense primes exert stronger influence. Although longer primes generally had stronger effects on judgments and behaviors than shorter primes, priming effects resulting from media campaigns (which had long durations) were smaller than effects from shorter exposures. The authors note, however, that this may have to do with the lag between the prime exposure and measurement. However, inconsistent results emerged for the notion that priming effects fade with time. More specifically, the researchers found that the size of the media effect was larger when there was a 24 hour lag between the prime presentation and measurement of its effects than when there was a lag of only 30 minutes. Clearly, more research is needed to determine if the “priming”
communication scholars are describing is comparable to the priming social psychologists refer to in the context of construct and attitude accessibility.

The Proposed Model

These studies seek to test portions of a preliminary model of message processing and effects that places a heavy emphasis on the role of automatic attitude activation and accessibility. The model is presented in Appendix A. Looking from left to right, the first portion of the model addresses the question of whether messages featuring certain attitude objects have the potential to automatically-activate evaluations of those objects from memory. It also addresses some potential moderators of this proposed relationship. These questions are addressed in the proposed studies and will be fully articulated throughout this text. The second portion of the model investigates how accessible attitudes toward alcohol influence message orientation and subsequent outcomes. These questions will not be investigated in the present studies, but will be followed-up post dissertation. The notion that automatic attitudes automatically orient attention to messages and other stimuli arises from Roskos-Ewoldsen’s (1997) transactive model of attitude accessibility. The model (discussed in greater detail below) proposes that once such attitudes orient individuals to messages, either thoughtful motivated processing or automatic non-deliberative processing may emerge. Both types of processes influence decision-making and behavior. The emphasis in the present studies is to investigate automatic processes arising through message exposure. Future research will investigate both automatic and deliberative types of processes, making an effort to fully articulate when one process with dominate over the other.
CHAPTER 2

STUDY 1: THEORETICAL FRAMEWORK AND HYPOTHESES

Overview

The purpose of Study 1 is to investigate whether messages, in this case advertising messages, can automatically-activate one’s attitudes toward objects (in this case the object of interest is alcohol). Research conducted in social psychology has consistently used artificial primes as a means of measuring pre-existing automatic attitudes rather than assessing whether mediated stimuli can activate such attitudes (see Fazio et al., 1995; Greenwald et al., 1998). Thus, social psychologists have generally not been interested in assessing whether messages influence automatic attitude activation, which may lead to questions regarding whether media messages such as advertisements can even be expected to activate automatic attitudes. However, Fazio’s (1990) work proposes that if a strong link between an object and one’s evaluation of that object exist in memory, the evaluation of that object will be automatically-activated from memory upon encountering the object. Thus, if a strong object-evaluation link exists in memory, media exposure should automatically-activate that evaluation. Indeed, research conducted by Barden, Maddux, Petty, and Brewer (2004) has provided evidence that even modest primes, such as images, can influence the nature of the evaluation that is automatically-
activated from memory. The researchers found that images of a Black man dressed as a lawyer in a prison context resulted in more positive automatic evaluations of Blacks than images of a Black man dressed as a prisoner in that same context on an implicit measure. Thus, I propose that if such effects emerge with modest stimuli such as images, we should expect that 30-second advertising messages should successfully activate automatic evaluations, even more so, given that individuals are repeatedly exposed to such messages (as frequency of activation increases likelihood of priming effects, see Roskos-Ewoldsen, 1997).

There is very limited research in the advertising literature to support the notion that advertising messages can activate automatic attitudes. Although there is research on advertising and automatic/accessible attitudes, much of this has looked at the role of such messages in the development of more accessible attitudes (see Berger & Mitchell, 1989; Kardes, 1988), not on the success of such message in activating existing attitudes. However, research by Czyzewska and Ginsburg (2007) found that individuals exposed to anti-tobacco PSAs reported more negative automatic attitudes toward tobacco than those exposed to anti-marijuana PSAs, and those exposed to anti-marijuana PSAs reported more negative automatic attitudes toward marijuana than those exposed to anti-tobacco PSAs.

Effect of Condition on Automatically-Activated Attitudes

Thus, given previous research, the following hypothesis is advanced:

\( H1: \) Those exposed to the alcohol advertisements will report more positive automatically-activated evaluations of alcohol than those exposed to the control advertisements.
It should be noted that we previously tested whether alcohol advertisements automatically-activate one’s evaluations of alcohol from memory and found evidence to support this notion (see Goodall and Slater, 2008). Specifically, the study suggested that exposure to alcohol advertisements resulted in more positive attitude activation than exposure to control advertisements (non-alcohol product advertisements). There was no evidence of a difference in automatic attitude activation among individuals exposed to anti drunk driving PSAs and the control advertisements.

However, further investigation of these data suggests that additional follow-ups are necessary. In our initial study, participants were either exposed to alcohol advertisements, alcohol PSAs, or non-alcohol product advertisements (control condition). The participants’ automatically-activated attitudes toward alcohol were measured to assess whether those exposed to the alcohol advertisements reported greater positive attitude activation than those exposed to the control advertisements, and whether those exposed to the alcohol PSAs reported greater negative attitude activation. However, these data need to be interpreted with caution because although we used random assignment to place participants in the alcohol advertisement and control conditions, results indicate that those in the alcohol advertisement condition reported drinking more heavily than those in the control advertisement condition. Thus, it is unclear if the observed effect of condition on automatic attitude activation was indeed due to condition (message exposure) or whether it was due to alcohol use. What further complicates interpretation of these data is the fact that alcohol use was measured after message exposure. Accordingly, it is possible that the independent variable (alcohol advertisement exposure) influenced both attitude activation and self-reports of alcohol use. Thus, a follow-up in which
alcohol use is measured prior to message exposure will be conducted in an effort to replicate our previous findings.

Additionally, alcohol public service announcements (PSAs) will be investigated more thoroughly in the present study. Specifically, it is of interest to assess whether images of alcohol in anti-drunk driving messages may activate one’s evaluations of alcohol. Questions arise about the nature of activation, however. Given that alcohol use plays a role in college socialization, many participants are expected to have well-learned positive evaluations of alcohol, which could be easily activated through message exposure. It is not clear whether such participants would have strong well-learned associations between alcohol and negativity. Although they may have well-learned associations between drunk driving and negativity, it seems unlikely that such a demographic would have strong negative associations toward alcohol in general.

In our previous study (see Goodall and Slater, 2008), we found no evidence that alcohol PSAs automatically activate either negative evaluations of alcohol, or positive evaluations of alcohol. However, limitations with the stimuli used in this study make follow-up research necessary. The PSAs used by Goodall and Slater (2008) contained several messages produced by Mothers Against Drunk Driving (M.A.D.D.) displaying negative consequences of driving under the influence, but containing no images of alcohol. For example, one message featured a crying baby who had recently lost her mother in a motor vehicle accident caused by a drunk driver. Although the message contained auditory reference to drunk driving, there were no visual cues that might activate evaluations of alcohol. Questions remain as to whether PSAs that contain visual imagery of alcohol are capable of automatically-activating one’s evaluations of alcohol.
Although it makes sense that PSAs about the consequences of drunk driving would make no visual reference to alcohol use, several messages (specifically those recently produced by the Ad Council) show individuals in various social contexts engaging in alcohol consumption behaviors. It is important to investigate how such visual cues may be processed at an automatic level via automatic attitude activation.

Thus, in this study, two types of alcohol public service announcements are compared. Although both types of messages condemn driving under the influence, they use markedly different content features and affective appeals. The first group of messages, produced by the Ad Council, depicts young adults in various social contexts enjoying themselves while consuming alcohol. The appeal of these messages is positive, depicting humorous aspects of intoxication, and the positive social aspects of drinking, while condemning the irresponsible decision to drive under the influence. Unlike other types of alcohol PSAs, the messages show the substance being consumed in the message. The other group of messages, produced by Mothers Against Drunk Driving (M.A.D.D.), depict the victims of drunk driving, and use markedly more negative appeals. Unlike the Ad Council messages, the M.A.D.D. messages selected make no visual reference to alcohol consumption.

When looking at automatic processes—specifically, the role of automatically-activated attitudes—concerns arise about the potential negative consequences of including visual reference to alcohol use in a PSA. Fazio’s conceptualization of attitudes and attitude accessibility suggests that whenever a strong enough object-evaluation link exists in memory, simple exposure to the attitude object should be enough to activate that evaluation from memory. Thus, exposure to visuals of the substance in an alcohol PSA
may be enough to inadvertently activate one’s positive automatic evaluations of alcohol.

Accordingly, the following hypothesis is advanced:

\( H2 \): Those exposed to the Ad Council PSAs will report more positive automatically-activated evaluations of alcohol than those exposed to the control advertisements.

Additionally, it is expected that differences in automatic attitude activation will emerge between the Ad Council PSA and M.A.D.D. PSA conditions. Specifically, it is proposed that:

\( H3 \): Those exposed to the PSAs with positive depictions of alcohol use (Ad Council) will report more positive automatically-activated evaluations of alcohol than those without such depictions (M.A.D.D.).

**Moderators**

**Alcohol Use.** It is expected that several variables may influence the relationship between message exposure and automatic attitude activation. Specifically, it is proposed that heavier drinkers may demonstrate the greatest levels of attitude activation due to their strong, well-learned attitudes toward alcohol. It is proposed that given their cumulative experiences with alcohol, which positively reinforce their use of the substance, heavy drinkers will have developed strong memory associations toward alcohol with great potential for automatic activation (Stacy, 1997). Thus, although heavier drinkers across all conditions may demonstrate more positive automatically-activated evaluations of alcohol than lighter drinkers, such effects are expected to be magnified in the alcohol advertisement and Ad Council PSA conditions.
**H4:** Heavier drinkers exposed to either (a) the alcohol advertisements, or (b) the PSAs with positive depictions of alcohol use (Ad Council) will demonstrate the greatest amount of positive automatic attitude activation.

*Message Evaluation.* In addition to investigating whether advertisements automatically activate evaluations of alcohol from memory, and whether alcohol use moderates this relationship, this study will also investigate attitude toward the advertisement as a potential moderator. The advertising literature has emphasized the important role of attitude toward the advertisement in message processing and effects. This literature suggests that products and brands are continually paired with message content that elicits positive affect, and over time, the positive evaluation transfers to the product or brand via classical conditioning. Such positive evaluations then influence intentions and purchasing decisions (MacKenzie, Lutz, & Belch, 1986; Mitchell & Olson, 1981; MacKenzie & Lutz, 1989). Although the literature on attitude toward the advertisement has emphasized the influence of ad evaluations on brand evaluations (e.g., Budweiser, Heineken), ad evaluations should presumably also influence attitude object evaluations (e.g., alcohol) via conditioning. Further, although the literature has emphasized the role of attitude toward the ad on deliberative attitude assessments, there is evidence that such effects will emerge automatically as well.

Specifically, Olson and Fazio (2001, 2002) have provided evidence that implicit attitudes can be formed and activated via *evaluative conditioning*. Olson and Fazio (2001) found that implicit attitudes toward conditioned stimuli were formed by repeatedly pairing unconditioned stimuli (e.g., valenced words and images, which activate positive or negative evaluations) with conditioned stimuli (e.g., novel objects).
More specifically, conditioned stimuli paired with positive items were evaluated more positively on an implicit measure than stimuli paired with negative items. These effects emerged even though participants demonstrated no explicit memory of the critical pairings (Olson & Fazio, 2001). In a follow-up investigation, Olson and Fazio (2002) used a subliminal priming procedure and found consistent results, providing further evidence that implicit attitudes can form via a conditioning mechanism below the conscious awareness of individuals.

In this case, I suggest that the advertisement is the unconditioned stimulus and positive affect generated by the advertisement is the unconditioned response. Such affect may be generated due to enjoyment and liking of the message. Alcohol is the conditioned stimulus and positive affect toward alcohol is the conditioned response. Exposure to the advertisements may strengthen, at least momentarily, the associative links between positivity (elicited in response to the alcohol advertisement) and the attitude object in the advertisement (alcohol), resulting in more positive evaluations of alcohol (as assessed by the implicit attitude measure). Thus, consistent with the literature and our previous findings, the following hypotheses are proposed:

**H5a:** Among those in the alcohol advertisement exposure condition, those who report more positive evaluations of the advertisements will report more positive automatically-activated attitudes toward alcohol; no such effect will be found in the control condition.

**H5b:** Among those in the Ad Council PSA condition (messages showing positive depictions of alcohol use), those who report more positive evaluations of the
advertisements will report more positive automatically-activated attitudes toward alcohol; no such effect will be found in the control condition.

If results suggest the relationship proposed in hypothesis 5b, they must be interpreted with caution, however, as various television alcohol PSAs use markedly different message appeals, notably negative appeals that seek to visually illustrate (rather than simply suggest) the consequences of driving under the influence (e.g., those produced by M.A.D.D. and the U.S. Department of Transportation). However, interest in the present study is to investigate whether messages that contain extensive visual reference to alcohol and alcohol consumption behavior (which also happen to contain more positive message appeals) inadvertently activate one’s automatic evaluations of alcohol. Future research will make greater effort to compare and account for various types of message appeals of PSAs in an effort to understand processing and effects that emerge both automatically and deliberatively.

Automatically-Activated Attitudes as a Predictor of Behavioral Willingness

Questions arise about the implications of automatically-activated evaluations of alcohol. As noted in Appendix A, message orientation resulting from one’s activated evaluation should influence one’s willingness to engage in behaviors relevant to the attitude object, and should ultimately influence behaviors and decisions. Behavioral willingness is a construct that arises from Gibbons, Gerrard, and Lane’s (2003) prototype-willingness model. The model may help explain the mechanisms through which automatically-activated attitudes guide risky health behaviors. The prototype-willingness model makes an effort to address potential problems with health behavior models that assume the attitude-to-behavior relationship emerges through a reasoned
process. Specifically, it proposes that there are two pathways to risk behavior, a reasoned
and an unreasoned path. In the unreasoned path, behavioral willingness takes the place of
behavioral intentions in earlier theories. Behavioral willingness is one’s willingness to
engage in a risky behavior given a particular set of circumstances (Gibbons et al., 2003).
Although the prototype-willingness model proposes that behavioral willingness operates
through a spontaneous process, it does not specify the potential influence of
automatically-activated attitudes on behavioral willingness. Given the non-deliberative
nature of behavioral willingness and the evidence noted above that non-deliberative
behaviors are particularly prone to influence by automatically-activated attitudes, it is
expected that:

\[ H_6: \] Automatically-activated attitudes toward alcohol will influence one’s
willingness to engage in risky alcohol-related behaviors (e.g., drinking until
intoxicated, driving under the influence).

Direct effects of these advertisement and PSA exposures on behavioral
willingness seem improbable, given the brief message exposure and the extent to which
alcohol-related behavior patterns are well-established in a college-age population.
However, if advertisements and/or PSAs influence automatically-activated attitudes as
proposed above, then it is also reasonable to expect that:

\[ H_{7a}: \] There will be a significant indirect path from message exposure (alcohol
advertisement vs. control) through automatically-activated alcohol attitudes on
such behavioral willingness to engage in risky behaviors.
$H7b$: There will be a significant indirect path from message exposure (Ad Council PSA\(^1\) vs. control) through automatically-activated alcohol attitudes on such behavioral willingness to engage in risky behaviors.

$H7c$: There will be a significant indirect path from message exposure (Ad Council PSA vs. M.A.D.D. PSA\(^2\)) through automatically-activated alcohol attitudes on such behavioral willingness to engage in risky behaviors.

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\(^1\) With positive depictions of alcohol use.

\(^2\) With no visual reference to alcohol use.
CHAPTER 3

STUDY 1: METHOD

Design and Stimuli

The study was conducted in two parts. In the first part, participants were asked to answer a number of questions about their social and recreational habits. Participants were told that after completing the questionnaire, they would view and evaluate several television advertisements. They were told that information about one’s social and recreational habits can be used to help researchers understand why people like and dislike certain advertisements. In this study, the questions about social and recreational habits were filler items and were not used in the analyses. Rather, they were included in an effort to detract from the study’s emphasis on alcohol use. Embedded in this section were two alcohol use questions. Alcohol use was strategically included in this pre-message exposure questionnaire in an effort to avoid the potential effects of condition (message exposure) on self-reported alcohol use. As noted previously, it was important to assess alcohol use prior to message exposure because in an initial investigation (see Goodall & Slater, 2008), alcohol use was measured after message exposure and the exposure potentially influenced self-reported alcohol use.
The second part of the study used a posttest-only quasi experimental design with random assignment. The design is categorized as quasi, rather than fully experimental, because the different levels of the independent variable were not manipulated.³ The independent variable, or message type (alcohol advertisement, Ad Council PSA, M.A.D.D. PSA, control advertisement) is a four-level between-subjects factor.

Those in the alcohol advertisement condition were exposed to three 30-second advertisements (for Bacardi, Budweiser, and Miller) presented in a random order. Those in the control condition were exposed to three 30-second non-alcohol product advertisements (for Apple Computers, AT&T, and Nike). Those in the Ad Council PSA condition were exposed to three 30-second alcohol PSAs that contained visual reference to alcohol consumption behavior and positive affective appeals. The messages address the issue of “buzzed” driving by comically juxtaposing visibly intoxicated individuals with those who are only slightly intoxicated. The messages call for those who are merely “buzzed” to take responsible action and not drive under the influence of alcohol, even if such influence is light to moderate. Those in the Mothers Against Drunk Driving (M.A.D.D.) PSA condition were exposed to three 30-second alcohol PSAs that make no visual reference to alcohol and contain negative affective appeals. The messages address the issue of drunk driving by depicting victims of motor vehicle accidents caused by drunk drivers.

³ In an effort to test and understand real-world televised advertisements, it was not feasible to manipulate across conditions. Future research will make it a priority to control for various message content differences across these message types by: (a) creating and/or manipulating messages, and (b) using a large, representative pool of real world messages and running a random effects model. To do either using television advertising would require, however, a large-scale, funded study.
Procedure

All data collection occurred in a computer lab using MediaLab (Jarvis, 2006a) and DirectRT (Jarvis, 2006b) software. Participants were placed in private rooms with individual computers so that the four conditions could be run within a single data collection session. After signing a consent form, participants were randomly assigned to one of the four conditions. They began the study by answering the questionnaire about social and recreational habits of OSU students. Next, they began the second portion of the study by viewing the series of advertisements presented in a random order. Immediately following exposure to the advertisements, participants completed a measure of automatically-activated evaluations of alcohol: the alcohol Affect Misattribution Procedure (AMP; Payne, Govorun, & Arbuckle, in press). Following the measurement of automatic attitude activation, participants were asked to evaluate each message (viewing two screen shots of each advertisement prior to answering each set of questions in order to refresh their memory). They also answered questions assessing their willingness to engage in various risky alcohol-related behaviors.

Measures: Pre Message Exposure

Demographics

Participants (N=225) were asked to provide their gender, age, ethnicity, and current classification at the university (i.e., freshman, sophomore, etc.). Participant ages ranged from 18-51, with a mean age of 21.6 (SD=3.37). Fifty six percent of the participants were female, and 44% were male. The majority of the participants (83%) identified their ethnicity as White, 4% as Asian, 8% as Black, 2% Hispanic, and approximately 2% selected some other category, or multiple categories. Over half of the
students indicated that they were in their 4th year of school. Participants were also asked to indicate if they speak any languages in addition to English. This question allowed the researcher to assess whether any participants spoke Chinese or Japanese. This is important to consider, as such individuals may know the meaning of the pictographs used in the AMP task, and this knowledge could bias their evaluations of the pictographs. Only six students met this criterion and were removed from analyses involving the AMP.

*Alcohol Use*

Participants were asked how often they drink any kind of alcoholic beverage (never, once a month, several times a month, several times a week, and more than once a day), and how many drinks they usually have on the days that they drink (1, 2, 3, 4, 5 or more). “Drink” was defined for the participants as one shot of hard liquor, a glass of wine, or one beer (Slater, Lawrence, & Comello, in press). Approximately 10% of the participants indicated that they never drink, 14% indicated that they drink once a month, 40% indicated that they drink several times a month, and 35% indicated that they drink several times a week. Additionally, participants indicated that on the days they drink alcohol, they consume a mean of 3.84 drinks ($SD=1.27$). A single item index was created by multiplying the frequency and quantity items together (Rhem, 2006).

*Social and Recreational Habits*

Participants were also asked to indicate the types of activities they enjoy during their free time. Specifically, they were asked to list the top five social and recreational activities they enjoy during: (a) the weekends, and (b) week days/night. Participants were also asked to list OSU athletic events that they have attended in the past. For each item listed, they were asked to indicate how often they attend such events when they are
in season on a scale from 1-4, where 4=all season home games/matches, 3=half of the season home games/matches 2= two to three games/matches, 1=one game/match.

Participants were asked to indicate whether they had ever purchased discount tickets for Columbus events through OSU’s *Explore Columbus* program, which is funded by the university’s student activity fee. Those who indicated “yes” were asked to specify which events they attended. Participants were asked if they are currently members of a sorority or fraternity. If they answered “yes,” they were asked to rate their level of satisfaction with their membership on a scale from 0 (not at all satisfied) to 10 (very satisfied). Those who answered “no” were asked to indicate the likelihood of seeking membership in a sorority or fraternity in the near future on a scale from 0 (not at all likely) to 10 (very likely). Additionally, participants were asked about eating habits, specifically how many days in an average week they (a) cook for themselves, (b) eat at campus dining services, (c) eat at sit down restaurants, and (d) eat at fast-food restaurants.

Each of these questions served to distract participants from the student’s emphasis on alcohol use. Embedded in this section were the two items about alcohol use. They were embedded strategically so that alcohol use would not be made salient through the questions immediately prior to viewing the experimental stimuli. The alcohol use items were asked prior to message exposure, as there was concern that the experimental manipulation may influence self-reported alcohol use (e.g., those exposed to the alcohol advertisements reporting heavier drinking habits).

**Measures: Post Message Exposure**

After viewing the advertisements, participants completed a measure assessing their automatically-activated evaluations of alcohol (using an implicit measure of
attitudes), a measure assessing their attitudes toward the advertisements, and a measure assessing their willingness to engage in various risky alcohol-related behaviors. The following contains a detailed discussion of implicit measures of attitudes, which outlines the most commonly used measures and justifies the use of a particular measure, the Affect Misattribution Procedure (Payne et al., 2005). Then, the attitude toward the advertisement and behavioral willingness measures are discussed.

Overview of Implicit Measure of Attitudes

Implicit vs. Explicit Measures.

There are a number of available implicit and explicit attitude measures. Explicit attitude measures are traditional self-report measures such as Likert and Semantic Differential scales (Petty & Cacioppo, 1996). Such methods allow individuals the opportunity to deliberate on their attitudes by retrieving them from memory, or constructing them when necessary in an effort to select an appropriate response on the measurement scale. Attitudes can also be measured using a variety of indirect methods. Such methods allow researchers to make inferences about individuals’ attitudes by observing their responses on tasks without having to directly ask them to report their attitudes. With such measures, participants may not even be aware that their attitudes are being assessed (Petty & Cacioppo, 1996). Examples of such measures include projective techniques, in which individuals are asked to tell a story about an object and presumably project their evaluation on the object. Information error techniques also fall into this category and often include multiple-choice questions with response choices that are all false. Attitudes about the object are inferred based on the direction of the individual’s error. Behavioral indicators can also be used, which involve an analysis of observable
behavior to infer one’s attitudes. Various *physiological measures* are considered indirect, and can include: (a) electrodermal, (b) pupillary response, (c) electromyographic activity (EMG) (i.e., facial muscle movement), (d) event related potentials (ERPs) (i.e., changes in brain waves), and other similar measures (Petty & Cacioppo, 1996).

Finally, *implicit measures* of attitudes are considered indirect measures. As discussed above, such measures assess attitudes that are automatically-activated from memory through an uncontrolled process. It should be emphasized that implicit measures are not in a separate class from indirect measures. As noted by De Houwer (in press), “direct/indirect” refers to the measurement procedure and “implicit/explicit” refers to “functional properties of the outcome of the measurement procedure” (p. 11). Accordingly, not all indirect measures have functional properties that make them implicit. For example, the information error technique is an indirect measure, but it does not necessarily tap an evaluation that is automatically-activated from memory. As will be discussed below, recent evidence suggests that one of the most commonly used implicit measures appears to lack certain functional properties of automatic attitudes.

There are a large number of implicit measures of attitudes discussed in the literature, and many use markedly different techniques. Some of the most widely cited implicit measures will be discussed in detail, including the Evaluative Priming Paradigm (Fazio et al., 1995), the Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998) and its variants, and the Affect Misattribution Procedure (AMP, Payne et al., 2005). The discussion will emphasize differences among the measures, strengths and limitations, issues of reliability and validity, and will make an argument for the use of the AMP in the present study.
Evaluative Priming Measures

Overview. A commonly used evaluative priming measure was developed by Fazio et al. (1995). The measure is based on the notion that a person’s ability to indicate the connotation of a target adjective will be facilitated when he or she has been primed with an object that is evaluatively consistent with the target. Thus, if exposure to a prime of a cockroach automatically-activates a negative evaluation, when presented with the target disgusting, an individual will be able to easily indicate that the adjective is negative. Responding will be hindered, however, when the connotation of the object is inconsistent with the valence of the automatically-activated attitude (e.g., beautiful). The evaluative priming task developed by Fazio et al. (1995) deals specifically with racial attitudes (Black and White). However, evaluative priming tasks have been used to assess automatically-activated evaluations of overweight individuals (Bessenoff & Sherman, 2000), the elderly (Dijksterhuis, Aarts, Bargh, & van Knipenberg, 2000), and one’s level of self-esteem (Spalding & Hardin, 1999), to name a few.

The evaluative priming procedure outlined by Fazio et al., (1995) consists of several tasks. The first task serves the purpose of providing baseline response time data. Twelve positive and 12 negative adjectives are presented on a computer screen in random order and participants are asked to indicate their judgments of the words by pressing keys labeled good or bad. They are instructed to do quickly without making errors. Each adjective appears on the screen until the participant answers (or for a maximum of 1.75 seconds). There is a 2.5 second delay between trials. Participants are told that the second task deals with their ability to learn faces for a recognition task. They are asked to simply attend to 16 photos of faces. In the third task, participants are presented with 32 images
(16 new, 16 from the previous task) and are asked to indicate (pressing a key labeled “yes” or “no”) whether they had previously seen the image. Each face remains on the screen for a maximum of 5 seconds with a 2.5 second delay between each trial. The fourth phase is the actual priming task. Participants are told that the first two tasks will be combined. Primes (48 images of Black, White, and “other” faces⁴) are presented for 315 ms, followed by a 135 ms interval before the target adjective. A 2.5 second interval separates the trials. Four blocks of trials are conducted in which each image is presented once. In the last phase, participants are asked to detect which of the images they had seen in order to be consistent with the cover story. The task includes the 48 primes and 48 new images.

A variety of priming procedures have been developed using various modifications of this particular procedure (Fazio, 2001). Though the tasks tend to vary slightly, all of these measures consist of a task similar to the fourth task of Fazio et al.’s (1995) procedure. Specifically, participants are primed with a number of images that elicit an automatic evaluation, and immediately after exposure, participants are asked to categorize the connotation of adjectives. Although a number of differences emerge in how such measures are constructed, research by Hermans, De Houwer, and Eelen (2001) suggests that optimal evaluative priming effects emerge when stimulus onset asynchrony (SOA) is 200 ms. The SOA used in Fazio et al.’s (1995) task is 450 ms (315 ms prime, 135 ms interval before target appears). Thus, there is evidence that perhaps an ideal version of Fazio et al.’s (1995) measure would have a shorter SOA.

⁴“Others” were used as fillers to detract from the emphasis on Blacks and Whites.
Reliability. As noted by Fazio and Olson (2003), evaluative priming measures (and other response time based measures) have generally shown low levels of test-retest reliability. The authors state, however, that there has been a lot of variability in reliability for affective priming tasks, ranging from “abysmally low” to “moderate levels” (p. 311). It is proposed that a number of factors contribute to low reliability. First, too few trials are likely to produce unstable estimates. Some of the measures producing the lowest reliabilities have used as few as four critical trials. Yet, on the other hand, the inclusion of too many trials can result in boredom, fatigue, and consequently problematic results (Fazio & Olson, 2003).

De Houwer (in press) and Olson and Fazio (2003) propose that the degree of salience of the target concept influences the reliability of the measure. For example, if when completing Fazio et al.’s (1995) evaluative priming task, individuals are paying attention to the gender or physical attractiveness of individuals, rather than their race, they will be producing noise that contributes to low reliability. De Houwer (in press) suggests that to address this problem, researchers should make the target concept salient to participants, either through instructions, or the inclusion of a text-based prime (i.e., presenting the label of the category itself, such as the words “Blacks” and “Whites”). He proposes that this will reduce the probability that participants will pay attention to features of the concept other than the target feature (De Houwer, in press).

Validity. As noted by Fazio and Olson (2003), the selection of primes in any evaluative priming task will have a strong influence on the measure’s validity. Researchers need to carefully select stimuli that are representative of the concept of interest. Research has provided evidence that the particular primes selected to represent a
concept influence evaluative priming effects. For example, Livingston and Brewer (2002) found that prototypical images of Black faces resulted in greater automatic negativity toward Blacks than images of non-prototypical Black faces.

Assessment of the validity of evaluative priming measures has dealt almost exclusively with predictive validity. Such research has provided strong evidence that evaluative priming measures predict outcomes that such measures are expected to predict from the perspective of the MODE model. For example, Fazio et al. (1995) found that automatically-activated racial attitudes predicted how friendly individuals acted toward a Black target. Dovidio et al. (1997) found that those with more negative automatically-activated evaluations of Blacks demonstrated more blinking and less eye contact with a Black interviewer. Bessenoff and Sherman (2000) found that automatically-activated evaluations of overweight women predicted seating distances to an overweight woman. Each of these studies used similar evaluative priming tasks.

Although evaluative priming measures have consistently demonstrated predictive validity, they have generally failed to demonstrate convergent validity. Research has demonstrated that the two most heavily cited implicit measures (evaluative priming and the implicit association test) tend to have surprisingly low correlations. As noted above, measurement reliability most certainly contributes to this problem (Fazio & Olson, 2003). However, the lack of relationship between the two implicit measures has much to do with their underlying mechanisms, which presumably differ greatly across evaluative priming and IAT measures. Some researchers even suggest that the IAT does not successfully assess automatically-activated attitudes (Fazio & Olson, 2003). Thus, although affective priming tasks appear unrelated to other supposed implicit measures, they are not
necessarily invalid measures. Rather, as discussed below, the problem may lie primarily
with the IAT.

Underlying mechanisms. As noted by Fazio and Olson (2003), the mechanisms
underlying priming measures are well understood, as such measures developed from
years of research on priming in both cognitive and social psychology. When using such
measures, the primes presented automatically activate the evaluation associated with that
prime. This creates a processing advantage for targets that are evaluatively congruent
(Fazio & Olson, 2003). Fazio (2001) also proposes that a spreading of activation
mechanism is at work. Specifically, facilitation produced by the prime is also due to
activation spreading from the prime to the associated evaluation. For example, if an
image of a cockroach automatically-activates a negative evaluation, that evaluation will
spread and increase the activation level of targets such as “disgusting.”

Implicit Association Test (IAT)

Overview. According to its creators, the IAT is a method for indirectly measuring
strength of association among concepts (Nosek, Greenwald, & Banaji, 2007). The task
requires “sorting of stimulus exemplars from four concepts using just two response
options, each of which is assigned to two of the four concepts” (p. 267). The IAT is built
on the notion that the sorting task will be facilitated when two concepts that share a
response are strongly associated. The IAT is conducted as follows. First, participants are
asked to categorize words into two categories. For example, in the race version of the
IAT (see Greenwald et al., 1998), participants are exposed to 25 traditionally African-
American names and 25 traditionally White names and are asked to categorize them as
Black or White (images are used in some versions). In the second task, participants are
exposed to 25 pleasant words and 25 negative words and are asked to place them into the appropriate category (positive or negative). These two tasks are combined in the third task, such that Black is paired with either positive or negative, and White is paired with either positive or negative. Participants are then exposed to the names and adjectives they were exposed to previously and must place them into the appropriate category. For those with negative automatic evaluations of Whites, the task will be more difficult when placing a traditionally White name into the White category when that category is connected to positive. On the other hand, the response will be facilitated when White and negative are paired categories. In the fourth task, participants repeat the original target-concept discrimination, but this time, the response keys reverse (e.g., if White was originally the left hand response key, it becomes the right hand response key). Finally, in the fifth task, participants repeat the combined task with reversed categories (i.e., if White and positive were originally paired, White and negative will be paired) (Greenwald et al. 1998; Greenwald & Nosek, 2001).

**Reliability.** Researchers have generally demonstrated that the IAT has stronger reliability than affective priming tasks. Test-retest reliability has reached what has been deemed a sufficiently high level (for response time based measures) of .6 by several researchers (Fazio & Olson, 2003; Greenwald & Nosek, 2001; Nosek, Greenwald, & Banaji, 2007). Additionally, it has been reported that split half reliability can range as high as .7-.9 (Nosek et al., 2007). However, as noted by Cunningham, Preacher, and Banaji (2001), reliability estimates for the IAT can increase substantially when measurement error is taken into account. Given their reliance on response latencies, many implicit measures of attitudes are fraught with measurement error.
Validity. According to Fazio and Olson (2003) there is mixed evidence regarding the predictive validity of the IAT. Although some studies have shown that it successfully predicts subsequent judgments and behavior, others have shown no relationship. The IAT, however, has successfully demonstrated concurrent validity. Specifically, it has been able to successfully categorize individuals into a variety of groups, such as ethnic and cultural groups (e.g., Japanese and Korean Americans, East and West Germans), gender, smokers and non-smokers, individuals with phobias (snake and spider), and sexual orientation (Fazio & Olson, 2003; Greenwald & Nosek, 2001; Nosek et al., 2007). In order to demonstrate convergent validity, researchers have assessed relationships between IAT assessments of attitudes and self-report assessments. There is evidence that the two types of measures are significantly related (Gawronski, 2002; Nosek et al., 2007). However, there are exceptions to these findings. For example, Karpinski and Hilton (2001) found no relationship between an IAT assessment of attitudes and an explicit assessment of those attitudes. As will be discussed in more detail below, “extrapersonal associations” may have contaminated the IAT, resulting in the lack of reported relationship. Finally, researchers have found that IATs assessing attitudes toward unrelated objects have no relationship to one another, providing some evidence of discriminant validity (Gawronski, 2002).

Underlying mechanisms. As noted by Fazio and Olson (2003), very little is known about the mechanisms driving the IAT, presumably because the development of the measure was strongly methodologically, rather than theoretically driven. The test is based on the notion that if two concepts are highly associated (i.e., elderly and negative), the IAT’s sorting task will be facilitated when those two associated concepts share the same
response compared to when they have different responses (Greenwald & Nosek, 2001; Nosek et al., 2007). Several mechanisms have been proposed to explain IAT effects.

First, it has been proposed that incompatible response mapping produces a shift in response criteria to the target and attribute stimuli on such incompatible trials (Greenwald & Nosek, 2001). For example, suppose that an individual displays automatic negativity toward a certain ethnic group. Names of individuals from that ethnic group are referred to as the target stimuli, and the positive and negative adjectives in the task are the attribute stimuli. When the ethnic group and “good” share a category, individuals have to shift the categories in their minds in order to correctly categorize the target and attribute stimuli. This results in a slower response (Brendl, Markman, & Messner, 2001).

A second explanation uses a figure-ground asymmetry model and proposes that participants perceive one response category as figure on the ground of the other response category. When the task switches, the participants responses are slowed (Rothermund & Wentura, 2001). A third explanation is a task-set switching account, which proposes that IAT effects reflect differential costs of task-switching (Klauer & Mierke, 2005; Mierke & Klauer, 2001). Within each block of the IAT, participants repeatedly switch between two tasks: (a) categorizing targets (i.e., names or images), and (b) categorizing attributes (i.e., positive and negative adjectives). The authors propose that “costs” refer to increased categorization errors and response latencies. In compatible blocks, participants can respond quickly and accurately, even if they are not engaging in this task switching. For example, in a particular block of a flower/insect IAT, suppose that flower and good share a category. When categorizing the word “tulip” one will come to the same categorization regardless of whether he or she categorizes based on the target (tulip being a flower) or
attribute (tulip being good). Thus, participants do not need to engage in task switching for each trial. They do, however, have to make such task switches in incompatible blocks (i.e., flower and bad sharing a category). In such a situation, the individual must categorize tulip by target, and not attribute in order to make a correct response.

A fourth explanation is proposed by De Houwer (2001, in press). This is based on “relevant” and “irrelevant” features of the IAT. De Houwer proposes that the structurally relevant feature of any target concept in the IAT (i.e., tulip) is its membership in one of the target categories (tulip is a flower, not an insect). However, it could be proposed that the IAT is sensitive to structurally irrelevant features, such as the valence of the individual target (i.e., tulip is positive). In order to test whether structurally relevant features (i.e., the valence of the target categories) or structurally irrelevant features (i.e., the valence of the exemplars) drive the IAT, De Houwer (2001) conducted a study using British participants in which he used the target British and Foreign, but unlike other IATs, included both positive (e.g., Princess Diana) and negative (e.g., Rosemary West—mass murderer) British names and both positive (e.g., Albert Einstein) and negative (e.g., Adolph Hitler) foreign names. Results were supportive of the structurally relevant model, as the valence of the exemplars had no effect on IAT performance. Specifically, British participants responded more favorably to the British category regardless of exemplar valence. Task performance was dictated by the instructions, which asked participants to categorize the target stimuli. Thus, the IAT reflects attitudes toward the category, and not the exemplars of that category.

Criticism and Variants of the IAT. As noted by Karpinski and Steinman (2006), the mechanisms discussed above can be interpreted to suggest that IAT effects are at least
in part due to factors other than automatically-activated evaluations of the attitude object. This leads to serious questions about the utility of the measure. De Houwer’s (2001) work in particular has led to strong criticism of the IAT. Specifically, Fazio and Olson (2003) propose that De Houwer’s findings suggest that “in contrast to priming measures, the IAT has little to do with what is automatically-activated in response to a given stimulus.” (p. 315). Fazio and Olson (2003) propose that evaluative priming tasks assess automatic attitudes because they provide an estimate of the average evaluation evoked by stimuli (e.g., Black faces). Although the IAT is thought to assess automatic attitudes, it assesses the strength of association between a category label (e.g., Black) and an evaluation (positive or negative) in comparison to a different category label (e.g., White) (Fazio & Olson, 2003). Thus, exemplars in the IAT are attended to only to the point at which their category membership is derived. The specific exemplars used make little difference (although they should be clear members of the category). Specifically, the IAT’s instructions to categorize items forces them “to be construed only as representatives of their respective categories, resulting in IAT scores based predominantly on associations to category labels” (Olson & Fazio, 2004, p. 654).

*Extrapersonal associations and the personalized IAT.* Given the IAT’s sensitivity to the category labels and not the exemplars of those categories, Fazio and Olson (2003) propose that it is subject to the influence of “extrapersonal associations,” or associations other than one’s own automatically-activated responses. Research by Karpinski and Hilton (2001) suggests that this may occur with the IAT. The authors found that participants showed preference for apples over candy bars on an IAT, but did not find such results on an explicit measure. The researchers explain that society tends to
associate apples with “good” and virtually never with “bad,” whereas candy bars are associated with both good and bad.

Olson and Fazio (2004) propose that extrapersonal associations may explain differences among responses to the IAT and other implicit measures, notably evaluative priming tasks. Research has indicated that approximately 80% of Whites who complete the IAT exhibit automatic negativity toward Blacks, whereas only 50% of Whites who complete comparable evaluative priming tasks exhibit such negativity (Olson & Fazio, 2003, 2004). Additionally, Blacks do not appear to show an in-group preference on the IAT, but have repeatedly shown such preference on evaluative priming tasks. Olson and Fazio (2004) propose that negative depictions of Blacks in society, notably through the media, influence IAT responses. Although individuals may not personally endorse these views, they are likely aware of them. This knowledge may facilitate their associating Black and negativity on the IAT when the two share a category.

Consider an example provided by Olson and Fazio (2004). One may have very negative personal attitudes toward peanuts due to severe allergies. However, when attempting to map “peanuts” and “pleasant” into the same category on an IAT, one may draw on extrapersonal associations (notably that many individuals like peanuts). Such extrapersonal associations can help facilitate the completion of the task. Thus, the resulting response on the IAT is contaminated (Han, Olson, & Fazio, 2006; Olson & Fazio, 2004).

In response to these issues, Olson and Fazio (2004) developed a variant of the IAT that seeks to overcome the influence of such extrapersonal associations. Specifically, the authors created a version of the test that uses the labels “I like” and “I don’t like”
rather than “pleasant” and “unpleasant,” which could be subject to societal, or normative associations that do not match one’s own attitudes. Results indicated that the personalized version decreased the amount of racial prejudice revealed by the IAT. Further, in replicating Karpinski and Hilton’s (2001) study, Fazio and Olson (2004) found that although participants showed a strong preference for apples over candy bars on a traditional IAT, they showed no such preference on the personalized IAT. Finally, scores on the personalized IAT correlated with explicit attitudes, but scores on the traditional IAT did not (Olson & Fazio, 2004). Follow-up research found that extrapersonal associations influenced IAT responses even when prior to completing the IAT, individuals rated the extrapersonal information as irrational, and claimed that the information would not influence their decisions. Interestingly, the inclusion of extrapersonal information did not influence a priming procedure or a personalized version of the IAT (Han, Olson, & Fazio, 2006).

**Fakeability.** The IAT has been subject to additional criticism, as there is evidence that individuals are able to fake responses on the measure. However, it is certainly not as subject to fakeability as explicit self-report measures of attitudes (Steffens, 2004). More recent research has found that participants were able to successfully fake an IAT assessing their newly formed attitudes when receiving instructions to either conform with, or respond in opposition to the researcher’s expectations (De Houwer, Beckers, & Moors, 2007). Thus, the IAT may not purely assess automatically-activated attitudes.

**Single Category IATs.** An additional criticism of the IAT is that it is only appropriate to use when the researcher is interested in comparing evaluations of two categories. For a variety of attitude objects, evaluation of one object may occur naturally
in reference to another (e.g., Coke and Pepsi, young and old). However, for some concepts, there is no relevant comparison category (e.g., smoking). The IAT cannot be effectively used in such contexts, as it relies on a second attitude object in the measurement procedure (Nosek & Banaji, 2001). In both evaluative priming and IAT measurement, it has been the norm to use two comparison categories. However, evaluative priming tasks allow separable measures of each attitude object. The IAT does not allow this separation, and provides an assessment of automatic preference for one object over the other (Nosek & Banaji, 2001).

The Go/No-Go Association Task (GNAT) (Nosek & Banaji, 2001) was developed in order to address these limitations of the IAT. It is based on the IAT, but allows for a single category to be investigated. The task consists of 96 stimulus words and images: (a) 24 names or images of the attitude object of interest, (b) 24 names or images of other objects (serving the purpose of noise), (c) 24 positive adjectives, and (d) 24 negative adjectives. The task consists of two blocks. In one block, the attitude object of interest is paired with good (i.e., Flower/Good), and in the second, it is paired with bad (i.e., Flower/Bad). Participants are instructed to press the space bar whenever an object appears that fits the category (i.e., “go”) and are instructed to do nothing for items that do not belong in the category (i.e, “no-go”) (Nosek & Banaji, 2001). In addition to using the GNAT to assess a single category, the authors also created a Black/White GNAT which allowed the separation of evaluations of Blacks and Whites (rather that just providing one’s relative preference for one category over the other, as in the IAT) (Nosek & Banaji, 2001).
Like the IAT, the development of the GNAT is methodologically, rather than theoretically driven. Thus, there is little information regarding potential mechanisms producing its effects. Like other implicit measures, the GNAT has low reliability (split-half reliability of \( r = .20 \)). The race GNAT was very weakly correlated with the race IAT, which the authors suggest has to do with low reliability of both measures. However, they suggest that each measure “may elicit substantively different aspects of implicit social cognition because of specific aspects of their designs” (Nosek & Banaji, 2001, p. 661). Thus, there is little known about how the GNAT operates and whether it is even effectively assessing one’s automatically-activated attitudes.

More recently, an additional Single Category IAT (SC-IAT) has been developed (Karpinski & Steinman, 2006). Structurally, the measure appears to be more similar to the IAT than the GNAT. It is set up the same way with the right and left response keys, but on one side the key represents two categories (e.g., good/flower) and on the other it represents only one category (e.g., bad). When the task switches, the attitude object shares a category with the opposite valence (e.g., bad/flower), and the original valence becomes a category on its own (e.g., good) (Karpinski & Steinman, 2006). Karpinski and Steinman (2006) found that the SC-IAT successfully predicted intentions, was related to explicit measures of attitudes, and had high internal consistency (\( r = .69 \)). However, consistent with previous research, there is evidence that the measure is not completely immune to faking. Additionally, the authors propose that since the SC-IAT is based on the IAT, there may be alternative explanations for effects produced by the measure. Specifically, effects may emerge due to extrapersonal associations, the costs associated with task switching, or figure ground asymmetry (Karpinski & Steinman, 2006).
Finally, De Houwer (2003) introduced the *Extrinsic Affective Simon Task (EAST)*, which is another single category version of the IAT. This task, however, tries to address some of the potential problems of the IAT, notably those that emerge due to the comparison of performance on two different tasks. As discussed previously, there is evidence that perhaps IAT effects emerge due to participants trying to recode the tasks in order to simplify them (see discussion of *task set switching* above). Thus, the EAST, involves only a single task. In completing the EAST, participants are asked to classify white (non-colored) adjectives on the screen as “good” or “bad.” If the word is colored, however, they are asked to use the color, and not the word itself as a basis of categorization. The authors define one color as representing “good,” and the other as “bad.” Responding is facilitated when the valence of the colored word matches the valence of the category that color represents. Like other response time implicit measures, the EAST’s split-half reliability can be extremely low (De Houwer, 2003). Further, Teige, Schnabel, Banse and Asendorph (2004) report that $\alpha = .24$. They also found that responses on the EAST were not related to responses on either IAT or self report versions, raising questions about its validity.

*Affect Misattribution Procedure (AMP)*

The Affect Misattribution Procedure (AMP) (Payne, Cheng, Govorun, & Stewart, 2005; Payne, Govorun, & Arbuckle, in press) was used in the present study. The AMP is a recently developed implicit measure of attitudes that differs markedly from evaluative priming methods and the IAT (and its variants). The AMP combines research on projective tests (e.g., inkblot tests) and priming in order to assess whether one’s affective responses from one source are misattributed to another source when conditions are
ambiguous. It also draws on research by Murphy and Zajonc (1993), which found that
affective responses to brief primes transferred to ambiguous objects such as Chinese
pictographs (for non-Chinese speaking participants).

The task is conducted as follows. First, participants are informed that various
Chinese characters (pictographs) will be presented on the computer screen. Next, they are
told that they will be asked to evaluate each character’s pleasantness by pressing a key
labeled “pleasant” if they perceive that it is more pleasant than the average Chinese
pictograph, and “unpleasant” if they perceive that it is less pleasant than the average. In
the race version on the AMP, participants are exposed to images of Black and White
faces and a neutral grey square. They are told that these images could bias their
judgments of the pictographs, and that they should avoid making judgments of the
pictographs based on their liking or disliking of the images.

Participants complete 72 trials of the AMP (in which the 12 Black and 12 White
primes are presented twice, and the grey square is presented 24 times). Seventy two
unique Chinese pictographs are randomly paired with the primes. For each trial, the
prime is presented for 75 ms, followed by a blank screen for 125 ms (200 ms SOA),
followed by the Chinese pictograph for 100 ms, followed by a pattern mask of “noise,”
which remains on the screen until participants rate the pictograph as “pleasant” or
“unpleasant.” Payne et al. (in press) have also developed an alcohol version of the AMP
that uses images of alcohol, water, and a grey square as primes.

Reliability. Unlike other implicit measures (notably evaluative priming measures),
which have generally displayed disappointingly low reliability (Fazio & Olson, 2003),
both the race and alcohol AMPs have demonstrated high reliability. Payne et al. (2005)
found an average reliability of $\alpha = .88$ across six studies, and Payne et al. (in press) found an average reliability of $\alpha = .91$ across four studies using the alcohol AMP.

**Validity.** Payne et al. (2005) demonstrate validity of the AMP in three ways. First, they demonstrate that it is sensitive to objects that are nearly universally regarded as favorable or unfavorable (i.e., smiling babies and puppies for favorable items, and spiders and guns for unfavorable items). Second, they demonstrate that the AMP predicts behavioral intentions. Third, they demonstrate that AMP scores are only related to explicit attitude measurements when individuals are unmotivated to conceal their attitudes. Payne et al. (in press) also demonstrated validity of the alcohol version of the AMP. Specifically, the alcohol AMP successfully predicted beverage choice (beer or water). It also successfully distinguished between drinkers and non-drinkers, hazardous and non-hazardous drinkers, and those who had experienced life problems associated with drinking. Further the alcohol AMP predicted drinking frequency and quantity. It outperformed comparable versions of an IAT and an affective priming task. Of the variables discussed, the IAT only predicted drinking frequency, and the affective priming task only predicted drinking quantity.

**Underlying Mechanisms.** Unlike all of the other implicit measures discussed thus far, the AMP does not use response times in order to assess automatically-activated evaluations. Also, because it does not use categorization tasks, the AMP has no clear right or wrong answers (unlike the IAT or evaluative priming tasks). Rather than assessing how automatic attitudes facilitate or interfere with responses, the AMP looks at how they influence participants’ construal of the target items.
The AMP is based on the assumption that when conditions are ambiguous, participants will misattribute their affective responses from one source (i.e., a prime) to another source (i.e., a Chinese pictograph). Payne et al. (2005) provide evidence that this is occurring because the AMP effects emerge even when participants are bluntly warned that the primes could influence their evaluations of the pictographs, and are asked to prevent such influence from biasing their responses. If participants believe they are being influenced, they should be able to successfully adjust their evaluations of the pictographs. Even individuals who are highly motivated to conceal their evaluations exhibit AMP effects. More specifically, individuals who are motivated to conceal racial prejudice are able to adjust their responses on an explicit measure, but are unable to make adjustments on the AMP (Payne et al., 2005). Consistent findings emerged on the alcohol AMP (Payne et al., in press). This suggests that participants do not perceive that they are being influenced by the primes, and are unable to control their responses on the AMP. Thus, the AMP assesses automatically-activated evaluations of an object by investigating how such evaluations influence the construal of the target items.

The AMP in the present study. After collecting the data, responses to the 72 trials were aggregated for each participant. This was conducted by taking a count of the total number of pleasant and unpleasant responses to each of the three primes (alcohol, water, gray square). Then, a net valence variable was calculated for each prime by subtracting the number of unpleasant responses per prime from the number of pleasant responses per prime. Accordingly, individuals with negative scores reported more unpleasant than pleasant responses, those with positive scores reported more pleasant than unpleasant responses, and those with scores of zero reported an equal number of unpleasant and
pleasant responses to the prime. The data collected from the AMP were analyzed using repeated measures designs (the within subject factor being prime—alcohol, water, or gray square).

**Attitudes toward the Advertisement**

A series of semantic differential scales were used to assess attitudes toward the advertisements. Participants were asked to circle the number that best represents their opinion on a scale from 0 to 10 for the following items: favorable/unfavorable, good/bad, enjoyable/unenjoyable, likeable/dislikeable, interesting/uninteresting, pleasant/unpleasant, appealing/unappealing, exciting/boring. These items were taken from various existing scales (see Goodall & Slater, 2008; Machleit & Wilson, 1988; MacKenzie & Lutz, 1989; Mitchell & Olson, 1981). The items were factor analyzed for each advertisement, revealing a single factor. Accordingly, an index was created for each message that averaged across all items. Cronbach’s alpha revealed sufficiently high reliability for each index (i.e., $\alpha > .8$).

In order to further simplify the data, additional factor analyses were run for each of the four conditions. For the alcohol advertisements, a single factor emerged across the three messages. Given that reliability was sufficiently high ($\alpha = .74$), a single index was created. The mean evaluation of the alcohol advertisements was 6.56 ($SD=2.03$) on an 11-point scale. For the Ad Council PSAs, a single factor emerged across the three messages with sufficiently high reliability ($\alpha=.84$). Accordingly a single index was created by averaging across items. The mean evaluation of the Ad Council PSAs was 5.80 ($SD=1.88$) on an 11-point scale. A single factor with sufficiently high reliability ($\alpha=.70$) also emerged for evaluations of the M.A.D.D. PSAs, justifying the creation of a
single index. The mean evaluation of the M.A.D.D. PSAs was 3.92 (SD=1.55). For the control advertisements, a single factor emerged across the three messages. A single index with sufficiently high reliability was created (α<.70). The mean evaluation of the control advertisements was 7.87 (SD=1.41).

It should be noted that a limitation of the design is that participants responded to each of these questions after viewing all three advertisements and completing the measure of automatic attitude activation. It was important to assess automatically-activated attitudes immediately after message exposure, as is it suggested that the effects of media primes diminish quickly (see Roskos-Ewoldsen et al., 2007), and the self-report nature of the advertisement evaluation items could potentially influence the automatically-activated evaluation. In order to facilitate responding to the ad evaluation items, participants were briefly presented with two screen shots from each advertisement prior to answering these items. This allowed them to refresh their memory of the advertisements they had previously viewed. Given the nature of the design, effects of individual advertisements were not investigated. Rather, cumulative effects of exposure to the three messages were investigated.

**Behavioral Willingness**

Behavioral willingness was measured using a modified version of Gibbons et al. (2003) and Gibbons, Gerrard, Blanton, and Russell’s (1998) measure. In the original measure, participants are asked to think about a risk-conductive situation (e.g., “Suppose you are with a group of friends playing a drinking game which involves taking repeated shots of liquor”). Next, participants are asked to indicate how likely it is that they would engage in a series of behaviors, beginning with a low-risk behavior and progressively
becoming more risky (e.g., “play until I am extremely intoxicated”) on a scale from “not at all likely” to “very likely.” We previously used this measure successfully (see Goodall & Slater, 2008). However, the self-report nature of the measure is questionable, as it allows participants opportunity to deliberate on the likelihood of engaging in each of the behaviors. This seems inconsistent with the authors’ conceptualization of behavioral willingness.

Accordingly, a modified measure developed by Comello and Slater (under review) was used that relies on response latencies to provide some indication of the extent to which people are deliberating on their responses. Participants were presented with three alcohol-relevant scenarios and were asked to indicate whether they “agree” or “disagree” that they would be likely to engage in such behaviors by selecting one of two keys on a computer. Participants were asked to respond as quickly as possible without making mistakes. The three items were presented in a random order and dealt with drinking games (liquor and beer), and “buzzed” driving. One item asked participants to “suppose you are with friends who start playing a drinking game involving repeated shots of hard liquor. How likely is it that you would do the following?” The next screen contained the statement “I would drink until I was drunk.” Participants were asked to either select “agree” or “disagree.” Another item asked participants to “suppose you are with friends who start playing beer pong. This game includes two teams, and members of each team try to throw ping pong balls across a table into full cups of beer. If a ball lands in a person's cup, that person must quickly drink the entire contents. How likely is it that you would do the following?” Again, participants saw the statement “I would drink until I was drunk” and had to indicate whether they agreed or disagreed. Finally,
participants were asked to “suppose you have been drinking with friends at a party several miles from campus. You and your friends are ready to go home, and you are the one who drove. You are buzzed, but not as much as your friends. How likely is it that you would do the following?” Next, the statement, “I would drive my friends home” appeared on the screen and participants had to indicate whether they agreed or disagreed with the statement.

Given that response latencies tend to be positively skewed, all data were subject to a natural logarithm transformation prior to analysis (see Greenwald, Nosek, & Banaji, 2003). The natural logarithm transformed data correspond to the raw data, in that lower transformed scores indicate lower raw scores (i.e., faster reaction times). Next, the variables were standardized in order to identify those cases that were +/- 3 SD from the mean. These cases (n=9, of 666 responses) were removed from analyses. In each of the nine instances, removed cases had response latencies between 7000 and 13000 ms, suggesting some kind of distraction prevented the participant from responding in a reasonable time frame.

Because participants could either indicate that they “agree” (score of 1) or “disagree” (score of 0) with the statements, the data had to be aggregated in such a way that reflected both the speed and valence of their response. Accordingly, procedures were used to reformat the responses to place them on a bipolar scale, such that fast positive responses receive larger positive values and fast negative responses receive larger negative values. Slower positive or negative responses are closer to the neutral point of zero. A new variable was created by taking 1/(original variable). This inverse ensured that faster responses now had larger values and slower responses now had smaller values.
Next, responses latencies associated with “disagree” were multiplied by -1, to switch the sign of the response latency. Those associated with “agree” remained positive. These procedures were used for all three behavioral willingness variables (beer drinking game, liquor drinking game, and driving under the influence).

Descriptive statistics illustrate that approximately half of the participants agreed that they would drink until they were drunk and half disagreed that they would do so in the liquor drinking game scenario. Approximately 57% agreed that they would drink until they were drunk and 43% disagreed in the beer drinking game scenario. Finally, 34% agreed that they would drive their friends home when buzzed and 66% disagreed that they would do so in the off-campus party/buzzed driving scenario. The mean response time to the liquor drinking game scenario item was 2346 milliseconds ($SE=77.28$), or approximately 2.3 seconds. The mean response time to the beer drinking game scenario was 2299 milliseconds ($SE=77.21$), or approximately 2.3 seconds. Finally, the mean response time to the buzzed driving scenario was 2391 milliseconds ($SE=89.80$), or approximately 2.4 seconds. These data suggest that participants took the same amount of time to respond to each of the three scenarios [$F(2,663)=.485, p=.616$].
Prior to conducting the hypothesis tests, a univariate ANOVA was conducted with condition as the between subjects factor and self-reported alcohol use as the dependent variable. As expected, there were no differences in self-reported alcohol use across the four conditions, $F(3,218)=.34, p=.80$. It should be noted that $p$-values reported in this section are two-tailed, unless otherwise noted.

Effects of Condition on Automatically-Activated Evaluations of Alcohol

The first hypothesis proposes that those exposed to the alcohol advertisements will report more positive automatically-activated evaluations of alcohol than those exposed to the control advertisements. A repeated measures analysis of variance was run with experimental condition (control, alcohol advertisement, Ad Council PSA, and M.A.D.D. PSA) as the independent variable, and automatically-activated evaluations of alcohol as the dependent variable. Because the measure of automatically-activated evaluations of alcohol (the AMP) uses three primes (alcohol, water, and grey square), it is included as a repeated factor.

Consistent with the work of Payne et al. (in press), and Goodall and Slater (2008), there was a significant main effect for prime, Greenhouse-Geisser $F(1.745,373.40)=55.233, p<.001$, $\eta^2=.205$. Means for the primes are as follows: water ($M= 9.86, SE=.837$), alcohol ($M= 2.265$, $SE=.837$), Ad Council PSA ($M= 1.65$, $SE=.837$), and M.A.D.D. PSA ($M= 1.86$, $SE=.837$).
$SE=.946$), gray square ($M=-2.142$, $SE=.994$). Post hoc Tukey comparisons indicate that participants reported more pleasant responses to the water primes than the gray square ($p<.001$) or alcohol primes ($p<.001$). Additionally, participants reported more pleasant responses to the alcohol, than control (gray square) primes ($p<.05$).

Analyses revealed a significant prime x condition interaction, Greenhouse-Geisser $F(5.235,373.403)=2.51, p<.05, \eta^2=.03$ (see Table 4.1). The cell means of the interaction are reported in Table 4.2. Using the procedures outlined by Keppel and Wickens (2004), planned comparisons were calculated in order to investigate differences in responses to the primes among those in the alcohol advertisement and control conditions. Contrary to the prediction of hypothesis 1, results indicate that there are no differences in responses toward pictographs preceded by alcohol primes among the two conditions, with those in the alcohol advertisement condition ($M=-.071$, $SE=1.867$) reporting similar responses to the alcohol primes as those in the control condition ($M=1.321$, $SE=1.911$), $F(1,355.77)=.33, p>.05$. There were also no differences in responses to the water prime [$F(1, 1,355.77)=.14, p>.05$] and the gray square/neutral prime [$F(1,355.77)=.26, p>.05$] among participants in the alcohol advertisement and control conditions.
Table 4.1

_prime x condition_ Repeated Measures ANOVA

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime</td>
<td>Greenhouse-Geisser</td>
<td>16046.312</td>
<td>1.745</td>
<td>9196.248</td>
<td>55.233</td>
<td>.000</td>
</tr>
<tr>
<td>Prime*Condition</td>
<td>Greenhouse-Geisser</td>
<td>1253.487</td>
<td>5.235</td>
<td>417.829</td>
<td>2.212</td>
<td>.05</td>
</tr>
<tr>
<td>Error</td>
<td>Greenhouse-Geisser</td>
<td>62171.626</td>
<td>355.770</td>
<td>166.500</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.2

_prime x condition_ Interaction Cell Means

<table>
<thead>
<tr>
<th>Condition</th>
<th>Prime</th>
<th>Mean</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Advertisement</td>
<td>Alcohol</td>
<td>-.071</td>
<td>1.867</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>7.571</td>
<td>1.652</td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>-3.893</td>
<td>1.960</td>
</tr>
<tr>
<td>Positive PSA</td>
<td>Alcohol</td>
<td>6.036</td>
<td>1.867</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>11.929</td>
<td>1.652</td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>-2.107</td>
<td>1.960</td>
</tr>
<tr>
<td>Control Advertisement</td>
<td>Alcohol</td>
<td>1.321</td>
<td>1.919</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>8.491</td>
<td>1.698</td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>-5.132</td>
<td>2.014</td>
</tr>
<tr>
<td>Negative PSA</td>
<td>Alcohol</td>
<td>1.774</td>
<td>1.919</td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>11.434</td>
<td>1.698</td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>2.566</td>
<td>2.014</td>
</tr>
</tbody>
</table>
Hypothesis two suggests that the significant prime x condition interaction could be explained by differences in automatic attitude activation toward alcohol among those exposed to the Ad Council PSAs (which are positively-framed and contain visual reference to alcohol consumption) and the control advertisements. Results suggest that those in Ad Council PSA condition ($M=6.036$) reported more positive automatically-activated attitudes toward alcohol than those in the control condition ($M=1.321$), [$F(1,355.77)=3.8, p<.05$]. There were no differences in responses to the water prime [$F(1,355.77)=1.99, p>.05$] and the gray square/neutral prime [$F(1,355.77)=1.54, p>.05$] among participants in the alcohol advertisement and control conditions. This pattern suggests that the positive priming in response to the alcohol PSAs was specific to the attitude object—alcohol—and did not represent a generalized pattern of more positive affect regardless of AMP prime.

Hypothesis 3 proposed that the Ad Council PSAs (which contain positive affective appeals and feature visual reference to alcohol) would be more likely to activate positive automatically-activated evaluations of alcohol than the M.A.D.D. PSAs (which are negatively-valenced and make no visual reference to alcohol). Results support this hypothesis. Specifically, results of the planned comparison suggest that those exposed to the positive PSAs with visual reference to alcohol ($M=6.036$) reported more positive automatically-activated evaluations of alcohol than those exposed to the negative PSAs with no visual reference to alcohol ($M=1.774$), [$F(1,355.77)=3.12, p<.05$]. An additional analysis was conducted in order to ensure that the negative PSAs did not inadvertently activate positive evaluations of alcohol. Results, support this notion, as there were no differences in automatically-activated evaluations of alcohol between those in the negative PSA and control advertisement ($M=1.321$) conditions, [$F(1,355.77)=.03, p>.05$]. Thus, results suggest that
only the PSAs making visual reference to alcohol use (i.e., the Ad Council messages) automatically activate positive evaluations of alcohol.

Alcohol Use as a Moderator of Effects of Condition on Attitude Activation

The findings for the prime x condition interaction were further investigated with follow-up analyses. First, as proposed in hypothesis 4, a model was constructed to test the notion that heavier drinkers in both the alcohol advertisement condition and the Ad Council PSA condition would demonstrate the most positive automatically-activated evaluations of alcohol. In order to test this proposition, a repeated measures ANOVA was run with alcohol use included as a factor. Prior to conducting this analysis, the alcohol use variable was subject to a median split. Specifically, those receiving scores of 12 or lower on the alcohol use variable were placed in the “low consumption” group \( n=125 \) and those with scores greater than 12 \( n=97 \) were placed in the “high consumption” group.

Although not significant, results are directionally consistent with a prime x condition x alcohol use interaction, Greenhouse-Geisser \( F(5.082,355.770)=1.709, p=.12, \eta^2=.024 \). An investigation of the cell means, however, illustrates no support for H4a or H4b (see Table 4.3 for cell means). Specifically, contrary to what was predicted in H4a, heavier drinkers \( (M=.00, SE=2.57) \) exposed to the alcohol advertisements did not demonstrate greater automatic attitude activation than lighter drinkers exposed to such messages \( (M=-.143, SE=2.57) \), \( p<.05 \). The data also lend no support to hypothesis 4b. Specifically, although as predicted, heavier drinkers exposed to the positive PSA reported the most positive automatically-activated evaluations \( (M=9.18) \), the evaluations were not more positive than those reported by heavy drinkers in the control condition \( (M=7.2) \) \( [F(1,355.77)=1.12, p>.05] \).
Table 4.3

Prime x Condition x Alcohol Use Interaction Cell Means

<table>
<thead>
<tr>
<th>Condition</th>
<th>Alcohol Use</th>
<th>Prime</th>
<th>M</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Advertisement</td>
<td>Low Alcohol</td>
<td>-.143</td>
<td>2.565</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>11.429</td>
<td>2.318</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>-5.357</td>
<td>2.790</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Alcohol</td>
<td>.000</td>
<td>2.565</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>3.714</td>
<td>2.318</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>-2.429</td>
<td>2.790</td>
<td></td>
</tr>
<tr>
<td>Positive PSA</td>
<td>Low Alcohol</td>
<td>4.000</td>
<td>2.328</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>11.353</td>
<td>2.104</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>-0.882</td>
<td>2.532</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Alcohol</td>
<td>9.182</td>
<td>2.894</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>12.818</td>
<td>2.616</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>-4.000</td>
<td>3.147</td>
<td></td>
</tr>
<tr>
<td>Control Advertisement</td>
<td>Low Alcohol</td>
<td>-3.097</td>
<td>2.438</td>
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</tr>
<tr>
<td></td>
<td>Water</td>
<td>8.323</td>
<td>2.203</td>
<td></td>
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<tr>
<td></td>
<td>Grey Square</td>
<td>-4.968</td>
<td>2.651</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Alcohol</td>
<td>7.545</td>
<td>2.894</td>
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<td></td>
<td>Water</td>
<td>8.727</td>
<td>2.616</td>
<td></td>
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<tr>
<td></td>
<td>Grey Square</td>
<td>-5.364</td>
<td>3.147</td>
<td></td>
</tr>
<tr>
<td>Negative PSA</td>
<td>Low Alcohol</td>
<td>-2.966</td>
<td>2.521</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>13.310</td>
<td>2.278</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>2.828</td>
<td>2.741</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High Alcohol</td>
<td>7.167</td>
<td>2.771</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Water</td>
<td>9.167</td>
<td>2.504</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grey Square</td>
<td>2.250</td>
<td>3.013</td>
<td></td>
</tr>
</tbody>
</table>

Message Evaluation as a Moderator of Effects of Condition on Attitude Activation

Hypotheses 5a and 5b propose that one’s evaluations of the messages may moderate the extent to which the messages automatically activate positive evaluations of alcohol. Specifically, it is hypothesized that those with more positive evaluations of the alcohol
advertisements should demonstrate more positive automatically-activated evaluations of alcohol than those with more negative evaluations of the advertisements. No such differences should emerge among those in the control condition. It is also proposed that those with more positive evaluations of the Ad Council PSAs (which make visual reference to alcohol use) should demonstrate more positive automatically-activated evaluations of alcohol than those with more negative evaluations of those PSAs.

In order to test this hypothesis, a repeated measures ANOVA was constructed with prime in the AMP task as a repeated factor (water, alcohol, grey square), and condition and message evaluations as between subjects factors. The message evaluation variable was subject to a median split. Scores on this variable ranged from 0 to 10.6. Those with a score of 6.4 or lower were placed in the “negative evaluation” group (n=114) and those with a score higher than 6.4 were placed in the “positive evaluation” group (n=110). Mean evaluations of the messages by group are as follows: alcohol advertisement (M=6.56, SD=2.03), Ad Council PSA (M=5.80, SD=1.88), M.A.D.D. PSA (M=3.92, SD=1.55), control advertisement (M=7.87 SD=1.41).

Results suggest a significant prime x condition x advertisement evaluation interaction, Greenhouse-Geisser $F(5.25,367.36)=2.30$, $p<.05$, $\eta^2=.03$. Investigation of the cell means (see Table 4.4) suggests no support for H5a, as those who evaluated the alcohol advertisements more positively ($M=-.526$, $SE=2.254$) did not report more positive automatically-activated evaluations of alcohol than those who evaluated the messages more negatively ($M=.889$, $SE=3.275$), $F(1,376.36)=.34$, $p>.05$. The data, however, lend support to H5b, as those who evaluated the Ad Council PSAs more favorably ($M=9.43$, $SE=3.032$)
reported more positive automatically-activated evaluations of alcohol than those who rated those messages less favorably ($M=4.00$, $SE=2.348$), $F(1,1376.36)=5.03$, $p<.05$.

Table 4.4

*Prime x Condition x Advertisement Evaluation Cell Means*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Advertisement Evaluation</th>
<th>Prime</th>
<th>$M$</th>
<th>$SE$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
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<td>Alcohol</td>
<td>.889</td>
<td>3.275</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water</td>
<td>11.889</td>
<td>2.891</td>
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<tr>
<td></td>
<td></td>
<td>Grey Square</td>
<td>-2.667</td>
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</tr>
<tr>
<td></td>
<td>High</td>
<td>Alcohol</td>
<td>-.526</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Water</td>
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<td>1.990</td>
</tr>
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<td>Alcohol</td>
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<td>High</td>
<td>Alcohol</td>
<td>9.429</td>
<td>3.032</td>
</tr>
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<td></td>
<td></td>
<td>Water</td>
<td>14.571</td>
<td>2.676</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grey Square</td>
<td>-3.619</td>
<td>3.207</td>
</tr>
<tr>
<td>Control</td>
<td>Low</td>
<td>Alcohol</td>
<td>-4.667</td>
<td>5.672</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Water</td>
<td>1.000</td>
<td>5.007</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grey Square</td>
<td>-8.667</td>
<td>5.999</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Alcohol</td>
<td>2.085</td>
<td>2.027</td>
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<td></td>
<td></td>
<td>Water</td>
<td>9.447</td>
<td>1.789</td>
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<td></td>
<td>Grey Square</td>
<td>-4.681</td>
<td>2.144</td>
</tr>
<tr>
<td>Negative PSA</td>
<td>Low</td>
<td>Alcohol</td>
<td>2.115</td>
<td>1.927</td>
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<td></td>
<td>Grey Square</td>
<td>2.154</td>
<td>2.038</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>Alcohol</td>
<td>-2.000</td>
<td>13.894</td>
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<tr>
<td></td>
<td></td>
<td>Water</td>
<td>12.000</td>
<td>12.264</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Grey Square</td>
<td>24.000</td>
<td>14.696</td>
</tr>
</tbody>
</table>
Automatically-Activated Attitudes as Predictor of Behavioral Willingness

Hypothesis 6 proposes a relationship between automatically-activated attitudes toward alcohol and willingness to engage in risky alcohol-related behaviors. Specifically, the hypothesis proposes that those with more positive automatically-activated attitudes will report greater willingness. Pearson’s correlations were run to test this hypothesis (see Table 4.5). Only responses to the alcohol prime in the AMP task were included as the automatically-activated attitudes variable (all three primes have been used in previous analyses in order to construct repeated measures models).

Table 4.5

<table>
<thead>
<tr>
<th></th>
<th>Auto Activated Attitudes</th>
<th>BW Liquor</th>
<th>BW Beer</th>
<th>BW Driving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Activated</td>
<td>r</td>
<td>1.000</td>
<td>.175*</td>
<td>.258**</td>
</tr>
<tr>
<td>Attitudes</td>
<td>N</td>
<td>218</td>
<td>213</td>
<td>211</td>
</tr>
<tr>
<td>BW Liquor</td>
<td>r</td>
<td>.175*</td>
<td>1.000</td>
<td>.502**</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>213</td>
<td>215</td>
<td>211</td>
</tr>
<tr>
<td>BW Beer</td>
<td>r</td>
<td>.258**</td>
<td>.502**</td>
<td>1.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>211</td>
<td>213</td>
<td>211</td>
</tr>
<tr>
<td>BW Driving</td>
<td>r</td>
<td>-.036</td>
<td>.012</td>
<td>.059</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>214</td>
<td>213</td>
<td>211</td>
</tr>
</tbody>
</table>

Note *p<.05, **p<.01

Results illustrate that those with more positive automatically-activated evaluations of alcohol demonstrate greater willingness to participate in a game involving repeated shots of liquor until the point of intoxication, \( r(213)=.175, p<.05 \). Similarly, those with more positive automatically-activated evaluations of alcohol demonstrate greater willingness to participate
in a game involving consumption of beer to the point of intoxication, $r(211) = .258, p < .01$.

Finally, contrary to what was hypothesized, those with more positive automatically-activated evaluations of alcohol did not demonstrate greater willingness to drive while moderately under the influence of alcohol, $r(214) = -.036, p = .60$.

Hypotheses 7a – 7c suggest that automatically-activated evaluations of alcohol will mediate, or in the absence of a direct effect, provide an indirect path to behavioral willingness for each of the three scenarios (liquor drinking game, beer drinking game, and driving under the influence). Hypothesis 7a predicted this relationship for the alcohol advertisement exposure condition. However, as noted above, the relationship between the independent variable and mediator was demonstrated to be non-significant, thus the mediation model was not tested. Hypothesis 7b and 7c predicted this mediation/indirect effects model for the Ad Council PSA exposure condition. As noted above, the test of hypothesis 2 supported the notion that exposure to such messages resulted in more positive automatically-activated evaluations of alcohol than exposure to the control messages. Given this finding, the full models were constructed and tested (see Figures 4.1 and 4.2).
A bootstrapped Sobel test of indirect effects was used to test H7b (see Hayes, 2007; Preacher & Hayes, 2004) using 5,000 bootstrap resamples. A dichotomous independent variable was first created, which included the Ad Council PSA condition and the control conditions. This was necessary, as available macros require either a continuous or a dichotomous independent variable, and differences in automatically-activated evaluations of
alcohol between the other conditions and the control condition were non-significant. Results are reported in Table 4.6.

Table 4.6


<table>
<thead>
<tr>
<th>Outcome Regressed on PSA Exposure</th>
<th>Drive under influence</th>
<th>Play Beer Game Until Intoxicated</th>
<th>Play Liquor Game Until Intoxicated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome Regressed on Evaluation (Exposure Controlled)</td>
<td>- .004 (0.025)</td>
<td>0.001 (0.026)</td>
<td>-0.005 (0.025)</td>
</tr>
<tr>
<td>Evaluation Regressed on PSA Exposure</td>
<td>4.58 (2.71)</td>
<td>4.26 (2.75)</td>
<td>4.27 (2.71)</td>
</tr>
<tr>
<td>Outcome Regressed on Evaluation (Exposure Controlled)</td>
<td>.0002 (0.0009)</td>
<td>1.00* (0.009)</td>
<td>.10* (0.0009)</td>
</tr>
<tr>
<td>Outcome Regressed on PSA Exposure (Evaluation Controlled)</td>
<td>-.005 (0.025)</td>
<td>.002 (0.001)</td>
<td>-0.010 (0.026)</td>
</tr>
<tr>
<td>Indirect Effect Mean.</td>
<td>.001 (0.005)</td>
<td>.010* (0.007)</td>
<td>.005 (0.005)</td>
</tr>
</tbody>
</table>

Note. 5000 bootstrap re-samples to obtain unbiased probability distributions (see Preacher & Hayes, 2004). N = 107. The SPSS macro produces un-standardized regression coefficients; unstandardized betas for the relationship between automatically-activated evaluations of alcohol and behavioral willingness measures are reported in text. Standard errors appear in parentheses. * p < .05 . † p = .10.

For the liquor drinking game behavioral willingness variable, the results are as follows. The direct effect of message exposure (to the positive alcohol PSA) on willingness
to participate in a drinking game involving repeated shots of liquor until intoxicated was non-significant \( [b=-.005, SE=.026, t(107) = -.1972, p=ns] \). As had been demonstrated previously, there was a significant effect of message exposure on automatically-activated evaluations \( [b=4.27, SE=.271, t(107) = 1.60, p<.05] \), meaning that those exposed to the PSAs were more likely to report positive automatically-activated attitudes toward alcohol than those exposed to the control advertisements. Results suggest a significant positive relationship between automatically-activated evaluations of alcohol and willingness to participate in the liquor drinking game until intoxicated \( [b=1.00, SE=.0009, t(107) = 1.27, p<.05, \text{ one-tailed}] \). The indirect effect, however, is non-significant, \( M = .05, SE = .005, p = .09, \text{ one-tailed} \).

For the beer drinking game behavioral willingness variable, the results are as follows. Consistent with the previous model, the direct effect of message exposure (to the positive alcohol PSA) on willingness to participate in a drinking game involving repeated shots of liquor until intoxicated was non-significant \( [b=.012, SE=.026, t(105) = .45, p=ns] \). As had been demonstrated previously, there was a significant effect of message exposure on automatically-activated evaluations \( [b=4.27, SE=2.75, t(105) = 1.56, p<.05] \), meaning that those exposed to the PSAs were more likely to report positive automatically-activated attitudes toward alcohol than those exposed to the control advertisements. There is a positive relationship between automatically-activated evaluations of alcohol and behavioral willingness, \( [b=4.27, SE=2.75, t(105) = 2.58, p<.01] \), meaning that those with more positive automatically-activated evaluations of alcohol report being more willing to participate in the beer drinking game until intoxicated. Additionally, there is evidence of a significant indirect effect, \( M = .097, SE = .007, p<.05, \text{ one-tailed} \).
For the driving under the influence behavioral willingness variable, the results are as follows. There is no evidence of a direct effect of PSA exposure on willingness to drive under the influence \[ b = .01, \ SE = .03, \ t(107) = -.15, \ p = \text{ns} \]. Results suggest that those exposed to the PSAs have more positive automatically-activated evaluations of alcohol \[ b = 4.58, \ SE = 2.71, \ t(107) = 1.70, \ p < .05 \]. However, there is no evidence of an effect of automatically-activated evaluations of alcohol on behavioral willingness \[ b = .0002, \ SE = .03, \ t(107) = -.18, \ p = \text{ns} \]. As would be expected from these findings, the indirect effect is non-significant, \( M = .001, \ SE = .005, \ p = \text{ns} \).

A bootstrapped Sobel test of indirect effects was used to test H7c (see Hayes, 2007; Preacher & Hayes, 2004) using 5,000 bootstrap resamples. A dichotomous independent variable was first created, which included the Ad Council PSA condition and the M.A.D.D. PSA conditions. Results are reported in Table 4.7.
Table 4.7


<table>
<thead>
<tr>
<th>Outcome Regressed on PSA Exposure</th>
<th>Drive under influence</th>
<th>Play Beer Game Until Intoxicated</th>
<th>Play Liquor Game Until Intoxicated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.015</td>
<td>-.018</td>
<td>-.033</td>
</tr>
<tr>
<td></td>
<td>(.024)</td>
<td>(.026)</td>
<td>(.025)</td>
</tr>
<tr>
<td>Evaluation Regressed on PSA Exposure</td>
<td>5.02*</td>
<td>4.84*</td>
<td>4.39*</td>
</tr>
<tr>
<td></td>
<td>(2.66)</td>
<td>(2.67)</td>
<td>(2.66)</td>
</tr>
<tr>
<td>Outcome Regressed on Evaluation (Exposure Controlled)</td>
<td>-.0001</td>
<td>.003*</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>(.0009)</td>
<td>(.000)</td>
<td>(.000)</td>
</tr>
<tr>
<td>Outcome Regressed on PSA Exposure (Evaluation Controlled)</td>
<td>-.005</td>
<td>-.030</td>
<td>-.036</td>
</tr>
<tr>
<td></td>
<td>(.025)</td>
<td>(.025)</td>
<td>(.026)</td>
</tr>
<tr>
<td>Indirect Effect Mean.</td>
<td>.016</td>
<td>.010(^1)</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>(.025)</td>
<td>(.007)</td>
<td>(.005)</td>
</tr>
</tbody>
</table>

*Note.* 5000 bootstrap re-samples to obtain unbiased probability distributions (see Preacher & Hayes, 2004). \(N = 107\). The SPSS macro produces un-standardized regression coefficients; unstandardized betas for the relationship between automatically-activated evaluations of alcohol and behavioral willingness measures are reported in text. Standard errors appear in parentheses. * \(p < .05\). \(^1\) \(p=.10\).

For the liquor drinking game behavioral willingness variable, the results are as follows. The direct effect of message exposure (to the positive alcohol PSA) on willingness to participate in a drinking game involving repeated shots of liquor until intoxicated was non-significant \([b=-.033, SE=.025, t(107) = -1.3131, p=ns]\). As had been demonstrated previously, there was a significant effect of message exposure on automatically-activated
evaluations \[ b=4.39, \ SE=2.66, \ t(107) = 1.65, \ p<.05, \ \text{one-tailed} \], meaning that those exposed to the PSAs were more likely to report positive automatically-activated attitudes toward alcohol than those exposed to the control advertisements. Results do not provide evidence of a positive relationship between automatically-activated evaluations of alcohol and willingness to participate in the liquor drinking game until intoxicated \[ b=.0006, \ SE=.0009, \ t(107) = .678, \ p=\text{ns} \]. As would be expected, the indirect effect is non-significant, \( M = .003, \ SE = .005, \ p=\text{ns} \).

For the beer drinking game behavioral willingness variable, the results are as follows. Consistent with the previous model, the direct effect of message exposure (to the positive alcohol PSA) on willingness to participate in a drinking game involving repeated shots of liquor until intoxicated was non-significant \[ b=-.018, \ SE=.025, \ t(105) = -.71, \ p=\text{ns} \]. As had been demonstrated previously, there was a significant effect of message exposure on automatically-activated evaluations \[ b=4.83, \ SE=2.67, \ t(105) = 1.81, \ p<.05, \ \text{one-tailed} \], meaning that those exposed to the PSAs were more likely to report positive automatically-activated attitudes toward alcohol than those exposed to the control advertisements. There is a positive relationship between automatically-activated evaluations of alcohol and behavioral willingness, \[ b=.003, \ SE=.0009, \ t(105) = 2.84, \ p<.01 \], meaning that those with more positive automatically-activated evaluations of alcohol report being more willing to participate in the beer drinking game until intoxicated. Additionally, there is evidence of a marginally significant indirect effect, \( M = .012, \ SE = .008, \ p<.07, \ \text{one-tailed} \).

For the driving under the influence behavioral willingness variable, the results are as follows. There is no evidence of a direct effect of PSA exposure on willingness to drive under the influence \[ b=.02, \ SE=.02, \ t(107) = .612, \ p=\text{ns} \]. Results suggest that those exposed
to the PSAs have more positive automatically-activated evaluations of alcohol [$b=5.02$, $SE=2.66$, $t(107) = 1.89, p<.05$]. However, there is no evidence of an effect of automatically-activated evaluations of alcohol on behavioral willingness [$b=-.0001$, $SE=.0009$, $t(107) = -.13$, $p=ns$]. As would be expected from these findings, the indirect effect is non-significant, $M = -.0006$, $SE = .005$, $p=ns$. 
CHAPTER 5

STUDY 1: DISCUSSION

Interpretation of Findings

The results of this study provide important insight about how individuals process alcohol advertising and public service messages, but also leave important questions unanswered, specifically regarding when, and through what mechanisms such messages automatically activate evaluations of alcohol. Results of this study reveal interesting findings for the Ad Council PSA condition (which consisted of messages with positive depictions of alcohol use). Results suggest that these messages may inadvertently activate one’s positive automatic attitudes toward alcohol. Those exposed to these messages (which show alcohol being consumed in fun, social settings) reported more positive automatically-activated evaluations of alcohol than those exposed to the control advertisements and the M.A.D.D. PSAs (which contain no visuals of alcohol or alcohol use). These findings have important implications for PSA message design, suggesting that one should avoid showing visual cues of alcohol consumption that may activate one’s positive evaluations of the substance. According to Fazio’s (1990) MODE model, if people are both motivated and able to consider these activated attitudes, they will likely override them and consider the message’s anti-drunk driving intent. However, if motivation and opportunity are absent, the automatically-
activated (positive) attitude is likely to influence one’s perceptions and decisions in potentially negative ways.

Like our previous investigation, these findings again suggest that alcohol PSAs do not activate one’s automatic negative evaluations of alcohol. This is not surprising, as the messages are not anti-alcohol, but rather anti-drunk driving. If the AMP measure addressed automatically-activated evaluations of drunk driving (which are presumably, strong, well learned cultural associations with potential for automatic activation), such a finding might have emerged. Future research should investigate this possibility with an adapted version of the AMP (or another similar implicit measure) with a drunk driving focus.

On their own, these data suggest that alcohol advertisements do not automatically activate one’s positive evaluations of alcohol use (as those in the alcohol advertisement condition did not report more positive evaluations of alcohol on the implicit measure of attitudes than those in the control condition). This finding contradicts our previous research (see Goodall & Slater, 2008), which found that those exposed to the alcohol advertisements reported more positive automatically-activated evaluations of alcohol than those exposed to the control advertisements. Results of that previous study, however, were inconclusive because although participants were randomly assigned to conditions, results indicated that those exposed to the alcohol advertisements self-reported heavier drinking habits than those in the other three conditions. Thus, there were questions as to whether differences in automatic attitude activation between the alcohol advertisements and control conditions were really attributable to message exposure, or whether they were attributable to differences in alcohol consumption. There were also questions as to whether the observed differences in alcohol consumption across conditions were genuine, or a result of message exposure.
Because drinking habits were assessed after message exposure, it was impossible to determine whether random assignment failed to result in equal conditions, or whether the experimental manipulation actually influenced self-reported alcohol use. The present findings suggest that perhaps the heavier drinking habits among those in the alcohol condition were responsible for our previous findings, rather than the effects of the message itself, as effects on advertisements did not replicate. On the other hand, given that significant effects emerged for the Ad Council PSA condition, results suggest that advertising messages do have the potential to automatically activate evaluations of alcohol, but the situations in which that is likely to occur are not well understood.

Although this issue cannot be fully addressed empirically with the present data, I argue that limitations of the stimuli may be partially responsible for the lack of expected differences between the alcohol advertisement and control advertisement conditions. Identical stimuli were used in the Goodall and Slater (2008) study and the present study. At the time of the original study, the stimuli in the alcohol advertisement and control conditions were currently running advertisements. These same stimuli were outdated and no longer running at the time of the present investigation. This is an important consideration, given that the advertising literature suggests that effects of repetitive message exposure can lead to wear out, and even negative affect over time (see Batra & Ray, 1986; Berlyne, 1970; and Stang, 1975). Comparison of message evaluation in the alcohol advertisement condition suggests that participants in the alcohol advertisement condition in the Goodall and Slater (2008) study (M=7.5, SD=1.6) had significantly more favorable evaluations of the messages than

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5 Recall that there were no differences in self-reported alcohol use across conditions in the present study. As an additional precaution, additional models were run with alcohol use as a covariate, and consistent results emerged.
those who viewed the same messages in the present study ($M=6.7$, $SD=1.5$, scale midpoint=6), $F(1,104)=6.192$, $p<.01$. Participants in the alcohol advertisement condition in the Goodall and Slater study ($M=12.25$, $SE=.96$) and the present study ($M=12.25$, $SE=.86$) reported similar levels of alcohol use, $F(1,103)=.000$, $p<.997$. Thus, differences in advertisement evaluations across the studies are unlikely attributable to differences in alcohol use.

These findings suggest that the effects observed across the Goodall and Slater (2008) and present study are likely more complex than originally anticipated. It may be necessary to not only consider automatically activated evaluations of alcohol, but also automatically activated attitudes toward the message itself. Previous research has provided evidence that enjoyment of advertising messages can lead to more positive brand and product evaluations (see MacKenzie, Lutz, & Belch, 1986; Mitchell & Olson, 1981; MacKenzie & Lutz, 1989), and more positive evaluations of the target issues in PSAs (see Nan, 2008), but the measures used in these studies have been explicit rather than implicit. Given the repetitive nature of advertising, there may be adequate opportunity for individuals to develop automatic attitudes toward individual messages, or advertising campaigns.

If the advertising messages become worn out and irritating over time, one’s evaluations of alcohol and the messages may potentially be in conflict with one another (i.e., positive automatically activated evaluation of alcohol, and negative automatically activated evaluations of the message). Questions remain about how such conflicting attitudes may interact. Research suggests that such conflict may result in an ambivalent attitude (see Sherman, Rose, Koch, Presson, Chassin, 2003), which may have been detected on the implicit measure in the present study. Olson and Fazio (2007) have investigated the issue of
discordant attitudes by looking at discrepancy between one’s evaluations of racial groups, and their evaluations of specific individuals from those groups. This may parallel the present context, which deals with general attitudes toward alcohol, and more specific attitudes toward the messages or campaigns. These studies suggest the importance of considering automatically activated attitudes toward both alcohol and the message in future research. Such research has the potential to expand on the literature investigating the impact of ad evaluations on product and issues evaluations, particularly the work on evaluations of PSAs (see Nan, 2008, Slater, 2006). Previous research has investigated how ad enjoyment influences the development of deliberative attitudes toward brands, products, and issues, but has not investigated how these processes emerge more automatically and implicitly. Given that Olson and Fazio (2001, 2002) have demonstrated that the repeated pairing of valenced stimuli with attitude objects can lead to the development of automatic attitudes (of which individuals lacked conscious awareness), it seems necessary to further investigate such processes in future research.

To summarize, results suggest that effects of message exposure on automatically-activated attitudes are presumably contingent on a number of factors (e.g., message enjoyment and novelty). Future research should compare current and outdated messages in order to investigate whether these differences matter, as previous research in advertising suggests they likely do.

In addition to the investigation of message exposure on automatically-activated attitudes toward alcohol, this study considered both alcohol use and attitudes toward the advertisements as moderators of this relationship. Results suggest that alcohol use does not moderate the relationship between message exposure and automatically-activated attitudes in
either the alcohol advertisement or Ad Council PSA condition. Specifically, those who report heavier drinking habits do not report more positive automatically-activated evaluations of alcohol in either condition.

This hypothesis is based on the assumption that heavier drinkers have stronger object-evaluation links than lighter drinkers. The lack of findings may be somewhat attributable to the sample, which consisted of college students, for whom alcohol use may play an important role in socialization. Specifically, over 90% of the participants reported drinking, with 75% of participants drinking either several times a month or several times a week. Of those 90% who reported that they drink, 80% reported consuming 3 or more drinks per drinking episode, and 44% reported drinking 5 or more drinks. Thus, a sample like this may lack the variability necessary to investigate whether differences in alcohol consumption moderate the relationship between message exposure and attitude activation. Future research should seek a more diverse sample containing both lighter (or non-drinkers) and heavier drinkers.

Attitude toward the advertisement was also investigated as a moderator of the relationship between message exposure and automatically-activated attitudes. This received mixed support, as there was no evidence that those who evaluated the alcohol advertisements more positively reported more positive automatically-activated evaluations toward alcohol than those who evaluated the advertisements less positively. This relationship did emerge, however, for the Ad Council PSA condition, with those reporting more positive evaluations of the messages also reporting more positive automatically-activated attitudes toward alcohol than those reporting more negative message evaluations. It is unclear why these findings emerged only for the Ad Council PSA condition and not the alcohol advertisement condition. However, as suggested above, it is possible that message familiarity may play a role. As was
noted previously, there is evidence that evaluations of the alcohol advertisements decreased between the original Goodall and Slater (2008) study, and the present study. Presumably, this would occur due to the messages becoming too familiar (through repeated exposure) and outdated. The Ad Council PSAs, although not new, are presumably less familiar to participants, as they are not televised nearly as frequently as alcohol advertisements. Again, this is something that is necessary to follow-up through future research in order to better interpret these findings.

This study also investigated a potential outcome of automatic attitude activation. Specifically, it investigated whether automatically-activated attitudes toward alcohol influence how open people are to various risky alcohol behaviors. Results suggest that those who report more positive automatically-activated evaluations of alcohol report greater willingness to participate in drinking games until intoxicated. Results did not suggest, however, that such evaluations influence willingness to drive while moderately under the influence of alcohol (or “buzzed”). Limitations of the measure may be somewhat attributable to this finding. Although the measure was designed in such a way to be able to capture responses that are spontaneous and automatic, and to identify those that are more thoughtful and deliberative (by looking at response latencies), results suggested that on average, participants took over two seconds to respond to each item, which presumably would allow them enough time to override their automatic responses with more thoughtful, and/or socially desirable ones. Thus, future research is needed to investigate more valid measures of behavioral willingness that are based on the techniques used in implicit attitude measures to capture responses that are truly automatic and uncontrolled. The traditional self-report measures used by Gibbons et al. (1998, 2003) also likely suffer from controllability and
social desirability problems. This is an important issue that should be addressed in future research.

In order to identify if automatically-activated attitudes provide an indirect path from message exposure to behavioral willingness, mediation models were constructed comparing the Ad Council PSA and control conditions (because there was evidence that the Ad Council messages automatically-activated positive evaluations of alcohol). Results suggested a non-significant indirect effect for the liquor drinking game outcome, but a significant indirect effect for the beer drinking game outcome.

Conclusions

Overall, these findings leave questions unanswered for the alcohol advertisement condition. Given that the Ad Council PSAs (which feature visuals of people consuming alcohol in social contexts) activated positive automatic attitudes toward alcohol, it seems likely that the alcohol product advertisements should have the same potential to do so. Accordingly, questions arise about whether previous exposure and message currency play a role in this relationship. It is necessary to sort out this possibility in future research.

Consistent with previous research, these findings suggest that attitudes toward the advertisement may moderate the relationship between message exposure and positive automatic attitude activation. Thus, messages that are enjoyable and well-liked may activate more positive evaluations of alcohol. Accordingly, the findings investigating the Ad Council PSAs suggest that there may be potential for such messages to fail, or even worse, backfire, if a couple of conditions are met. First, it may be risky to include visual reference to alcohol and/or alcohol consumption. Second, there is evidence that it may be risky to create alcohol PSA messages that are enjoyable and activate positive affect. Given that these particular
messages included both visual cues and positive appeals, it is not possible, however, to sort out whether both message content features are problematic, or whether they can produce negative message outcomes individually. This is an important consideration, as there are some currently running alcohol PSAs (e.g., those produced by the U.S. Department of Transportation) that use negative affective appeals, but contain visual reference to the substance in the message. Questions remain about whether these messages may potentially activate positive automatic attitudes toward alcohol, or whether only messages that contain both visual cues and positive affective appeals have such potential. This is an important issue that should be addressed in future research. Additionally, future research should address the limitations of the behavioral willingness measure in order to better understand the impact of automatically-activated attitudes (via message exposure) on judgments and decision-making.
CHAPTER 6

STUDY 2

Study Overview

Study 2 is a replication of Study 1 with a key methodological distinction. Specifically, an alternative to the Affect Misattribution Procedure (AMP) will be used as an assessment of automatically-activated attitudes. The rationale for including an alternative measure is that currently available and established measures of automatically-activated attitudes (including the AMP) use primes. These primes (i.e., images of alcohol) presumably activate one’s evaluations of the object. The strength and valence of these evaluations are gauged by looking at individuals’ responses after being exposed to the primes. These responses include performance on categorization tasks (e.g., the Implicit Association Test, or evaluative priming tasks), or in the case of the AMP, evaluations of ambiguous objects. There is concern with using such measures to assess whether mediated messages activate (or prime) one’s automatic attitudes because the measures themselves may be sufficient to activate existing evaluations of the object. Thus, it is possible that with such measures, differences in attitude activation across conditions will fail to emerge. It is possible that if a strong enough object-evaluation link exists in memory, the primes in the measures themselves may be enough to fully activate the
evaluation. In such a case, the alcohol advertisements may not result in increased
activation above and beyond what is activated by the measure itself. On the other hand, it
is possible that even if the measures automatically activate one’s existing evaluations of
alcohol, the advertising messages may still result in detectably higher levels of activation.
Given these two possibilities, a non-priming measure will be used in the study in place of
the AMP.

Substance Memory Associations

Unfortunately, the most established implicit measures of attitudes use primes.
Measures of memory association, however, are available that do not utilize primes.
Stacy’s (1997) work on memory associations and substance use holds that individuals
have different levels of strength between outcomes (e.g., enjoyment) or cues (e.g., a
party) and substances such as alcohol. Stacy proposes that the mere presentation of the
outcome or cue can activate an alcohol-consistent cognitive state if there is a sufficiently
strong object-outcome link or object-cue link. This is consistent with Fazio’s (1990)
conceptualization of attitudes and attitude accessibility. The only difference is that with
attitudes, we are referring to the object-evaluation link rather than the object-outcome or
object-cue link.

Stacy (1997) also proposes that a memory association approach to substance use
is consistent with Greenwald et al.’s (1998) work on implicit cognition. From this
perspective, when individuals have strong, well learned memory associations, such
associations have strong potential to be activated when certain cues are present. When
such activation occurs, decisions and behaviors may be biased in favor of substance use.
Stacy (1997) proposes that unless individuals consciously and deliberately try to access
less accessible alternative behaviors and cognitions, their substance use consistent cognitive state is likely to influence decisions and outcomes. He proposes that this process is spontaneous and automatic, which is consistent with Fazio’s (1986) automatic attitude-to-behavior process. Stacy (1997) states that processes through which memory associations influence decisions and outcomes are not necessarily unconscious, but they can come to mind with little to no effort and can bias one’s interpretations, thoughts and decisions. Additionally, Stacy suggests that the process is unlikely to be available to introspection, nor is it likely to be guided by deliberative weighing of pros and cons of a behavior.

Given that Stacy (1997) proposes that memory associations form through cumulative exposure and experiences with substances, presumably, individuals with strong memory associations toward a substance should also have strong, well-learned attitudes toward the object. The inclusion of a memory-association measure provides an opportunity to assess strength of association without the threat of double priming individuals in the alcohol advertisement condition and single priming individuals in the control condition. Stacy’s (1997) memory association measure assesses what he proposes is implicit, or uncontrolled cognition because it prevents deliberate recollection and conscious decision processes from influencing individuals’ responses. Although not implicit attitude measures, Stacy (1997) suggests that his memory association measures are appropriately categorized as implicit memory tests.

Hypotheses

Consistent with the previous study, it is expected that the measure used in this study will provide evidence of positive memory associations and evaluations of alcohol
being activated upon exposure to the message. Specifically, it is expected that the presence of familiar alcohol-relevant outcomes (e.g., enjoyment, relaxation) and familiar alcohol-relevant cues (e.g., parties, bars, social events) in the messages will activate an alcohol-consistent cognitive state (see Ames et al., 2002; Stacy, 1997, Stacy et al., 2000). Thus, the following hypotheses regarding the activation of alcohol memory associations are advanced:

\( H1 \): Those exposed to the alcohol advertisements will be more likely to (a) respond to alcohol-relevant homographs with alcohol-relevant terms, and (b) evaluate those alcohol-relevant terms more positively than those in the control advertisement condition.

Further, given the positive alcohol-relevant cues in the Ad Council PSAs, it is expected that:

\( H2 \): Those exposed to the Ad Council PSAs (with positive depictions of alcohol use) will be more likely to (a) respond to alcohol-relevant homographs with alcohol-relevant terms, and (b) evaluate those alcohol-relevant terms more positively than those in the control advertisement condition.

Finally, given that the M.A.D.D. PSAs do not contain such cues, it is expected that:

\( H3 \): Those exposed to the Ad Council PSAs (with positive depictions of alcohol use) will be more likely to (a) respond to alcohol-relevant homographs with alcohol-relevant terms, and (b) evaluate those alcohol-relevant terms more positively than those in the M.A.D.D. PSA condition (with no visual depictions of alcohol use).
Consistent with study 1, it is expected that several variables may influence the relationship between message exposure and memory associations. Specifically, it is proposed that heavier drinkers may demonstrate the greatest activation of alcohol memory associations. It is proposed that given their cumulative experiences with alcohol, which positively reinforce their use of the substance, heavy drinkers will have developed strong positive memory associations toward alcohol with great potential for activation upon message exposure (Stacy, 1997). Thus, the following hypotheses are advanced:

\[ H4a: \] Heavier drinkers exposed to the alcohol advertisements will demonstrate greater activation of memory associations than those in the control condition or M.A.D.D. PSA condition (with no visual depictions of alcohol use).

\[ H4b: \] Heavier drinkers exposed to the Ad Council PSAs (with positive depictions of alcohol use) will demonstrate greater activation of memory associations than those in the control condition or M.A.D.D. PSA condition (with no visual depictions of alcohol).

Also consistent with study 1, it is expected that evaluations of the message will influence the activation of memory associations. Specifically, it is expected that cues in the message that activate positive affect toward the message will also cue positive memory associations toward alcohol use. The advertising literature has demonstrated that message enjoyment influences message outcomes. Specifically, it has been demonstrated the message enjoyment can, over time, result to more positive brand evaluations (MacKenzie, Lutz, & Belch, 1986; Mitchell & Olson, 1981; MacKenzie & Lutz, 1989). Thus, it seems plausible that cumulative exposure to enjoyable advertising messages may result in more positive associations toward the object (i.e., alcohol). From an evaluative
conditioning perspective (see Olson & Fazio, 2001, 2002), it can be proposed that continued pairings of positive affect (elicited from the message) and the object of interest (alcohol) may result in a conditioned association between the message and object. Specifically, exposure to enjoyable alcohol advertisements may facilitate activation of positive memory associations. Given the positive appeals and positive alcohol cues present in the alcohol advertisements and Ad Council PSAs, it is proposed that:

*H5a:* Among those exposed to the alcohol advertisements and Ad Council PSAs, those who report more positive evaluations of the messages will report greater activation of memory associations toward alcohol.

*H5b:* Among those exposed to the alcohol advertisements and Ad Council PSAs, those who report more positive evaluations of the messages will report greater activation of memory associations toward alcohol.

Consistent with the work of Ames et al. (2002), Stacy (1997), and Stacy et al. (2000), once activated, alcohol consistent cognitions (i.e., memory associations) are likely to influence behavioral decisions. Specifically, Stacy et al. (2000) propose that when activated, memory associations are unlikely to influence behavior and outcomes emerging through reasoned or rational processes. Rather, they are likely to influence decisions and behavior through more spontaneous, unreasoned processes. This is consistent with Gibbons et al.’s (1998) prototype-willingness model (discussed in detail in study 1). The model proposes that risky behavior may emerge through either a deliberative and reasoned path, or a spontaneous and unreasoned path. The unreasoned path contains the construct of behavioral willingness, or one’s openness to risk
opportunity. This variable is proposed to influence behavior that occurs spontaneously. Thus, the following hypothesis is advanced:

\( H6 \): Activated alcohol memory associations will influence one’s willingness to engage in risky alcohol-related behaviors (e.g., drinking games, driving under the influence).

Further, given that it is proposed that exposure to the alcohol advertisements and Ad Council PSAs will activate one’s alcohol memory associations, the following hypotheses are advanced:

\( H7a \): There will be a significant indirect path from message exposure (alcohol advertisement vs. control) through alcohol memory associations on willingness to engage in risky behaviors.

\( H7b \): There will be a significant indirect path from message exposure (Ad Council PSA vs. control) through alcohol memory associations on willingness to engage in risky behaviors.

Method

Design and Stimuli

The design and stimuli for study 2 are consistent with study 1. Like study 1, study 2 was conducted in two parts. In the first part, participants completed a number of items about their social and recreational habits. Embedded in this section were two questions about participants’ alcohol use. Alcohol use was assessed prior to message exposure so that the experimental manipulation (message exposure) would not influence self-reported alcohol use. Participants were told that knowledge of their social and recreational habits would assist the researchers in understanding why people like and
dislike certain advertisements. However, the only items of interest in this section were the alcohol-use items.

The second part of the study used a posttest-only quasi experimental design with random assignment. Consistent with study 1, message type (alcohol advertisement, Ad Council PSA, M.A.D.D. PSA, control advertisement) is a four-level between-subjects factor. The stimuli used in study 1 were also used in study two. Specially, those in the alcohol advertisement condition were exposed to three 30-second advertisements (for Bacardi, Budweiser, and Miller) presented in a random order. Those in the control condition were exposed to three 30-second non-alcohol product advertisements (for Apple Computers, AT&T, and Nike). Those in the Ad Council PSA condition were exposed to three 30-second alcohol PSAs that contain visual reference to alcohol and use positive affective appeals, and those in the M.A.D.D. PSA condition were exposed to three 30-second alcohol PSAs that make no visual reference to alcohol and use negative affective appeals.

Procedure

All data collection occurred in a computer lab using MediaLab (Jarvis, 2006a) and DirectRT (Jarvis, 2006b) software. Participants were placed in private rooms with individual computers so that the four conditions could be run within a single data collection session. After signing a consent form, participants were randomly assigned to one of the four conditions. They began the study by answering the questionnaire about social habits of OSU students. Next, they began the second portion of the study by viewing the series of advertisements presented in a random order. Immediately following exposure to the advertisements, participants completed a modified memory association
measure (see Stacy, 1997). Following the memory association measure, participants were asked to evaluate each message (viewing two screen shots of each advertisement prior to answering each set of questions in order to refresh their memory). They also answered questions assessing their willingness to engage in various risky alcohol-related behaviors.

Measures: Pre Message Exposure

Demographics

Participants (N=120) were asked to provide their gender, age, ethnicity, and current classification at the university (i.e., freshman, sophomore, etc.). Participant ages ranged from 18-26, with a mean age of 19.9 (SD=1.53). Sixty two percent of the participants were female, and 38% were male. The majority of the participants (86%) identified their ethnicity as White, 5% as Asian, 5% as Black, 2% Hispanic, and approximately 2% selected some other category, or multiple categories. Twenty six percent of the participants indicated that they had freshman status in school, 36% had sophomore status, 26% junior status, and 11% had senior status.

Alcohol Use

Participants were asked how often they drink any kind of alcoholic beverage (never, once a month, several times a month, several times a week, and more than once a day), and how many drinks they usually have on the days that they drink (1, 2, 3, 4, 5 or more). “Drink” was defined for the participants as one shot of hard liquor, a glass of wine, or one beer (Slater, Lawrence, & Comello, in press). Approximately 15% of the participants indicated that they never drink, 18% indicated that they drink once a month, 41% indicated that they drink several times a month, and 27% indicated that they drink several times a week. Additionally, participants indicated that on they days they drink...
alcohol, they consume between 1 and 5 drinks, with a mean of 4.06 drinks ($SD=1.15$). A single item index was created by multiplying the frequency and quantity items together (Rhem, 2006).

Social and Recreational Habits

Participants were also asked to indicate the types of activities they enjoy during their free time. The items from study 1 were used.

Measures: Post Message Exposure

After viewing the advertisements, participants completed a measure assessing their alcohol memory associations, a measure assessing their attitudes toward the advertisements, and a measure assessing their willingness to engage in various risky alcohol-related behaviors.

Memory Associations

An adapted version of Stacy’s (1997), and Stacy, Newcomb, and Ames’ (2000) memory association measure was used. Stacy et al. presented participants with 5 ambiguous words related to alcohol (tap, draft, mug, shot, pitcher) and various non-alcohol related filler words in a random order. Participants were asked to quickly list whatever word came to mind after viewing each word, providing an indication of construct accessibility. Specifically, if the participants stated something related to alcohol after viewing the word “draft” rather than something non-alcohol related (e.g., a term paper), this would provide indication that alcohol was salient. Such a procedure does not however, suggest that one’s evaluations of alcohol are also activated. Thus, in order to assess evaluations of alcohol, the following modifications were made.
This first part of each trial was consistent with the original task. For the critical alcohol trials, responses relevant to alcohol were coded 1, and responses irrelevant to alcohol were coded 0. Examples of alcohol-relevant responses include “beer,” “booze,” “keg,” “liquor,” “tequila,” etc. Examples of non-relevant responses are as follows. For the word “tap” a number of participants responded with the words “dance,” and “finger.” For the word “pitcher,” a number of participants responded with the words “baseball,” “Kool-Aid, or “lemonade.” The task consisted of the five alcohol-relevant homographs (draft, mug, pitcher, shot, and tap), twenty non-alcohol relevant homographs (e.g., bow, bass, spring, row, rose), and five non-alcohol practice trials. The purpose of the twenty non-alcohol relevant words was to detract from the task’s emphasis on alcohol.

The task differed from Stacy’s (1997) and Stacy et al.’s (2000) task in that it also assessed participants’ evaluations of the alcohol-relevant words that they reported. Specifically, after listing the first word each presented word (homograph) made them think of, participants were asked to categorize the word by either selecting a key labeled “positive” or “negative.” Participants were asked to complete the task as quickly as possible without making mistakes, emphasizing that the researchers were interested in their “gut” reactions to each word, not their reactions after thinking about them carefully.

Each participant received two scores. The first score indicated the number of alcohol-relevant responses the participant made for the five alcohol-relevant homographs. Alcohol-relevant responses were given a score of 1, and non alcohol-relevant responses were given a score of zero. In order to create the response to alcohol-relevant homographs variable, a sum across each of the 5 alcohol-relevant trials was taken. Scores on this variable ranged from 0 to 3 ($M=1.00, SD=1.04$).
Next, an additional variable was constructed that included only participants who responded to at least one of the alcohol-relevant homographs with an alcohol-relevant word. Fifty eight percent of the participants met this criterion. Participants who rated the alcohol-relevant word they listed as favorable received a score of +1, and participants who rated the alcohol-relevant word they listed unfavorably received a score of -1. Next, a net valence score was calculated, such that participants who had an equal number of positive and negative evaluations of the alcohol-relevant words received a score of zero, those who had more positive than negative evaluations of the alcohol-relevant words received a score $\geq 1$, and those with more negative than positive evaluations received a score $\leq -1$. Results illustrate, however, that participants evaluated the alcohol-relevant words they listed as positive in 82% of the trials. Thus, there were few instances of participants evaluating the alcohol-relevant terms negatively. There is evidence, however, of a marginally significant relationship between evaluation valence and response time, with those evaluating the alcohol-relevant words negatively ($M=1388\text{ms, }SD=174$) taking longer to respond than those evaluating the words positively ($M=1026\text{ms, }SD=83$) $[F(1,117)=3.53, p=0.06]$. This increase in response latency suggests that individuals who responded negatively, deliberated longer, possibly overriding their initial positive response to the word.

*Attitudes toward the Advertisement*

The same items from study 1 were used to assess attitudes toward the advertisement. As in study 1, the items were factor analyzed for each advertisement, revealing a single factor. Accordingly, an index was created for each message that
averaged across all items. Cronbach’s alpha revealed sufficiently high reliability for each index (i.e., $\alpha \geq .8$).

In order to further simplify the data, additional factor analyses were run for each of the four conditions. For the alcohol advertisements, a single factor emerged across the three messages. Given that reliability was sufficiently high ($\alpha = .70$), a single index was created. The mean evaluation of the alcohol advertisements was 6.24 ($SD=1.63$) on an 11-point scale. For the Ad Council PSAs, a single factor emerged across the three messages with sufficiently high reliability ($\alpha=.74$). Accordingly a single index was created by averaging across items. The mean evaluation of the Ad Council alcohol PSAs was 5.33 ($SD=1.63$) on an 11-point scale. A single factor with sufficiently high reliability ($\alpha=.73$) also emerged for evaluations of the M.A.D.D. PSAs, justifying the creation of a single index. The mean evaluation of the M.A.D.D. PSAs was 4.04 ($SD=1.22$). Finally, for the control advertisements, a single factor emerged across the three messages. A single index with sufficiently high reliability was created ($\alpha<.70$). The mean evaluation of the control advertisements was 7.05 ($SD=1.51$).

**Behavioral Willingness**

Behavioral Willingness was measured using a modified version of Gibbons et al. (2003) and Gibbons, Gerrard, Blanton, and Russell’s (1998) measure that was used in study 1. Participants were again exposed to the three alcohol risk conductive scenarios (i.e., liquor drinking game, beer pong game, and driving under the influence scenarios) and were asked to indicate (yes or no) if they would be willing to engage in each behavior.
Given that response latencies tend to be positively skewed, all data were subject to a natural logarithm transformation prior to analysis (see Greenwald, Nosek, & Banaji, 2003). The natural logarithm transformed data correspond to the raw data, in that lower transformed scores indicate lower raw scores (i.e., faster reaction times). Next, the variables were standardized in order to identify those cases that were +/- 3 SD from the mean. These cases (n=4, of 356 responses) were removed from analyses. In each of the four instances, removed cases had response latencies between 8000 and 17000 ms, suggesting some kind of distraction prevented the participant from responding in a reasonable time frame.

Because participants could either indicate that they “agree” (score of 1) or “disagree” (score of 0) with the statements, the data had to be aggregated in such a way that reflected both the speed and valence of their response. Accordingly, procedures were used to reformat the responses to place them on a bipolar scale, such that fast positive responses receive larger positive values and fast negative responses receive larger negative values. Slower positive or negative responses are closer to the neutral point of zero. A new variable was created by taking 1/(original variable). This inverse ensured that faster responses now had larger values and slower responses now had smaller values. Next, responses latencies associated with “disagree” were multiplied by -1, to switch the sign of the response. Those associated with “agree” remained positive. These procedures were used for all three behavioral willingness variables (beer drinking game, liquor drinking game, and driving under the influence).

Descriptive statistics illustrate that approximately 45% of the participants agreed that they would drink until they were drunk and 55% disagreed that they would do so in
the liquor drinking game scenario. Approximately 56% agreed that they would drink until they were drunk and 44% disagreed in the beer drinking game scenario. Finally, 28% agreed that they would drive their friends home when buzzed and 72% disagreed that they would do so in the off-campus party/buzzed driving scenario. The mean response time to the liquor drinking game scenario item was 2597 milliseconds ($SE=185.5$), or approximately 2.6 seconds. The mean response time to the beer drinking game scenario was 2573 milliseconds ($SE=141.8$), or approximately 2.6 seconds. Finally, the mean response time to the buzzed driving scenario was 2502 milliseconds ($SE=138.8$), or approximately 2.5 seconds. These data suggest that participants took the same amount of time to respond to each of the three scenarios $[F(2,348)=.099, p=.906]$.

*Deliberative Attitudes toward Alcohol*

Deliberative attitudes toward alcohol were assessed using self-report Likert-type items developed by Payne et al. (in press). Participants were asked to indicate on a scale from 0-10 how favorable or unfavorable they perceive beer, wine, and liquor/mixed drinks. These three items were factor analyzed, revealing a single factor. Cronbach’s alpha was sufficiently high (.70), thus, a single index was created averaging across responses to the three items.

**Results**

Prior to conducting the hypothesis tests, a one-factor ANOVA was run to ensure that there were no differences in self-reported alcohol use across conditions. Results suggest no such differences $[F(3,95)=.620, p=.604]$. Mean self-reported alcohol use (combined frequency and quantity score) across conditions is as follows: Alcohol advertisement ($M=12.78, SD=1.12$), Ad Council PSA ($M=13.84, SD=1.05$), M.A.D.D.
PSA \((M=13.42, SD=1.07)\), and control advertisement \((M=12.00, SD=.99)\). One-tailed tests are reported in this section unless otherwise noted.

*Effects of Condition on Memory Associations*

In order to test hypotheses 1a-3a, a one factor ANOVA was constructed with experimental condition as a between subjects factor and responses to the alcohol-relevant homographs as the dependent variable. Descriptive statistics illustrate that on average, participants responded to one of the five alcohol-relevant homographs (e.g., tap, draft, pitcher, shot, and mug) with an alcohol-relevant term (e.g., beer, booze, keg, liquor, etc.) \((M=1.00, SD=1.04)\). Responses to the five alcohol-relevant terms ranged from zero to three alcohol-relevant terms.

Results of the ANOVA (see Table 6.1) illustrate a significant effect of condition on memory associations (as indicated by participant responses to alcohol-relevant homographs) \([F(3,116)=2.102, p<.05, \eta^2=.05]\). Post hoc comparisons (see Table 6.2) illustrate that consistent with hypothesis 1, those exposed to the alcohol advertisements \((M=1.267, SE=.187)\) were more likely to respond with an alcohol-relevant term after being exposed to the five alcohol-relevant homographs than those exposed to the control advertisements \((M=.667, SE=.187, p<.05)\). Although not significant, results are in the expected direction for hypothesis 2, with results suggesting that those exposed to the Ad Council PSAs \((M=1.167, SE=.187)\) may be more likely to respond with an alcohol-relevant term after being exposed to the five alcohol-relevant homographs than those exposed to the control advertisements \((M=.667, SE=.187, p=.11)\). Contrary to what was predicted in hypothesis 3, results suggest no support for the proposition that those exposed to the Ad Council PSAs \((M=1.167, SE=.187)\) are more likely to respond with an
alcohol-relevant term in response to the alcohol-relevant homographs than those exposed
to the M.A.D.D. PSAs ($M=.900$, $SE=.187$, $p=.37$).

Table 6.1

**Effects of Condition on Memory Associations**

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III SS</th>
<th>df</th>
<th>MS</th>
<th>$F$</th>
<th>P-value (one-tailed test)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>6.6</td>
<td>3</td>
<td>2.200</td>
<td>2.102</td>
<td>.05</td>
</tr>
<tr>
<td>Error</td>
<td>121.4</td>
<td>116</td>
<td>1.047</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>248.0</td>
<td>120</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>128.0</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6.2

**Tukey HSD Comparisons for Effects of Condition on Memory Associations**

<table>
<thead>
<tr>
<th>(I)</th>
<th>(J)</th>
<th>Mean Difference (I-J)</th>
<th>SE</th>
<th>$P$ (one-tailed)</th>
<th>95% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>.10</td>
<td>.26</td>
<td>.49</td>
<td>-.5885</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>.60</td>
<td>.26</td>
<td>.05</td>
<td>-.0885</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>.37</td>
<td>.26</td>
<td>.25</td>
<td>-.3219</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>-.10</td>
<td>.26</td>
<td>.49</td>
<td>-.7885</td>
</tr>
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<td></td>
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<td>.26</td>
<td>.11</td>
<td>-.1885</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>.27</td>
<td>.26</td>
<td>.37</td>
<td>-.4219</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>-.60</td>
<td>.26</td>
<td>.05</td>
<td>-1.2885</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>-.50</td>
<td>.26</td>
<td>.11</td>
<td>-1.1885</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>-.23</td>
<td>.26</td>
<td>.40</td>
<td>-.9219</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>-.37</td>
<td>.26</td>
<td>.25</td>
<td>-1.0552</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>-.27</td>
<td>.26</td>
<td>.37</td>
<td>-.9552</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>.23</td>
<td>.26</td>
<td>.40</td>
<td>-.4552</td>
</tr>
</tbody>
</table>
An additional analysis was conducted to test the second portion of hypotheses 1-3, which proposed that message exposure will not only influence whether or not individuals respond with alcohol-relevant terms to the alcohol-relevant homographs, but also whether they evaluate those alcohol-relevant terms more positively. Thus, an additional ANOVA was run with condition as a between-subjects factor and evaluations of the participant reported alcohol-relevant words (see Table 6.3). Results suggest no differences in how individuals evaluated the alcohol-relevant words they listed in response to the five alcohol-relevant homographs. The mean score for net valence evaluations of participant-reported alcohol-relevant words are as follows: Alcohol advertisement (\(M=1.33, SE=.31\)), Ad Council PSA (\(M=1.39, SE=.40\)), M.A.D.D. PSA (\(M= .67, SE = .31\)), control advertisement (\(M=1.00, SE = .37\)). The lack of differences across conditions is not surprising, however, as nearly 85% of the alcohol-relevant words participants listed in response to the homographs were categorized as favorable rather than unfavorable. Thus, these data suggest that when the object of alcohol was accessible, in most cases, the positive evaluation associated with that object was also activated.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value (one-tailed)</th>
<th>(\eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>6.233</td>
<td>3</td>
<td>2.078</td>
<td>1.020</td>
<td>.195</td>
<td>.044</td>
</tr>
<tr>
<td>Error</td>
<td>134.410</td>
<td>66</td>
<td>2.037</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>221.000</td>
<td>70</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>140.643</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Effects of Condition on Deliberative Attitudes

Finally, although not formally hypothesized, an additional analysis was conducted in order to compare the findings from the tests of hypotheses 1-3 to the findings using a traditional self-report measure of attitudes toward alcohol. Results suggest no effect of message exposure on explicit attitudes toward alcohol \([F(3,97)=.421, \ p=.74]\). Mean responses on this variable across conditions are as follows: Alcohol advertisement \((M=6.4, SE=.47)\), Ad Council PSA \((M=7.1, SE=.48)\), M.A.D.D. PSA \((M=6.9, SE=.46)\), and control advertisement \((M=6.9, SE=.46)\). Thus, although not necessarily an implicit attitude measure, this non-priming implicit memory measure appears to be more sensitive than a traditional self-report measure.

Alcohol Use as Moderator of Effect of Condition on Memory Associations

Hypotheses 4a and 4b propose that heavier drinkers exposed to the alcohol advertisements and Ad Council PSAs will be more likely to respond to the alcohol-relevant homographs with alcohol-relevant words than those exposed to the other two sets of messages, and that such individuals will evaluate those alcohol-relevant words more positively. In order to test this hypothesis, a general linear model (GLM) was constructed with condition as a fixed factor, alcohol use as a continuous factor, and memory associations as a dependent variable. Results of this analysis are reported in Table 6.4. Results suggest that alcohol use is a significant predictor of memory associations, such that those who reported heavier drinking habits also responded to more of the alcohol-relevant homographs with alcohol-related words \([F(1,91)=7.372, \ p<.001, \ \eta^2=.08]\). Additionally, as proposed in hypotheses 4a and 4b, there is a significant condition x alcohol use interaction \([F(3,91)=2.185, \ p<.05, \ \eta^2=.07]\). In order to interpret
this interaction, a series of regression analyses (see Table 6.5) were constructed to identify whether alcohol use predicted memory associations in each of the four conditions. Results are generally in support of this hypothesis, as alcohol use predicts memory associations in the alcohol advertisement condition \[b=.082, \text{SE}=.046, t(20) = 1.80, p<.05, R^2=.14\], Ad Council PSA condition \[b=.078, \text{SE}=.039, t(23) = 2.03, p<.05, R^2=.15\], and the M.A.D.D. PSA condition \[b=.087, \text{SE}=.037, t(26) = 2.40, p<.01, R^2=.18\], but not in the control condition \[b=-.036, \text{SE}=.33, t(22) = -1.082, p=.15\]. The unexpected finding is that alcohol use explains a fair amount of variance in memory associations \(R^2=.18\) even in the M.A.D.D. PSA condition.

Table 6.4

*Condition x Alcohol Use Interaction (Memory Association DV)*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>(p)-value (one-tailed test)</th>
<th>(\eta^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Use</td>
<td>7.069</td>
<td>1</td>
<td>7.069</td>
<td>7.372</td>
<td>.01</td>
<td>.075</td>
</tr>
<tr>
<td>Condition * Alcohol Use</td>
<td>6.285</td>
<td>3</td>
<td>2.095</td>
<td>2.185</td>
<td>.045</td>
<td>.067</td>
</tr>
<tr>
<td>Error</td>
<td>87.267</td>
<td>91</td>
<td>.959</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>213.000</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 6.5

*Alcohol Use as a Predictor of Memory Associations by Condition*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig. (one-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Advertisement</td>
<td>.082</td>
<td>.373</td>
<td>1.796</td>
<td>.04</td>
</tr>
<tr>
<td>Ad Council PSA</td>
<td>.078</td>
<td>.389</td>
<td>2.027</td>
<td>.03</td>
</tr>
<tr>
<td>Control</td>
<td>-.036</td>
<td>-.225</td>
<td>-1.082</td>
<td>.15</td>
</tr>
<tr>
<td>M.A.D.D. PSA</td>
<td>.087</td>
<td>.425</td>
<td>2.395</td>
<td>.01</td>
</tr>
</tbody>
</table>

It was also of interest to investigate whether alcohol use moderated the relationship between message exposure and evaluations of the alcohol-relevant words participants reported in response to the alcohol-relevant homographs. Accordingly, a general linear model was constructed with condition as a between subjects independent variable, alcohol use as a continuous independent variable, and evaluations of participant reported alcohol-relevant words as a dependent variable. Results suggest no such interaction [F(3,52)=1.225, \(p=.310\)]. It should be noted that previous analyses suggested that most participants evaluated any of the alcohol-relevant words they reported positively, thus, there is likely not enough variability in evaluations to test for these potential differences.
Table 6.6

*Condition x Alcohol Use Interaction (Memory Association Evaluation DV)*

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>P-value (two-tailed)</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Use</td>
<td>.125</td>
<td>1</td>
<td>.125</td>
<td>.084</td>
<td>.775</td>
<td>.002</td>
</tr>
<tr>
<td>Condition* Alcohol Use</td>
<td>5.467</td>
<td>3</td>
<td>1.822</td>
<td>1.225</td>
<td>.310</td>
<td>.066</td>
</tr>
<tr>
<td>Error</td>
<td>77.391</td>
<td>52</td>
<td>1.488</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>186.000</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Message Evaluation as Moderator of Effect of Condition on Memory Associations**

Hypothesis five proposed that those who demonstrate greater enjoyment of the advertisements will report greater activation of memory associations toward alcohol. In order to test this hypothesis, a general linear model was constructed with condition as a between subjects factor, message evaluations as a continuous independent variable, and memory association evaluations as a dependent variable. Results provide no evidence of an interaction when looking at responses to alcohol-relevant homographs as the dependent variable \[F(3,112)=1.74, p=.16\] or evaluations of reported alcohol-relevant homographs as the dependent variable \[F(3,62)=1.10, p=.36\].

**Memory Associations as a Predictor of Behavioral Willingness**

Hypothesis six proposes a positive relationship between memory associations and behavioral willingness. In order to test this hypothesis, a series of Pearson correlations were run. Data do not support this hypothesis, although some findings appear to approach significance. Specifically, individuals who reported more alcohol-relevant words in response to the alcohol-relevant homographs did not demonstrate greater willingness to participate in a beer pong game until intoxicated, \(r(115)=.09, p=.15\), drive while...
“buzzed” \( r(115) = .07, p = .30 \), or participate in a liquor drinking game until intoxicated \( r(115) = .13, p < .07 \). Data also suggest some, but limited support for this hypothesis when looking at how individuals evaluated the alcohol-relevant words they reported in response to the homographs. Specifically, individuals who evaluated those words more positively did not demonstrate greater willingness to participate in the liquor drinking game until intoxicated, \( r(67) = .13, p = .15 \), or drive while “buzzed,” \( r(67) = -.02, p = .87 \), but they did demonstrate greater willingness to participate in the beer pong game until intoxicated, \( r(67) = .27, p < .01 \).

Finally, hypotheses 7a and 7b propose an indirect path from message exposure (alcohol advertisement or Ad Council PSA) to behavioral willingness via message exposure. Given that the only significant hypothesized relationship from H6 was between memory association evaluations and willingness to participate in a beer pong game until intoxicated, only this test of indirect effects was conducted. The models tested are illustrated in Figures 6.1 and 6.2

\[
\begin{align*}
X &= \text{Condition} \\
&= (\text{Alcohol Ad or Control}) \\
M &= \text{Memory Association Evaluations} \\
Y &= \text{Behavioral Willingness} \\
&= (\text{Beer Pong}) 
\end{align*}
\]

*Figure 6.1. Test of Indirect Effect of Condition (Alcohol vs. Control) on Behavioral Willingness via Memory Association Evaluations.*
Figure 6.2. Test of Indirect Effect of Condition (Alcohol vs. Control) on Behavioral Willingness via Memory Association Evaluations.

Consistent with study 1, a bootstrapped Sobel test of indirect effects was used (see Hayes, 2007; Preacher & Hayes, 2004) using 5,000 bootstrap resamples. A dichotomous independent variable was first created, which included the alcohol advertisement and the control conditions. An additional dichotomous independent variable including the Ad Council PSA and control conditions was also created and used in an additional model. This was necessary, as available macros require either a continuous or a dichotomous independent variable and the hypothesized differences deal with these conditions. Results are presented in Table 6.7.
Test of Indirect Effect of Message Exposure on Behavioral Willingness (Beer Pong) Via Memory Association Evaluations.

<table>
<thead>
<tr>
<th>Message Exposure</th>
<th>Alcohol Advertisement vs. Control</th>
<th>Ad Council PSA vs. Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome Regressed on Message Exposure</td>
<td>.024</td>
<td>(.042)</td>
</tr>
<tr>
<td>Evaluation Regressed on Message Exposure</td>
<td>.783*</td>
<td>(.417)</td>
</tr>
<tr>
<td>Outcome Regressed on Evaluation (Exposure Controlled)</td>
<td>.027*</td>
<td>(.015)</td>
</tr>
<tr>
<td>Outcome Regressed on Message Exposure (Evaluation Controlled)</td>
<td>.002</td>
<td>(.042)</td>
</tr>
<tr>
<td>Indirect Effect Mean</td>
<td>.020(^1)</td>
<td>(.016)</td>
</tr>
</tbody>
</table>

Note: 5000 bootstrap re-samples to obtain unbiased probability distributions (see Preacher & Hayes, 2004). \(N = 107\). The SPSS macro produces un-standardized regression coefficients; unstandardized betas for the relationship between automatically-activated evaluations of alcohol and behavioral willingness measures are reported in text. Standard errors appear in parentheses. * \(p < .05\). \(^1\) \(p = .10\).

Results for the model looking at the alcohol advertisement and control conditions are as follows. There is no direct relationship between message exposure and behavioral willingness \((b = -.006, SE = .04, t(39) = -.15, p = .88)\). There is a significant relationship between message exposure and memory association evaluations \((b = .78, SE = .42, t(39) = 1.89, p < .05, \text{one-tailed})\) such that individuals who viewed the alcohol
advertisements reported more positive alcohol memory associations than those who viewed the control advertisements. Controlling for message exposure, there is a significant relationship between memory association evaluations and willingness to play beer pong until intoxicated ($b=.03, SE=.01, t(39)=2.12, p<.05$, one-tailed) such that those who reported more positive alcohol memory associations reported greater willingness to play beer pong until intoxicated. The indirect effect, however, approaches, but does not reach statistical significance, $M = .03, SE = .019, p=.09$, one-tailed.

Results for the model looking at the Ad Council PSA and control conditions are as follows. There is no direct relationship between message exposure and behavioral willingness ($b=.009, SE=.02, t(31)=.40, p=.70$). There is a significant relationship between message exposure and memory association evaluations ($b=.42, SE=.24, t(31)=1.75, p<.05$, one-tailed), such that individuals who viewed the alcohol advertisements reported more positive alcohol memory associations than those who viewed the control advertisements. Controlling for message exposure, there is a significant relationship between memory association evaluations and willingness to play beer pong until intoxicated ($b=.04, SE=.02, t(31)=2.30, p<.01$, one-tailed) such that those who reported more positive alcohol memory associations reported greater willingness to play beer pong until intoxicated. The indirect effect, however, approaches, but does not reach statistical significance, $M = .02, SE = .012, p=.09$, one tailed.

Discussion

The purpose of study 2 was primarily methodological. Concerns arose regarding the use of a priming measure of automatically-activated attitudes when assessing priming effects of mediated messages. Specifically, there was concern of “double priming”
participants in the alcohol advertisement and alcohol PSA conditions with both the alcohol content in the measure and the content in the messages, and “single priming” those in the control condition with the alcohol content in the measure only. This complication arose because existing implicit measures of attitudes were developed by social psychologists interested in how differences in strength of the object-evaluation association predict various outcomes, not how mediated content activates such evaluations (see Fazio’s et al.’s 1995 evaluative priming paradigm, and Greenwald et al.’s 1998 implicit association test). The rationale for study 1 was that the “double priming” from both the message and measure could potentially be problematic if object-evaluation associations are so strong that message exposure fails to activate anything above and beyond what the primes in the measure activate. Specifically, although exposure to alcohol advertisements may automatically activate positive evaluations of alcohol among those with strong positive object-evaluation links in memory, similar effects may emerge among individuals in the control condition if the primes in the message are enough to automatically activate their evaluations of alcohol.

Given that effects have emerged both in the Goodall and Slater (2008) study and study 1 of this investigation, it seems that priming measures can be effectively used in studies looking at priming effects of mediated messages. However, an alternative non-priming measure was used nonetheless to ensure that important findings were not being suppressed by the use of a potentially less sensitive measure. Thus, in the present study, a non-priming measure of alcohol memory associations was used. The original Stacy (1997) measure that was adapted most effectively gauges whether the object of alcohol
has been activated, not the strength of the object-evaluation link. However, by including an evaluative component, the adapted measure also addresses this issue.

Results provided evidence that exposure to any of the three alcohol messages (alcohol product advertisements, Ad Council PSAs, or M.A.D.D. PSAs) activated the object of alcohol from memory. Specifically, individuals in any of these three conditions were more likely to respond with an alcohol-relevant word (e.g., beer) to one of the five alcohol-relevant homographs (e.g., draft) than those in the control condition.

There was no evidence of message exposure influencing how individuals then evaluated the alcohol-relevant words they listed. However, this lack of finding may be attributable to two factors. First, the sample size for this variable was small, limiting the ability to detect modest effects. The overall sample size was 120 participants (approximately 30 participants per condition). This sample was reduced further when looking at memory association evaluations, which consisted only of individuals who responded to one or more of the alcohol-relevant homographs with an alcohol-relevant word \(N=70\). Second, and importantly, over 85% of the alcohol-relevant words listed in response to a homograph were evaluated positively. Thus, very few were evaluated negatively. This suggests that in this sample of college students (of which 80% reported drinking several times a month, drinking an average of 4 drinks per drinking episode), when the object of alcohol was activated, in most cases, a positive evaluation was also activated.

Although not formally hypothesized, the memory association measure was compared to a traditional explicit measure of alcohol attitudes which had participants self-report their evaluations of beer, wine, and liquor/mixed drinks. Results suggest no
evidence of any effect of condition on self-reported alcohol attitudes, thus, there is evidence that this indirect measure is more sensitive and robust. This finding is consistent with that was reported by Goodall and Slater (2008), when they compared the AMP and this explicit attitude measure, finding evidence of effects on the implicit, but not explicit level.

As expected, results of this study provide evidence of alcohol use moderating the relationship between message exposure and memory associations. Specifically, heavier drinkers listed more alcohol-relevant words in response to the alcohol-relevant homographs in all three alcohol conditions (alcohol product advertisement, Ad Council PSA and M.A.D.D. PSA), but not in the control condition. This finding makes sense because as noted by Stacy (1997), heavier drinkers tend to have stronger alcohol memory associations, thus, for such individuals, exposure to alcohol in a message is more likely to activate such associations than lighter drinkers with presumably weaker alcohol memory associations. It was unexpected that this finding would emerge in the M.A.D.D. PSA condition given the messages’ negative tone and lack of visual reference to alcohol use, but these results suggest that the auditory references to alcohol in the messages were sufficient to activate the construct, or object of alcohol. There was no evidence of alcohol use moderating the relationship between message exposure and evaluation of activated memory associations. However, as noted above, this is not surprising given sample size limitations and a lack of variability on this variable (i.e., most participants evaluated the alcohol-relevant words they listed positively).

Although it was expected that individuals who demonstrated greater enjoyment of the messages would report greater memory association activation, results did not support
this hypothesis. The rationale was, given the positive appeals and positive alcohol cues present in the alcohol advertisements and Ad Council PSAs, exposure to such messages would facilitate the activation of positive memory associations. Given that the measure was better suited to assess activation of the construct (alcohol), rather than evaluations of the object, it is not surprising that this finding failed to emerge. It is possible that the measure is not robust enough to detect this potential effect.

Finally, this study investigated the relationship between memory associations and willingness to engage in risky alcohol-behaviors, finding limited support. Specifically, of the individuals who responded to an alcohol-relevant homograph with at least one alcohol-relevant word, those who evaluated those words more positively demonstrated greater willingness to participate in a beer pong game until intoxicated. Further, there was evidence of marginally significant \( p = .10 \) indirect effects of message exposure (alcohol advertisement vs. control and Ad Council PSA vs. control) on willingness to participate in the beer pong game until intoxicated via memory association evaluations. Thus, individuals who viewed either the alcohol advertisements or Ad Council PSAs were more likely to evaluate the alcohol-relevant words they listed in the memory association task positively and individuals with more positive evaluations demonstrated greater behavioral willingness.

There was no evidence of such effects for either of the other two behavioral willingness scenarios (liquor drinking game and driving under the influence). Follow-up research is necessary using a more valid measure of behavioral willingness. As in study 1, participants took approximately two seconds to respond to each behavioral willingness scenario, which may allow adequate time to either override an automatic response, or
construct a response of the spot. Thus, this measure does not necessarily prevent people from making deliberative and reasoned responses. If so, this is inconsistent with the construct of behavioral willingness, which it thought to operate automatically and influence spontaneous outcomes. Accordingly, future research is needed to test and develop a more valid measure of this construct.
CHAPTER 7

GENERAL DISCUSSION

Interpretation of Combined Findings

Together, studies 1 and 2 provide important insight regarding how individuals process televised alcohol advertisements and public service announcements. Study 1 provided evidence that alcohol PSAs can potentially fail, or even backfire if they contain cues that may inadvertently automatically activate one’s positive evaluations of alcohol. Specifically, the positive automatic activation demonstrated among those in the Ad Council PSA condition was similar to what was observed among those in the alcohol advertisement condition in Goodall and Slater’s (2008) study.

This is an important consideration because if individuals have adequate motivation and opportunity, according to Fazio’s (1990) MODE model, they should be able to override their positive automatically-activated attitudes elicited by the anti drunk driving messages and deliberate on the consequences of irresponsible drinking behavior. However, when they lack such motivation and opportunity, they are unlikely to override the influence of their positive automatically-activated evaluations of alcohol elicited by exposure to the message. Accordingly, the automatically-activated attitude may influence outcomes consistent with its valence (Fazio, 1990). This notion is particularly troubling when we consider that individuals may lack motivation to thoughtfully process
advertising messages (Petty & Cacioppo, 1986), thus such processes may regularly
emerge when individuals are exposed to these supposed anti-substance abuse messages.

Although the findings provide evidence that the Ad Council PSAs automatically-
activated positive evaluations of alcohol, as noted in study 1, future research is needed to
further articulate the mechanisms through which this positive activation occurred.
Specifically, it is not clear whether the visual cues or positive message appeals are mostly
attributable to these findings. Study 1 followed up the findings of Goodall and Slater
(2008) and suggests that the mechanisms through which messages automatically activate
attitudes are not well understood. Contrary to what was reported by Goodall and Slater
(2008), study 1 failed to provide evidence that alcohol advertisements automatically
activate positive evaluations of alcohol. This lack of a relationship may be attributed to
message wear-out, which should be thoroughly investigated in future research, as such a
finding would have strong implications for the interpretation of existing literature on
advertising processing and effects.

Study 2 contributes to our understanding of the processing of televised alcohol
advertisements and PSAs and suggests that any type of alcohol message has the potential
to make the object of alcohol accessible if strong enough memory associations exist.
Thus, even messages that lack visual alcohol cues or positive alcohol-relevant outcomes
have the potential to activate the object of alcohol. However, in light of the findings in
study 1, it seems that perhaps various factors determine whether the evaluations
associated with that object are also activated. This is an important issue that should be
emphasized in follow-up research. Specifically, it is essential that we understand the
conditions in which advertising messages automatically activate existing evaluations from memory. It seems that certain contingencies exist that have not yet been articulated.

In addition to looking at a main effect of message exposure, these two studies also investigated alcohol use as a moderator of this relationship. The results of these two studies provide conflicting support that alcohol use moderates the relationship between message exposure and automatic attitude activation or activation of memory associations. In study 1, heavier drinkers were not more likely to demonstrate greater automatic attitude activation than lighter drinkers. This hypothesis was proposed because there is evidence that individuals who tend to consume alcohol more heavily have strong, well-learned and reinforced evaluations of the substance (Stacy, 1997). From Fazio’s (1990) conceptualization of attitudes as the strength of the object-evaluation association, it makes sense that individuals who drink more heavily will have attitudes that are more sensitive to automatic activation upon exposure to the object of alcohol. However, given that this sample consisted of college students who reported drinking regularly and heavily (see descriptive statistics in study 1), this sample may lack the variability necessary to detect such an effect. Follow-up research using more diverse non college student samples is necessary.

In study 2, there was evidence that heavier drinkers in any of the three alcohol conditions (alcohol advertisement, Ad Council PSA, M.A.D.D. PSA) demonstrated greater memory association activation than lighter drinkers in those conditions. Specifically, heavier drinkers exposed to these messages were more likely to respond to the alcohol-relevant homographs with alcohol-relevant words.
It is not clear why heavier drinkers are more likely to demonstrate activation of alcohol memory associations than lighter drinkers after exposure to the messages, but not greater automatically-activated attitudes toward alcohol. Future research is needed in order to understand why these findings emerged.

These studies also investigated whether evaluations of the messages influence automatic attitude or memory association activation. In study 1, it was demonstrated that among those in the Ad Council PSA condition, those who exhibited greater enjoyment of the messages also exhibited more positive automatically-activated attitudes toward alcohol. These findings failed to emerge in study 2. This is likely attributable to limitations of the memory association measure, as it was better suited to assess whether the construct of alcohol had been activated or made salient, rather than assess whether associated evaluations were also activated.

Finally, these studies investigated the construct of behavioral willingness and whether automatically-activated attitudes and memory associations predict willingness to engage in risky alcohol behaviors. Both studies suggest that these variables influence willingness to participate in a beer pong game until intoxicated. In study 1, those with more positive automatically-activated attitudes demonstrated greater willingness to participate in the game until intoxicated. There was also a significant indirect path from exposure to the Ad Council PSAs to behavioral willingness via automatically-activated attitudes. In study 2, individuals with more positive alcohol memory associations demonstrated greater willingness to participate in the beer pong game until intoxicated. There was also a marginally significant indirect path from exposure to the Ad Council PSAs and Alcohol Advertisements to behavioral willingness via alcohol memory.
associations. Thus, these findings provide preliminary support that message exposure may influence behavioral willingness via automatic attitude activation, or via activation of memory associations.

Conclusions and Future Directions

To summarize, these combined studies suggest the importance of considering how individuals process messages automatically, via automatically-activated attitudes and memory associations. As noted by Gibbons et al. (1998), Stacy (1997), and Stacy et al., (2000), it is important to recognize that many types of behaviors are driven by spontaneous, unreasoned decision-making processes. These authors propose that this is especially the case with risky health behaviors, such as substance use. The literature also provides evidence that individuals often lack motivation and opportunity to thoughtfully deliberate on message content (see Petty & Cacioppo, 1984). Thus, it is important for mass communication researchers to consider how message processing and influence occurs through automatic, implicit types of processes.

This research contributes to a growing body of literature in communication emphasizing that (a) individuals often do not thoughtfully consider everything they know about an object or situation when determining how to act, and (b) they most likely use readily accessible information and cues when they lack motivation and opportunity to process thoughtfully (see Roskos-Ewoldsen, 1997; Shrum 2002, 2009, Slater, 2006). It also further tests and articulates a mechanism through which priming effects emerge (see Roskos-Ewoldsen et al., 2009), which is a much needed area of research. Additionally, it contributes to our understanding of the moderating role of attitude toward the advertisement, providing additional evidence that ad evaluations can not only influence
outcomes of product advertisements, but also PSAs (see Nan, 2008, Slater, 2006).

Finally, this research makes an effort to work across multiple classes of communication and social psychological theories by incorporating elements of information processing, message effects, and behavior change theories. Together, such theories have the potential to provide a richer and clearer understanding of the mechanisms and processes through which messages influence people (see Cappella, 2006, Slater, 2006).

The emphasis on automatic processes that emerge when individuals lack motivation and opportunity to deliberate is very much related to the notion of peripheral processing in Petty and Cacioppo’s (1986) Elaboration Likelihood Model (ELM) of persuasion, a message processing model commonly used and cited in the communication literature. However, although ELM research has demonstrated that individuals tend to rely on “peripheral” cues when they lack motivation and/or opportunity to process, the model does not clearly articulate a mechanism through which such processing emerges. The present studies perhaps offer some insight as to how automatic, non-deliberative processing emerges, by suggesting the role of automatically activated attitudes.

It seems likely that the processes described above are particularly important in a cluttered media environment in which individuals face with large quantities of messages competing for their attention (see Goldman & Papson’s, 1996 discussion of advertising clutter). In such contexts, messages may influence individuals incidentally, and possibly unconsciously, through the processes described and demonstrated in the present studies.

Specifically, these studies suggest that mediated health messages have the potential to automatically activate existing evaluations and associations from memory. Sometimes this activation may be unintended, and potentially detrimental, thus, message
developers should avoid including message cues that may inadvertently activate evaluations at an automatic, preconscious level. At the same time, they should seek to include cues that may activate evaluations consistent with their message goals. However, in order to most successfully apply these findings to message development, research is needed to articulate the mechanisms through which messages automatically activate evaluations of objects, and to understand when such effects will and will not emerge. Specifically, follow-up research is needed to understand why effects of message exposure on automatically-activated evaluations of alcohol have not consistently emerged across the Goodall and Slater (2008) study and the present investigation.

Additionally, it is necessary for future research to continue to provide evidence of the consequences of messages automatically-activating evaluations from memory. These studies provide preliminary evidence that once activated, such evaluations may influence willingness to engage in risky alcohol-relevant behaviors. However, future research should seek to provide evidence of an impact on spontaneous behavior, as proposed by Fazio’s (1990) MODE model and Gibbons et al.’s (1998) prototype willingness model. Social psychologists have provided compelling evidence that automatically-activated attitudes influence decision-making and behavior that is spontaneous and unreasoned (see Bessenoff & Sherman, 2000; Dovidio et al., 1997; Fazio et al., 1995; Towles-Schwen & Fazio, 2002), but there is little, if any, evidence of indirect effects of message exposure on such outcomes via automatically-activated attitudes. Communication scholars should seek to demonstrate such a relationship.

Future research should also address limitations of the stimuli used in the present studies. A noted limitation is that the messages were not manipulated across conditions.
Although the use of existing real-world messages helped the studies maintain high ecological validity, it also makes it difficult to account for various message feature differences that may attribute to the differences observed across some conditions. Accordingly, future research should seek to replicate the present studies using a more controlled full experimental design with manipulated messages.

Future research should also seek to extend the present work to various types of messages, including non-health messages (i.e., messages about politics, social and economic issues, etc), and non-advertising messages (i.e., entertainment media narratives, news media, etc.). Although the investigation of automatic processes, particularly the activation of implicit attitudes, is particularly important when looking at messages such as product advertisements, which may not be frequently processed thoughtfully and extensively, it may also be important to look at such processes when investigating the impact of entertainment media content. Specifically, research suggests that as individuals become more engaged and transported in entertainment narratives, the less likely they are to argue against the message (see Green & Brock, 2000; Slater & Rouner, 2002). Slater and Rouner propose that when this occurs, individuals “fade into the background” (p. 176) of the narrative and presumably process the message less thoughtfully. In such situation, the role of automatically-activated attitudes and the automatic processes described in this investigation seem particularly relevant.

In sum, the present studies suggest the importance of investigating message processing that occurs automatically, and to some extend below the message recipient’s consciousness. Such types of processes may not only be relevant to advertising and public service messages, but various types of mediated messages. Although preliminary,
the present studies provide a starting point for this research program and leave a number
of questions unanswered for pursuit in future research.
LIST OF REFERENCES


APPENDIX A

RESEARCH PROGRAM MODEL
Research Program Model

Message Exposure → Automatic Attitude Activation → Orientation → Motivated Processing

Moderators:
- Alcohol Use
- Ad Evaluation
- Ad Affect

Non-Deliberative Processing → Deliberative Attitudes → Behavioral Intentions → Deliberative Behavior

Deliberative Norms

Behavioral Willingness → Spontaneous Behavior