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The Moderating Role of Attitude Structure in the Likelihood of Automatic Attitude Activation

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A thesis submitted to the Department of Psychology
in conformity with the requirements for
the degree of Master of Science

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Abstract

Sébastien J.R.J. Houde

The Moderating Role of Attitude Structure in Predicting
the Likelihood of Automatic Attitude Activation

January, 2004

Research has offered strong evidence concerning the affective priming of attitudes across a range of procedural variations (e.g., Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). However, an additional factor that could be included in the attitude accessibility model (Fazio et al., 1986; 1990) is the role played by attitude structure. Three experiments were conducted to investigate the moderating role of attitude structure (i.e., affective versus cognitive bases) on automatic attitude activation. All experiments were conducted in two phases – an attitude manipulation/selection stage, followed by a priming procedure. In the Pilot Experiment (N=23) and Experiment One (N=50), attitude structure and valence (i.e., positive versus negative) were manipulated experimentally using procedures developed by Fabrigar and Petty (1999). In Experiment Two (N=47), attitude structure and valence were assessed through pre-screening of participants. The results showed that the automatic attitude activation was obtained in Experiment Two, $F_{(1, 43)} = 24.42$, $p < .001$, but not in Experiment One, $F_{(1, 43)} = 0.42$, p = ns, or in the Pilot Experiment, $F_{(1, 21)} = 0.96$, p = ns. Interestingly, no significant interaction was found between prime structure and target structure when isolated in the analysis, in any of the three experiments. That is, there was no evidence for the structural priming of attitude. The present findings offer possibly conflicting evidence regarding the role played by attitude structure in moderating automatic attitude activation. These results are discussed in the context of attitude formation, experimental procedure variations, and the moderating role of associative strength. Finally, preliminary comments are made about the validity of the Need for Affect (Maio & Esses, 2001) and the Need for Cognition (Caccioppo & Petty, 1982) scales for predicting attitude structure formation.

Dedication

This work is dedicated to the most important people in my life.

(Maman, Papa, Mélanie, Marie-Christine, Jean-François, Marc-André, et Louis-Simon)

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CHAPTER 1: INTRODUCTION

> "Automatic activation processes are those which may occur without intention, without any conscious awareness and without interference with other mental activity. They are distinguished from operations that are performed by the conscious processing system since the latter system is of limited capacity and thus, its commitments to any operation reduces its availability to perform any other operation." (Posner & Snyder, 1975, p.81-82).

More than a quarter of a century ago, Posner and Snyder (1975) drew the distinction between automatic and conscious mental processes. According to their conceptualization, there exist two fundamental information processing modes. In automatic control mode, processing operates passively following stimulation, whereas in conscious control mode, processing is intentional and requires attentional control. Based on these two basic principles, Shiffrin and Schneider (1977) proposed a general theoretical framework: The dual-process theory of detection, search and attention. Using a series of experiments, they demonstrated the qualitative differences between the two modes of information processing and traced the course of learning of automatic-attention responses. More specifically, they demonstrated that automatic processing 1) occurs under the threshold of consciousness, 2) does not require attention, 3) requires a well-learned set of responses or considerable training, and 4) can gradually improve following practice.

This line of research has been highly influential and inspired numerous programs of research in various areas of cognitive as well as social psychology (Bargh, 1984). Indeed, this dual-process theory of information processing has become the standard in areas such as attention and encoding (Neely, 1977; Posner & Snyder, 1975; Shiffrin & Schneider, 1977), memory (Schachter, 1987), skills acquisition (Anderson, 1982; 1983, see review in Bargh, 1996), social perception and judgment (Bargh, Chen, & Burrow, 1996; Bargh, Lombardi, Higgins, 1988; Smith &

Lerner, 1986), implicit behaviours (Chartrand & Bargh, 1999) and more interestingly attitudes and persuasion (Bargh, Chaiken, Raymond, & Hymes, 1996; see review in Fazio, 2001).

Hence, the current research project will focus on the application of this theory to the attitude domain. As evidenced by prior empirical work (e.g., Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, Sanbonmatsu, Powell, & Kardes, 1986), it has been demonstrated that attitudes[1] may be activated automatically from memory by the mere presentation of their corresponding attitude objects[2]. Moreover, it has been shown that people have the tendency to automatically classify as either good or bad most, if not all, of the stimuli they encounter. Such "unintentional" mental categorization is assumed to be essential at simplifying and understanding the environment we live in, and facilitating the performance of social judgments (Smith & Lerner, 1986) and behaviours (Fazio, 1989). The prevalence of this automatic categorisation effect has been consistently observed across procedural variations and has recently motivated a number of applied (e.g., advertising, decision making, attitude-behaviour relationship and prediction) as well as more fundamental research (e.g., information processing, memory).

In line with these recent developments, the present program of research attempts to examine the relationship between attitude structure and the automatic activation of an attitude. The original framework, as briefly introduced above, put forward the idea that the affective evaluation of an attitude may be activated automatically from memory upon simple presentation of the attitude object. In the

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[1] An *attitude* can be defined as a relatively general and enduring evaluation of an object, person, or concept presumed to vary along an evaluative continuum ranging from negative to positive (Krosnick & Petty, 1995).

[2] The term *object* refers to the target of evaluation. It may refer to social issues, abstract concepts, categories of situations, categories of people, specific individuals, as well as physical objects.

present work, the main agenda consisted of determining whether the structure of an attitude may also be activated automatically from memory and whether or not it could possibly moderate or disrupt the automatic evaluation process. In addition to this main objective, secondary aims were to explore the importance of individual differences in attitude formation, and to further explore the primacy of affect hypothesis and the negativity bias hypothesis.

However, before reviewing prior findings on these two topics, it is important to define the concept of "attitude structure". Attitude structure is generally conceptualized as the notion that attitudes can be based on a set of basic properties or distinct foundations (e.g., Breckler, 1984). Although a number of researchers have focused their research on the global evaluative nature of an attitude, others have come to realise the importance or value of studying the basic structural components that contribute to the formation of the underlying global evaluation. A core idea underlying attitude structure is that such global evaluative judgments can be reflected by three broad categories of affective, cognitive and behavioural responses (e.g., Ostrom, 1969; Breckler, 1984). Accordingly, each of these responses is assumed to represent different informational content about a target attitude object. Finally, empirical research has shown that these basic components display some degree of positive correlation (e.g., Breckler, 1984; Breckler & Wiggins, 1989a), but remain valid independent predictors of one's global evaluative judgement.

Initial Findings

When people are asked to evaluate or judge a person, an object or a concept, they are unlikely to perform an exhaustive search of memory for any potential fragment of cognitive or affective information that may relate to the evaluative target. Rather, the extent of their evaluation is more likely to be determined by the

subjective ease of retrieval (Haddock, 2000) or by the information that is more readily accessible from memory about the target object (Fazio, 1995; Srull & Wyer, 1979). That is, once a person has formed an evaluation about an object, the summary evaluation, rather than the raw informational data, is more likely to predict future judgments or behaviour about the target.

The Affective Priming Paradigm

Typically, the automatic attitude activation effect has been studied using a variation of the sequential priming paradigm (e.g., Neely, 1977). This procedure is an adaptation of the classic priming method used to investigate automatic spreading-activation in memory. It involves the presentation of a prime stimuli (e.g., nurse), for a short period of time prior to presentation of a target stimuli (e.g., doctor), the latter of which the participants must respond to /evaluate. Findings show that the speed of responding to the target word was facilitated when the prime stimuli was semantically related to the target word (e.g., nurse-doctor) and inhibited when the prime stimuli was semantically unrelated to the target word (nurse-truck). Thus, the resulting assumption was that concepts or information associated with the primes were automatically activated from memory upon presentation of the prime and, in turn, affected the target-related evaluative judgment[3] process.

Based on these findings, Fazio et al. (1986) reasoned that similar priming effects may be observed with attitudes. That is, the presentation of an attitude object should, in the same fashion as a semantically significant prime, activate from memory a number of associated evaluations relating to that object and, hence, facilitate or inhibit the evaluative response. Assuming that the activated associations

[3] The classic experiments (Neely, 1976; 1977) focused mainly on lexical decision tasks, where participants were required to perform word/nonword judgments. This technique has also been used to study activation from memory in the context of text processing, spatial representation and semantic relation (see Styles, 1997).

are capable of spreading along the memory network, Fazio et al. (1986) developed a new priming paradigm, involving participants' performance of an adjective connotation task. During this task, participants were first presented with a prime attitude object (e.g., party) at the center of a computer screen and were instructed to keep this word in memory. Then, following a short interval (e.g., 300ms), a target stimulus appeared (e.g, awful) once again at the center of the screen. At this stage of the process, participants had to indicate, by pressing a key labelled "good" or a key labelled "bad", whether the adjective (target) is positive or negative. Finally, after pressing the key, participants had to recite aloud into a microphone the memory word (prime) presented earlier. This process was repeated for each trial. It is important to keep in mind that in this procedure the name of the attitude objects were used as primes and that participants were not consciously aware of the evaluation process. Participants were simply instructed to keep the name of the attitude object in memory and then perform the evaluation of the target adjectives. Thus, this paradigm ensures that the attitude objects or primes exert their influence automatically.

By means of this paradigm, Fazio et al. (1986) tested and found support for the existence of the automatic attitude activation effect. Through a series of three experiments, they supported the hypothesis that faster reaction times should be observed on trials for which the primed attitude objects is congruent with the valence/connotation of the target than on trials for which there was incongruence. For example, presentation of the word "cockroach" to participants who held a negative evaluation of cockroaches facilitated (i.e., faster reaction times) their evaluative response (during the adjective connotation task) to negative adjective words, such as "repulsive" or "bad". The same pattern of facilitation was also observed when participants held a positive evaluation towards the primed object

(e.g., gift) and were asked to evaluate positive adjective words (e.g., delightful). At last, inhibition (i.e., slower reaction times) was observed for incongruent trials.

However, these results were only obtained under certain conditions. First, the findings revealed that automatic attitude activation only occurs for short stimulus onset asynchrony (SOA); where SOA refers to the time interval between the presentation of the prime and target stimulus. For example, automatic attitude activation was found with a SOA of 300ms but no such effect was found at an SOA of 1000ms (see Experiment Three; Fazio et al., 1986). This finding is consistent with other research in the field (e.g., De Houwer, Hermans, & Eelen, 1998) and represents a critical feature of Fazio's paradigm. As argued by Fazio et al. (1986), such results provide empirical evidence that the effect can only be attributed to unintentional activation of the corresponding attitude and does not permit participants to develop response strategies or conscious expectancies about the response process. Second, the effect seems to be moderated by the associative strength (or accessibility) between the attitude object and the evaluation. That is, the automatic attitude activation is argued to vary as a function of the variability along the strength continuum of the object-evaluation association in memory. Although this argument has been the center of an interesting debate (see Bargh, et al., 1992; Chaiken & Bargh, 1993), a meta-analysis has attested to the reliability of the associative-strength argument concerning its implications for automatic attitude activation (see Fazio, 1993). This argument is further discussed below.

Mechanisms Underlying Automatic Attitude Activation

Although automatic attitude activation has been observed in numerous experiments, research is still needed to understand the specific mechanism responsible for the effect. The vagueness of the original account (see Fazio et al.,

1986), initially misled researchers to interpret the affective priming paradigm as an associative network model. Such a model assumed an interconnection between all positive, as well as all negative concepts in memory. It explains the affective priming effect as a spread of activation from the prime to "all" other concepts of similar valence in memory. Although this mechanism may have some significance in mediating the effect, it is important to note that the affective priming paradigm suggested by Fazio et al. (1986) was only concerned with the spread of activation from the primed attitude object to its "specific" associated evaluation in memory (e.g., positive).

As an alternative to the spreading activation explanation, a number of researchers (e.g., Klinger, Burton, & Pitts, 2000; Wendura, 1999) have found possible evidence for the "response competition mechanism". The main idea behind this theory is that the presentation of a primed attitude object prepares participants to respond to the target stimulus. That is, the presentation of a prime that is congruent with the target is thought to initiate a specific response pathway. As a consequence, it places the individual in a state of readiness, thus facilitating the evaluation process. Alternatively, if the primed attitude object is connotatively incongruent with the target, the evaluation process is likely to be inhibited. The underlying explanation is that participants must not only perform the evaluative judgment but are also required to "suppress" the evaluation activated by the incongruent attitude prime. Thus, facilitation or inhibition takes place depending on whether the evaluation activated by the prime and the target complement or conflict with each other.

Importantly, even though these two mechanisms provide alternative accounts for the affective priming effect, both concur that that the evaluation associated with the prime can be activated automatically from memory upon presentation of that

prime (Fazio, 2001). As suggested by Fazio (2001), both explanations may represent viable and complementary explanations mediating the affective priming effect. Further research is necessary before any conclusion can be drawn.

On the Generality of the Automatic Attitude Activation Effect

The Unconditional Nature of the Affective Priming Effect

Following the seminal work performed by Fazio and his colleagues (1986), several subsequent experiments were performed using variations of the original paradigm to investigate a number of methodological concerns and assess the potential conditionality of the effect. Using an assortment of priming stimuli, target stimuli, and task requirements, the automatic attitude activation effect has been found to be a replicable and reliable phenomenon. The present section offers a summary of the most recent findings.

The first set of findings demonstrates the prevalence of the affective priming effect across various types of priming stimuli, other than familiar attitude names. For instance, the effect was observed using visual primes such as black-and-white line drawings (Giner-Sorolla, Garcia, & Bargh, 1999), and high-resolution color images of the attitude objects (e.g., Fazio, Jackson, Dunton, & Williams, 1995). Similar results were also obtained when the primes were presented subliminally (e.g., Wittenbrink, Judd, & Park, 1997) as well as when the attitude objects serving as primes were episodically associated stimuli learned prior to performing the priming task (see De Houwer et al., 1998)[4].

Similar affective priming affect has been demonstrated even after the quality of the target stimuli has been altered. Originally, Fazio et al. (1986) as well as other

[4] In this experiment, participants were provided with a set of unfamiliar words (so-called "Turkish words"). For each of these words, a translation was provided which corresponded to an attitude object. These results show that automatic attitude activation can be obtained even with experimentally created priming stimuli.

researchers (e.g., Bargh et al., 1992) had relied primarily on "evaluative adjectives" (e.g., "good", "evil") as targets. However, other researchers have found evidence of the affective priming effect even when participants are required to evaluate the name of other attitude objects (e.g., Greenwald, Draine, & Abrams, 1996) or are asked to assess the pleasantness of color photographs (Hermans, De Houwer, & Eelen, 1994) as target stimuli.

Finally, the last set of experimental findings concentrates on the ubiquity of the affective priming effect across procedural experimental variations (e.g., instructions, time delay, etc.). In the original paradigm (see Fazio et al., 1986), participants were required to perform an assessment task prior to performing the priming task. They were also given instructions to hold the attitude prime in memory as a "memory word" for each trial. Finally, the effect was obtained using an adjective connotation task. Through a series of experiments, researchers investigated whether these "procedural elements" influenced the prevalence of the effect. For example, Bargh et al. (1992) established that the automatic activation effect is found regardless of whether the participants were given instructions with respect to remembering the primes. Moreover, they showed that the automatic attitude activation effect is obtained even when an interval of two days separates the assessment of the attitude prime and the priming task. Also, Bargh et al. (1996) showed that the affective priming of attitude can be obtained using a naming/pronunciation task. Sanbonmatsu, Osborne, and Fazio (1986) found similar results using a word identification task. Overall, these findings further attest to the characterisation of the affective priming effect as an unconditional process, regardless of variations in the nature of the priming stimuli, the nature of the target stimuli or the methodological procedures.

Attitude Strength as a Moderator of the Affective Priming Effect

One of the most controversial aspects of the model of attitudes as object-evaluation associations in memory proposed by Fazio (1986, 1989) concerns the moderating role of associative strength. The theoretical foundations of the model suggest that not all attitudes have the power to be activated automatically by mere observation of the attitude object. Also, not all attitudes have the power to influence judgment or behaviour. Only attitudes that have a high degree of association between the representation of the object and the representation of its evaluation are capable of achieving automaticity. Research on attitude strength has demonstrated that not all attitudes have equal properties and chronic accessibility[5], and may vary along an attitude-nonattitude continuum (e.g., Krosnick, Boninger, Chuang, Berent, & Carnot, 1993; Petty, Haugtvedt, & Smith, 1995). Correspondingly, the attitude accessibility model conceptualizes associative strength as a continuum (Fazio et al., 1986; 1989). At the lower end of the continuum, there exists no apparent object-evaluation association in memory. No attitude is held and there is no potential for automaticity. As the strength of association between the object and the evaluation increases (e.g., weak to moderate), the chronic accessibility of the attitude increases. At this level, the attitude held is accessible upon presentation of the attitude object but still requires some degree of reflective processing. Automatic attitude activation is not yet achieved. Finally, at the upper end of the continuum, there exists a strong mnemonic linkage permitting almost immediate access to evaluative information about the attitude object. Any reference or mention of the object is likely to automatically activate the attitude. Although this conclusion was challenged by Bargh et al. (1992),

[5] This view corresponds to the traditional view that attitudes are enduring predispositions that are stored in and activated from the long-term memory.

and resulted in an interesting debate, the results obtained showed that regardless of whether or not the affective priming effect was present for weak prime attitude objects, the size of the effect fluctuated as a function of the associative strength (Fazio, 2001). Besides, associative strength has also been found to be influential in a number of cognitive and social psychological research concerned with semantic priming and non-attitudinal issues, respectively (see review in Fazio, 2001). Cumulatively, such findings support the important role of attitude strength.

Finally, adopting the attitude as object-evaluation perspective, it is important to consider the determinants of attitude accessibility. Although little consideration has been devoted to this topic, two general principles have been offered by Fazio (1989). The first principle states that "the more often individuals note and rehearse the object-evaluation association, the stronger it becomes" (Fazio, 1989, p.252). This principle is directly based on associative learning and suggests that repeated attitudinal expression strengthens the associative link. Previous research has demonstrated that repeatedly expressing an attitude increases its accessibility (Roese & Olson, 1994) and reduces the response time on subsequent attitude surveys (e.g., Fazio, Chen, McDonel, & Sherman, 1982; Powell & Fazio, 1984).

The second principle states that the "greater the perceived diagnosticity of the informational basis for an attitude, the more strongly individuals associate the object and the evaluation" (Fazio, 1989, p.252). In other words, because attitudinal evaluation may come from diverse sources of information such as affective (i.e., emotion created by the object), cognitive (i.e., belief about the object), and behavioural (i.e., prior behaviour towards the object), individuals may come to trust some informational bases as more indicative of their attitude. For example, it has already been found that attitude based on sensory experiences (Wu & Shafer, 1987),

and attitude based on emotional reactions to an object are relatively more accessible. Thus, this principle suggests that some classes of information may be distinguished more readily and increase the attitude's chronic accessibility. Clearly, this topic remains to be examined more fully in relation with attitude formation and attitude structure. Hence, the need for the present research endeavour is supported.

On the Power and Functional Value of Accessible Attitudes

Automatically accessible attitudes have been shown to have an important impact on a number of cognitive and social processes (see review in Fazio, 1995). First, highly accessible attitudes are capable of guiding one's perception of an attitude object. They also serve as a filter for processing and judging the incoming attitude-relevant information. This theoretical perspective suggests that the acute accessibility of an attitude becomes heightened following the observation of the attitude object, and subsequently serves to bias processing of incoming information. To exemplify, the findings from Fazio and Williams' (1986) election study showed that individuals with a highly accessible attitudes towards a candidate were more likely to display perceptions of political debate performance that were more congruent with their attitude than were individuals with less accessible attitudes. That is, individuals with strong object-evaluation associations were more likely to have held colored perceptions of the debate. Similarly, Roskos-Ewoldsen and Fazio (1992) have demonstrated through a series of experiments that attitudes that are highly accessible from memory are more likely to attract visual attention than objects associated with less accessible attitudes. More specifically, the findings showed that attitude-evoking objects are more likely to be noticed and reported, and can interfere with a participant's performance on a visual search task.

Second, besides affecting information processing, highly accessible attitudes are also found to affect decision-making. Results from a number of experiments (Blascovich, Ernst, Tomaka, Kelsey, Salomon, & Fazio, 1993; Fazio, Blascovich, & Driscoll, 1992) indicated that accessible attitudes function to ease decision-making by reducing the amount of effort (as measured by different indices of autonomic reactivity) invested in the process. For example, Blascovich et al. (1993) found that participants showed less autonomic reactivity when they already possessed accessible attitudes towards the decision alternatives. That is, possessing an a-priori attitude towards the alternatives obviated the need to perform an evaluation of the alternatives prior to making the decision. In the end, holding such pre-existing attitudes is assumed to benefit the individual by reducing the cognitive demand and freeing attentional resources.

Finally, attitude accessibility has been suggested to be a critical moderator of the attitude-behaviour link. According to the MODE model (Fazio & Towles-schwen, 1999; Sanbonmatsu & Fazio, 1990; see Figure 1), attitudes capable of

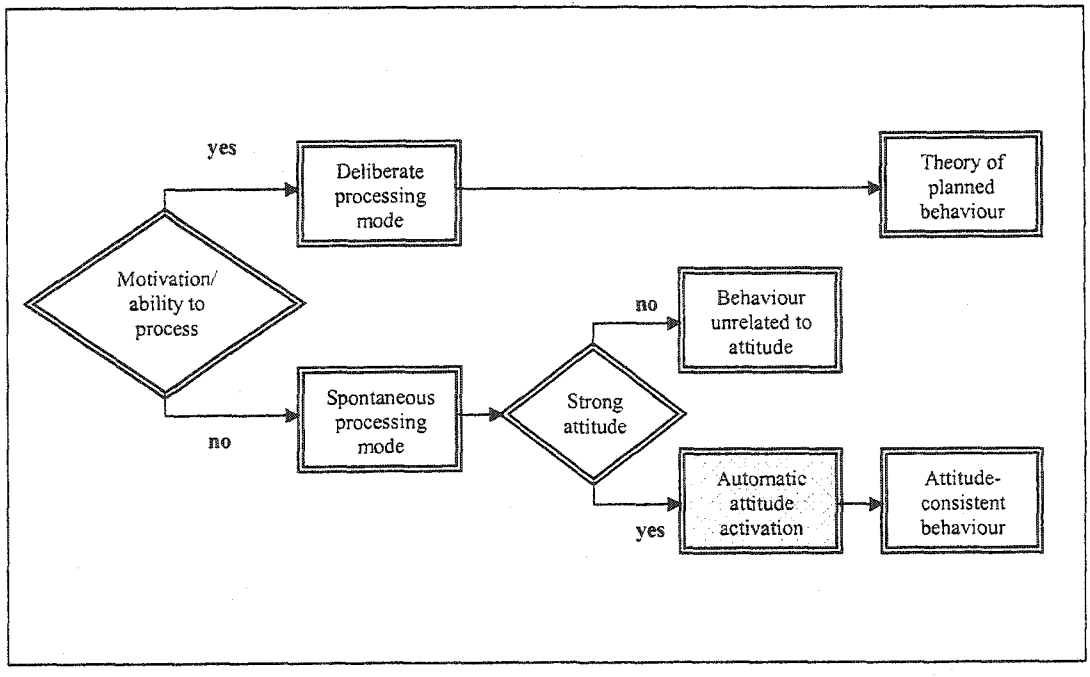

Figure 1-1. The MODE Model (Fazio, 1990).

automatic activation can guide behaviour in a relatively spontaneous manner. However, such implicit influence is deemed to be more important in behavioural situations that call for spontaneous, as opposed to deliberative decision making. For instance, an individual possessing sufficient motivation and ability to process the incoming information is more likely to reconsider his/her pre-existing attitude regarding the attributes of the decision alternatives before deciding on the behaviour(s) to perform (Fazio, 1995). As a result, automatically activated attitudes will have less influence on the behaviour/decision process. It is important to note that attitude-behaviour consistency is apparent with a deliberative process only if the evaluation performed matches the evaluation expressed earlier in the past (Fazio, 1995). Conversely, if either motivation or ability (e.g., time) are lacking, further search and re-evaluation of the informational content is curtailed. As a consequence, the individual is more likely to be influenced by pre-existing summary constructs in memory. Indeed, the automatically activated evaluation from memory will influence the individual's assessment of the attitude object in the situation. In turn, such an assessment will spontaneously affect behavioural decisions. Recent research has provided empirical evidence supporting this model by assessing automatically activated racial attitudes (e.g., Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; Fazio, 1995) or by directly manipulating attitude accessibility (e.g., Bassili, 1995). By and large, these sets of research show that attitude-behaviour consistency is greater for more accessible attitudes.

Limitations of Past Research

The Relationship Between Attitude Structure and Attitude Accessibility

Although there has been a tremendous amount of theorizing about the affective priming effect, there exists a lack of understanding of the role played by

attitude structure in relation to this effect. There have been few attempts made at understanding the differences in accessibility between the various structural components of attitudes (e.g., Giner-Sorolla, 2001; Verplanken, Hofstee, & Janssen, 1998) in relation to different attitude strength indices, different attitude functions and/or the attitude-behaviour link. In general, researchers have restricted their experimental design to manipulation or selection of attitude objects with distinctive attitude valence. There has been little attention or exploration of what may occur when both valence and attitude structure are manipulated simultaneously in the design.

A core assumption underlying attitude structure is that it can be categorised broadly into a number of distinctive structural components, all varying along a common evaluative continuum. Accordingly, a number of attitude theorists have argued that attitudes are complex representations, composed of several simple representations, each capable of preserving information about different target objects that we encounter - directly or indirectly - in our environment (e.g., Breckler, 1984; Breckler & Wiggins, 1989b; Ostrom, 1969). According to this perspective, attitude structure is defined as the "differences and interactions among the simple representations that comprise a complex representational system" (Breckler & Wiggins, 1989b, p.418). It is common to conceptualise and classify these representations or attitudinal responses to attitude objects into affective, cognitive and behavioural categories (e.g., Rosenberg & Hovland, 1960; Zanna & Rempel, 1988).

Although there is a long history supporting this tripartite theory of attitude structure, recent research has primarily focused on the affective and cognitive structural properties (e.g., Chaiken, Pomerantz, & Giner-Sorolla, 1995; Crites,

Fabrigar, & Petty, 1994; Giner-Sorolla, 2001). Typically, the affective component refers to positive or negative emotions, feelings, or drives associated with an attitude object. Alternatively, the cognitive components have been described as beliefs, knowledge structures, perceptual responses and thoughts about positive or negative attributes or characteristics of an attitude object. Thus, according to this two-component view of attitude, each component can have a positive and negative valence, and mutually contribute, in varying proportions, to the prediction of a global attitude about an attitude object.

It is important to note that empirical evidence supporting the distinction between an affective and a cognitive component of attitude is far from being unequivocal (see McGuire, 1985). Nevertheless, the most recent empirical findings have provided the strongest support for the two-component model of attitude structure. For example, research evidence suggests that both components possess a distinctive structural nature (e.g., Edwards, 1990; Edwards & von Hippel, 1995; Millar & Tesser, 1986), are based on distinct antecedent learning experiences (e.g., Breckler & Wiggins, 1989a) and independently contribute to the prediction of an overall attitude (e.g., Breckler, 1984; Breckler & Wiggins, 1989a; Crites et al, 1994; Eagly & Chaiken, 1993). In addition, it is important to note that this distinction between the two components is not completely dichotomous. It is very unlikely that an individual will ever develop a purely affect- or cognitive- based attitude. In general, empirical research has shown that both components display some degree of positive correlation (e.g., Breckler, 1984; Breckler & Wiggins, 1989a).

Measuring the Affective and Cognitive Properties of Attitudes

Another problem noted in the research on structural properties of attitudes deals with an inconsistency concerning the assessment of the affective and cognitive

attitudinal bases (e.g., Breckler, 1984; Granberg & Brown, 1989; Stangor, Sullivan, & Ford, 1991). Although a substantial amount of research has been conducted on attitude structure, few researchers have attempted to answer this important shortcoming. In order to address this shortcoming, Crites et al. (1994) have identified and summarised the main problems associated with the measurement of affective and cognitive properties of attitude. First, they pointed to inconsistencies in the conceptualization of the affective and cognitive properties of attitude. Second, they have indicated that researchers have failed to take into account the structural characteristics of the assessment measures. Third, researchers have failed to assess the reliability and validity of the scales being used. Finally, Crites et al. (1994) have pointed that the measurement scales used in previous studies have been idiosyncratic to specific attitudinal objects.

Based on the results of this analysis, Crites et al. (1994) developed and validated *general* scales, varying in terms of their structural characteristics, to assess the affective and cognitive components of attitude. More specifically, these experimenters provided empirical evidence that the newly created *general* affective and cognitive measures can differentiate between attitudes based primarily on affective versus cognitive information. Thus, though at an early stage of experimentation, Crites et al. (1994)'s findings suggest that valid, reliable, and methodologically sound measures are available to assess the two structural properties (affective versus cognitive) of attitudes.

Attitude Formation and Individual Differences

Another limitation of past research is the lack of understanding regarding the role played by individual differences regarding attitude formation and change. For example, there has been little exploration of how personality variables may influence

the attitude formation process. Some personality traits could differentially predispose individuals to seek out or be more responsive to information of a specific nature (affective vs. cognitive), and consequently increase their susceptibility to develop attitudes with distinctive structural bases (affective vs. cognitive).

Along this line, some research have already provided preliminary support for inferring a link between individual differences and attitude formation. For instance, prior research suggests that personality traits of extraversion and neuroticism are positively correlated with a propensity to experience (e.g., Larsen & Ketelaar, 1991) and elaborate (Rusting & Larsen, 1998) on positive and negative affect, respectively. Therefore, it seems reasonable to propose that similar individual differences factors could affect people's predisposition to develop affect- or cognitive- based attitudes. For example, research suggests that individuals differ in terms of their motivation to approach or avoid emotion-inducing situations (Maio & Esses, 2001), and in terms of their tendency to engage in and enjoy thinking (Caccioppo & Petty, 1982). These tendencies are better known as the "need for affect" and the "need for cognition". Hence, exploring these factors could be informative as to pre-selecting participants prior to performing experiments in which attitude structure is manipulated.

Attitude Structure Manipulation and Attitude Formation History

Two other important methodological limitations uncovered in past research have yet to be addressed by research in this area. First, there is a lack of an adequate methodology to validate the structural compositionality of attitudes. Also, past research has failed to consistently control for attitude formation history. Specifically, as suggested by Messe, Bodenhausen, and Nelson (1995)[6], previous research has

[6] Such an argument was made in the context of research studying the affective/cognitive persuasion matching and mismatching effect (e.g., Edward, 1990; Millar & Millar, 1990).

often neglected to consider the modality underlying the formation and development of an attitude. This shortcoming is significant because past research has shown the utility of considering whether the attitude was created via direct versus indirect experience (e.g., Fazio, 1995; Fazio & Zanna, 1981). For example, Fazio, Powell, and Herr (1983) demonstrated that participants' attitudes were more likely to be activated automatically when attitudes were created following direct experience with the attitude object than following indirect experience. Furthermore, Fazio et al. (1982) have showed that participants with attitudes based upon direct experience were faster at expressing such attitudes compared to participants whose attitudes were created through indirect experience. Given these findings, it is reasonable to suggest that future research studying automatic attitude activation control for, or include assessment of the attitude formation history in the experimental design.

Interestingly, Fabrigar and Petty (1999) have attempted to control for such potentially confounding variables. In their attitude formation paradigm, they hold constant the direct/indirect attitude formation history by experimentally manipulating the structural bases of an attitude. As suggested by Fabrigar and Petty (1999), this newly adapted procedure permits the validation of the affective and cognitive attitude manipulation and the persuasion treatments. Briefly, this procedure consists of presenting participants with either cognitive or affective information about a fictitious object (e.g., "Lemphur" = marine animal) in order to construct the desired attitude base. For example, a new set of affective-positive information about a fictitious object would be presented to create an affective-positive attitude. Similarly, a new set of cognitive-positive information would be presented to create a cognitive-positive attitude. Likewise, the information could be manipulated to create new affective-negative, or cognitive-negative attitudes. Then, following the reading of

any new set of information, the participants are asked to complete an overall, a cognitive, and an affective attitude scale (see Crites et al., 1994). Finally, a manipulation check is performed by measuring the discrepancy scores between the mean affective and the cognitive scores against the mean overall attitude scores. For instance, a successful manipulation or creation of a cognitive attitude would be indicated by smaller mean discrepancy score between the cognitive and the overall attitude scale than between the affective and the overall scale. This manipulation/ formation methodology provides us with an adequate procedure for answering a number of questions about the interaction between attitude structure and attitude accessibility, while controlling for attitude formation history.

Overview of Thesis

The framework proposed in this thesis is an attempt to expand the existing attitude accessibility model (Fazio et al., 1986; 1990) by including, as an additional factor, the role played by attitude structure. Using a conceptually similar priming-based design (as in Fazio et al., 1986), the aim of this thesis is to examine the role played by attitude structure in the likelihood of automatic attitude activation.

Theoretical Perspective

The experiments in this thesis were developed under the assumption that attitudes consist of relatively stable and well-learned evaluative responses that are retrieved from long-term memory. Second, supporting the attitude accessibility model (Fazio, 1986), it is assumed that the mere presentation of an attitude object is capable of automatically activating any associations relating to that object. Third, given that research has offered strong evidence concerning the affective priming (positive vs. negative) of attitudes, it is suggested that similar priming effects would take place with the structural properties of attitudes (affective vs. cognitive). In other

words, to the extent that people can automatically categorise attitude objects as positive or negative, it is assumed that people can also learn, internalise and implicitly characterise the attitude object based on their fundamental structural components. Such an approach suggests a plurality of informational input, where the nature of the evaluative response following the presentation of an object is dependent upon the antecedent information or attitude formation history.

Goals and Objectives of the Research

The principal objective of the present research program is to expand the attitude accessibility model proposed by Fazio (1986) to explore the role played by attitude structure. To achieve this object, three experiments (a pilot study and two experiments) were conducted. This set of studies has a number of specific goals.

The first goal is to explore the conditions under which automatic attitude activation is more likely to occur and to understand the interaction between the affective evaluation and the structural compositionality of an attitude. Specifically, it is predicted that participants would be faster at responding to target stimuli when such targets match the attitude primes in terms of structure (affective vs. cognitive) and/or valence (positive vs. negative). However, it is proposed that matching the valence between prime and target will have a greater priming effect than matching their structure. That is, based on evolutionary principle, participants should implicitly be better at differentiating/distinguishing the positive and negative information of an attitude as opposed to its structural base.

The second goal of this research is to further investigate the primacy of affect hypothesis (Zajonc, 1980; 1984). As described above, although research has confirmed that the affective and cognitive components of attitudes are highly correlated, the information they provide has a non-redundant influence on the overall

attitude. Some models of attitude have suggested that affectively based attitudes differ from cognitively based attitudes on several grounds. For example, psychological research on attitude and persuasion supports the notion that attitudes based on affect are stronger (e.g., Edwards, 1990; Edwards & Von Hippel, 1995), more stable over time (Downing, Jacobson, & Brock, 1998), more likely to arise from direct experience with the attitude objects (Millar & Millar, 1996), and more accessible in memory (Giner-Sorolla, 2001; Verplanken et al., 1998) than cognitive-based attitudes. As a result, supporting the primacy of affect hypothesis, it was predicted that participants generally would be faster at evaluating/responding to target stimuli when the prime attitudes are based on affect rather than on cognition.

The third goal of these experiments is to further explore the negativity bias hypothesis. Based on the model of evaluative space (See Cacioppo & Bentson, 1994), there exist multiple modes of evaluative activation, which are suggested to account for the positive and negative evaluative activation process. Such a theoretical view assumes that these multiple modes result from the operation or interaction/ combination of separable positive and negative motivational substrates. Such a conceptualization of separable positive and negative evaluation processes suggests that different activation functions[7] may potentially exist for the two systems (Ito, Larsen, Smith, & Cacioppo, 1998b). Psychological research has offered strong evidence that the negative motivational system tends to respond more intensely than the positive motivational system for comparable amounts of activation (e.g., Ito, Cacioppo, & Lang, 1998b; Ito et al., 1998a). That is, negative information is assumed to influence attitudinal and behavioural expressions more strongly than does positive

[7] Activation functions can be defined as a means of expressing the value of the different positive and negative systems on a common scale of positivity and negativity (Cacioppo & Bentson, 1994).

information (Cacioppo & Bentson, 1994). This greater sensitivity to negative information corresponds to the negativity bias hypothesis. More importantly, the findings from Ito et al. (1998b) suggest that such negativity bias operates at the evaluative-categorization stage. Therefore, because the present experiments are employing a priming procedure, it is expected that such a negativity bias effect will emerge from the process, replicating the findings of Ito et al. (1998b), but this time providing implicit behavioural substantiation of the effect. Thus, in the context of these experiments, it is expected that the overall effect (inhibition or facilitation) of the negative attitude primes will be greater on the target words than the positive attitude primes.

The fourth and final goal of this research is to investigate the role played by individual differences regarding attitude formation. As described previously, the notion that affect and cognition are distinct is not a new idea (e.g., Zajonc, 1980). Supporting this theoretical perspective, researchers have further suggested that affect and cognition operate on two different information processing systems (see Kuhl, 1986; LeDoux, 1989; Murphy & Zajonc, 1993). Such distinctive systems are believed to interact with each other and affect the initial evaluative screening process (Bargh et al., 1996). However, one could also suggest that the extent to which either of these systems are prioritised or placed in the forefront when new information is presented about an attitude object could be explained by individual differences in the motivation to approach or avoid affectively charged information (Maio & Esses, 2001), as well as their motivation to organise, elaborate, and evaluate the factual information available (Cacioppo & Petty, 1982). Consequently, it is hypothesised that individual differences in people's motivation to approach or avoid emotion-inducing information (as measured by the Need for Affect scale) and differences in

their tendency to elaborate and organise the factual information (as measured by the Need for Cognition scale) will predict the degree to which the attitude structure manipulation is successful. That is, for example, more extreme affective- and cognitive- based attitudes are expected to be created for individuals high in need for affect and high in need for cognition, respectively.

CHAPTER 2: PILOT EXPERIMENT

Overview and Goals

The Pilot Experiment was undertaken with several goals in mind. The first goal was to evaluate the effectiveness of specific facets of the methodological process to be used in Experiment 1. That is, this experiment involves the 1) further validation of the Fabrigar and Petty (1999) attitude formation paradigm, 2) evaluation of the cognitive demands (i.e., amount of information) placed on the participants relative to the learning and consolidation of the newly created attitudes, 3) determination of the testing parameters for the priming phase, and 4) detection of other potential experimental or design limitations.

The second goal of the Pilot Experiment was to conduct preliminary analysis of the structural priming hypothesis. More specifically, this experiment served to inquire into the potential interaction effects between attitude structure and valence. More specifically, the following hypotheses were tested:

H_1: Participants would be faster at responding to target stimuli when such targets match the attitude primes in terms of structure (affective vs. cognitive).

H_2: Participants would be faster at responding to target stimuli when such targets match the attitude primes in terms of valence (positive vs. negative).

H_3: Participant would be faster at evaluating target adjective words when they relate to primed attitudes in terms of structure and valence, than when they relate in terms of structure or valence (assuming support for H_1 and H_2).

H_4: Matching the valence between primed attitudes and target adjective words would have a greater priming effect than matching their structure (assuming support for H_1 and H_2).

Method

Design

This experiment was a 2 (target valence: positive vs. negative) x 2 (prime valence: positive vs. negative) x 2 (target structure: cognitive vs. affective) x 2 (prime structure: cognitive vs. affective), within-subject factorial design. Testing was executed in a single two and a half hour session.

Participants

Participants were 23 English-speaking undergraduate students (7 males and 16 females) at Saint-Mary's University, aged 18 to 26 ($M = 20.8$) recruited on campus. All students received compensation for their participation in the form of extra course credit. One univariate outlier was found; the participant recorded extremely high reaction times during the attitude priming phase. For instance, in some experimental conditions, the mean reaction time was over 10 seconds. Such a pattern of findings showed that the participant did not comply with the experimental instructions in the priming phase (e.g., participant stopped in the middle of experimental trials). This case was deleted. Twenty-two participants remained for the analysis.

Materials and Apparatus

This study was conducted on IBM computers using two computer software programs: Medialab™ (version 2002.1.15; Jarvis, 1997/ 2003) and Direct RT™ (version 2002.2.0.2; Jarvis, 1999/2003). The former was used in the attitude formation phase of the experiment whereas the latter served in the attitude priming phase (see Adjective Connotation Task).

For the attitude formation phase, the information presented to the participants consisted of an adapted set of short narratives used by Fabrigar and Petty (1999)[8]. These passages (see Appendix A) were selected because they have been empirically tested and shown to successfully create affective and cognitive attitude bases (see Fabrigar & Petty, 1999). Two of these narratives were cognitive in nature and presented informative content about fictitious marine animals in the form of an encyclopaedia entry. One included primarily positive information whereas the other included primarily negative information about the animal's habitat, behaviour, diet and reproduction. The other two narratives were affective in nature and consisted of a series of emotionally evocative events. The narratives contained very little informative content. Instead, they were designed to elicit predominantly positive or negative emotional reactions. In summary, the configuration of the narratives was designed to create four distinct attitudes that vary in structure (affective vs. cognitive) and valence (positive vs. negative).

Measures

Attitude-relevant Affect, Attitude-relevant Cognition, and Overall Attitude Measures

Assessments of the validity of the affective/cognitive manipulations were conducted using the measures developed by Crites et al. (1994; see Appendix A). These measures represent valid and reliable instruments for assessing affect, cognition, and overall attitude in a wide array of attitude objects. Accordingly, attitude-relevant affect was measured using a 16-item semantic differential scale. The scale included eight adjectives that reflected positive emotions (e.g., happy, calm) and eight adjectives that reflected negative emotions (e.g., sad, angry). Attitude-relevant cognition was measured using a 14-item semantic differential scale. The

[8] The procedure and stimuli they used were originally adapted from Crites et al. (1994).

scale included seven adjectives that reflected positive traits (e.g., useful, valuable) and seven adjectives that reflected negative traits (e.g., harmful, foolish). Overall, attitude was measured using an 8-item semantic differential scale. The scale included four adjectives that reflected positive evaluations (e.g., good, like) and four adjectives that reflected negative evaluations (e.g., bad, dislike). For each of the affective, cognitive, and overall attitudinal items, participants were required to answer on a 7-point bipolar continuum labelled from "not at all" to "definitively". Overall scores for each of the three scales were computed by reverse coding the negative items and averaging responses across all items. The overall, affective, and cognitive attitude scales were all found to be reliable in measuring the four newly created attitudes with Cronbach alpha coefficients ranging from .67 to .93[9]. The lowest reliability was found on the cognitive attitude scales.

Attitude Accessibility

Attitude accessibility was measured using procedures similar to those used by Fazio et al. (1986). Thirty adjectives served as target words in the priming task. These adjectives were identical to the set of 16 affective and 14 cognitive adjectives constituting the affective and cognitive scales developed by Crites et al. (1994). Each of the affective adjectives was paired three times in the priming task with each of the priming stimuli (Lemphur/affective-negative, Filotrite/affective-positive, Sikoraie/cognitive-negative, Ramylle/cognitive-positive, and neutral). Similarly, each of the cognitive adjectives was paired *at least* three times with each priming stimuli. However, because of the uneven number of affective and cognitive targets, two cognitive adjectives (one positive, one negative) were randomly selected (from

[9] Across the four attitude objects, reliability coefficients of .87, .85, .84, and .93 were found on the overall attitude scales, whereas reliability coefficients of .83, .83, .74, and .85 were found on the affective scales, and reliability coefficients of .77, .85, .67, and .70 were found on the cognitive scales.

the original 14) in every 16 trials involving cognitive targets. Three-letter strings (e.g., BBB) were employed to provide the nonprime baseline.

A total of 480 experimental trials were created. Every 160 trials, a random ordering of the trials were performed, such that each target adjectives (16 affective and 14 + 2 =16 cognitive) appear once with each priming stimuli (32 targets X 5 primes). In addition, the five primes were designed to appear randomly and no more than four times every 20 trials. A final restriction was that each of the 16 experimental conditions (e.g., affective-positive prime ➢ cognitive-negative target), as well as the four neutral prime conditions (e.g., neutral prime ➢ cognitive-negative target) appeared at least once every 20 trials.

Procedure

This study was composed of two phases. The first phase was devoted to creating four attitudes with distinctive structural bases (cognitive/positive, cognitive/negative, affective/positive, and affective/negative). The procedure developed by Crites et al. (1994) and adapted by Fabrigar and Petty (1999) was used to provide a set of materials that would control for direct/indirect experience and provide attitudes with distinctive structural bases. By the same token, this attitude creation procedure also ensures that new sets of attitudes towards the attitudinal objects control for individual differences and experience history[10]. The second phase involved participants' performance on an adjective connotation task (see Fazio et al., 1986).

[10] Experience history is referred to as the sum of individuals' experiences with any attitude objects (e.g., politicians). It may consist of direct exposure (i.e., interaction with politicians), or indirect experiences (i.e., reading or hearing about politicians).

Phase 1: Attitude Structure Manipulation and Attitude Formation

One at the time, participants were shown into the experimental room and were seated in front of the computer. Prior to testing, participants were informed that the study was concerned with word recognition and information processing. They were further told that the researchers were interested in people's knowledge and reaction to potentially unfamiliar animals. First, participants were required to complete a consent form and a participant background questionnaire (see Appendix A). The purpose of the background questionnaire was to gather some demographic information and inquire into any mental and/or physical disabilities (i.e., visual impairment or reading disability) that may affect participants' performance during the experiment.

Next, participants were presented information on the computer using the program "Medialab". The participants were told that they would be reading a few passages about potentially unfamiliar animals and that the researcher is interested in getting a sense of participant's feelings/cognitions towards these animals. The informational content provided for each animal (4) was manipulated:

1. The Lemphur = negative emotionally evocative information,
2. The Filotrite = positive emotionally evocative information
3. The Ramylle = positive cognitive information, and
4. The Sikoraie = negative cognitive information.

Before reading each passage, participants were required to answer a series of questions concerning their feelings or cognitions toward the animal in question. They were instructed that if they are unfamiliar with the animal they should try to answer the question based on their expectation about the animal. The purpose of filling these scales (see Appendix A) was to prime the affective or cognitive dimension of attitude relating to the animal evaluated and, to further enhance the likelihood that the passage will create the desired cognitive or affective attitude structural base. For

example, before reading the emotionally evocative passage about the Lemphur or the Filotrite, the participants were required to complete the 16-item affect scale. Alternatively, before reading the cognitive passage about the Ramylle or the Sikoraie, the participants had to answer the 14-item cognition scale. After completing the structure-related scale and reading the attitudinally-manipulated narrative, the participants were then required to complete the overall, affective, and cognitive attitude scales. The 8-item overall attitude scale was always presented first, and the 16-item affective and 14-item cognition scales were counterbalanced across participants. The completion of these scales was designed to assess the effectiveness of the attitude manipulation procedure. This process was repeated for all four animals. The order of presentation of the four narratives and scales (or attitudes formation process) was counterbalanced across participants.

Finally, the participants were given a 20 minute related filler task. This task was designed to provide participants with an opportunity to consolidate their attitude by briefly reflecting on the information they had just read about each of the animals. Participants were provided with a fixed time of five minutes to write down any information they recalled or reactions associated with each animal. The related filler task for each animal was presented in the same order as the attitude formation process. A reminder sheet (see Appendix A) was also provided for this task to ensure that participants focus on the correct animal. Participants were then excused from the laboratory for a short break.

Phase 2: Attitude Priming/Adjective Connotation Task

In the second phase, the participants were told that the second part of the experiment concerned word recognition and meaning, and that speed and accuracy were required. This task was performed using the program "Direct RT". During this

test, the four animals or attitude objects previously evaluated were used as primes along with different strings of three letters (e.g., BBB) intended to serve as nonprime baselines. The 16 affective and 14 cognitive words, from the affective and cognitive scales used in phase one, served as the target words. Participants were instructed that this type of task requires them to keep in memory one word while making a judgment. That is, they were informed that a memory word would be presented followed by a target adjective. Participants had to indicate, by pressing a key labelled "good" or a key labelled "bad", whether the adjective (target) was positive or negative, and then recite aloud, into a microphone[11], the memory word (prime) at the end of the trial. The categorisation was performed by pressing "left" or "right" on a keyboard, using both hands index fingers. The positions of key labels were counterbalanced across participants. Reaction time for every word categorisation trial was recorded automatically.

Before performing this task, participants underwent a block of 20 practice trials involving words (e.g., flower, devil) different than the ones used as primes. The practice trials were done to allow participants to familiarize themselves with the paradigm. An interval of 3000ms separated every trial. The stimulus onset asynchrony (SOA) or time between the prime and the target was set at 300ms (the prime was presented for 200ms followed by a 100ms interval). In total, participants were presented with 6 blocks of 80 trials, separated by a two-minute break. Once this phase was completed, participants were asked to evaluate their ability to differentiate and recall information about the four attitude objects. Finally,

[11] Although it has been demonstrated that automatic attitude activation occurs regardless of whether subjects are instructed to recite the memory word aloud at the end of each trial (as in Fazio et al., 1986), it was believed that instructing the subjects that they will be recorded in a microphone would serve as a motivation goal and would ensure a careful processing of the prime stimuli.

participants were debriefed, thanked, given compensation for their participation, and excused (see Appendix A for debriefing form).

Results

Overview

In order to examine the viability of the structure priming hypothesis, three major sets of analyses were undertaken. The first set of analyses was performed to assess the effectiveness of the attitude manipulation, that is, whether the manipulation of the narratives content was able to create the desired attitude structural bases and valences. Hence, an analysis of structural consistency (see Chaiken, Pomerantz, & Giner-Sorola, 1995) was conducted for each newly created attitude. As a result, it was hypothesised that the evaluation, in terms of structure and valence, of the attitude created would be in line with the manipulated content of the narratives. The second set of analyses was performed on the response time latencies to explore the plausibility of the structural priming hypothesis. A series of analyses of variance were executed to inquire into the potential relationship between attitude structure and valence. Finally, a qualitative analysis was completed to assess participants' evaluation of their subjective recall and potential for differentiation (i.e., capacity to distinguish information that belonged to each attitude object).

Attitude Bases Manipulation

An evaluation of the overall attitudes measure revealed that there was no difference in extremity between the affective-positive ($M = 6.21$) and cognitive-positive ($M = 6.20$) attitudes, $t_{(1, 21)} = 0.39, p = .97$. However, an examination of the negative attitudes revealed that affective-negative attitudes ($M = 2.22$) were slightly more extreme than cognitive-negative attitudes ($M = 3.55$), $t_{(1, 21)} = 4.77, p < .001$.

Following this check, an analysis of discrepancy scores was performed in order to assess the effectiveness of the attitude formation manipulation. This procedure, called analysis of structural consistency (Chaiken et al., 1995), consists of testing whether affect-evaluation consistency and cognition-evaluation consistency differed across the affective and cognitive attitude objects. This was performed by calculating two discrepancy scores, affective and cognitive, for each attitude object. The first discrepancy score was obtained by subtracting the absolute value of the difference between each participant's affective score and overall attitude score. The second was obtained by subtracting the absolute value of the difference between each participant's cognitive score (ranging from 1 to 7) and overall attitude score (ranging from 1 to 7). A smaller discrepancy score value between affect scores and overall attitude scores would be expected if the attitude created was based on affect (e.g., Lemphur). Similarly, a smaller discrepancy score value between cognition scores and overall attitude scores would be expected if the intended attitude was based on cognition (e.g., Ramylle). The results of the analysis (see Table 2-1) showed that the attitude

Table 2-1

Source Table for the Analysis of Structural Consistency of Affective-Negative, Affective-Positive, Cognitive-Positive and Cognitive-Negative Attitudes: Pilot Experiment.

	Intended Attitude Object Structure			
	Affective		Cognitive	
Type of Discrepancy	Lemphur	Filotrite	Sikoraie	Ramylle
Affect-Evaluation	.54	-.38	.37	-.85
Cognition-Evaluation	.69	-.88	.16	-.35

formation was not entirely successful in creating the intended affective and cognitive bases for the four attitude objects. This assumption was supported by the following series of contrasts.

Contrast analyses were performed to evaluate the significance of the difference. A contrast of the mean discrepancy score for the Lemphur revealed that the affective-evaluation difference was not significantly smaller than the cognitive-evaluation difference, $t_{(1, 21)} = .90, p = .34$. A contrast of the mean discrepancy score for the Filotrite revealed that the affective-evaluation difference was significantly smaller than the cognitive-evaluation difference, $t_{(1, 21)} = -4.11, p < .001$. Similarly, contrast of the mean discrepancy score for the Ramylle revealed that the cognitive-evaluation difference was significantly smaller than the affective-evaluation difference, $t_{(1, 21)} = 3.60, p < .01$. Finally, contrast of the mean discrepancy score for the Sikoraie revealed no significant difference between cognitive-evaluation difference and the affective-evaluation difference, $t_{(1, 21)} = -1.56, p = .13$. Combined, these results revealed that the attitude formation phase was effective at creating the intended attitude structure for the Ramylle and the Filotrite, but was not successful at creating the intended attitude structure for the Lemphur and the Sikoraie. By and large, these findings are not entirely consistent with previous findings (Fabrigar & Petty, 1999; Crites et al., 1994). They offer partial evidence (only two of the four intended attitudes were successfully created) of the validity of this attitude formation paradigm.

Attitude Priming

For all the conditions combined, an average error rate of 1.87 % was obtained across participants. All response time latencies resulting in an error were excluded from the analysis. To reduce the influence of deviant reaction times, a set criterion of ± 3.29 standard deviations ($p < .001$, two-tailed) from the participant's.

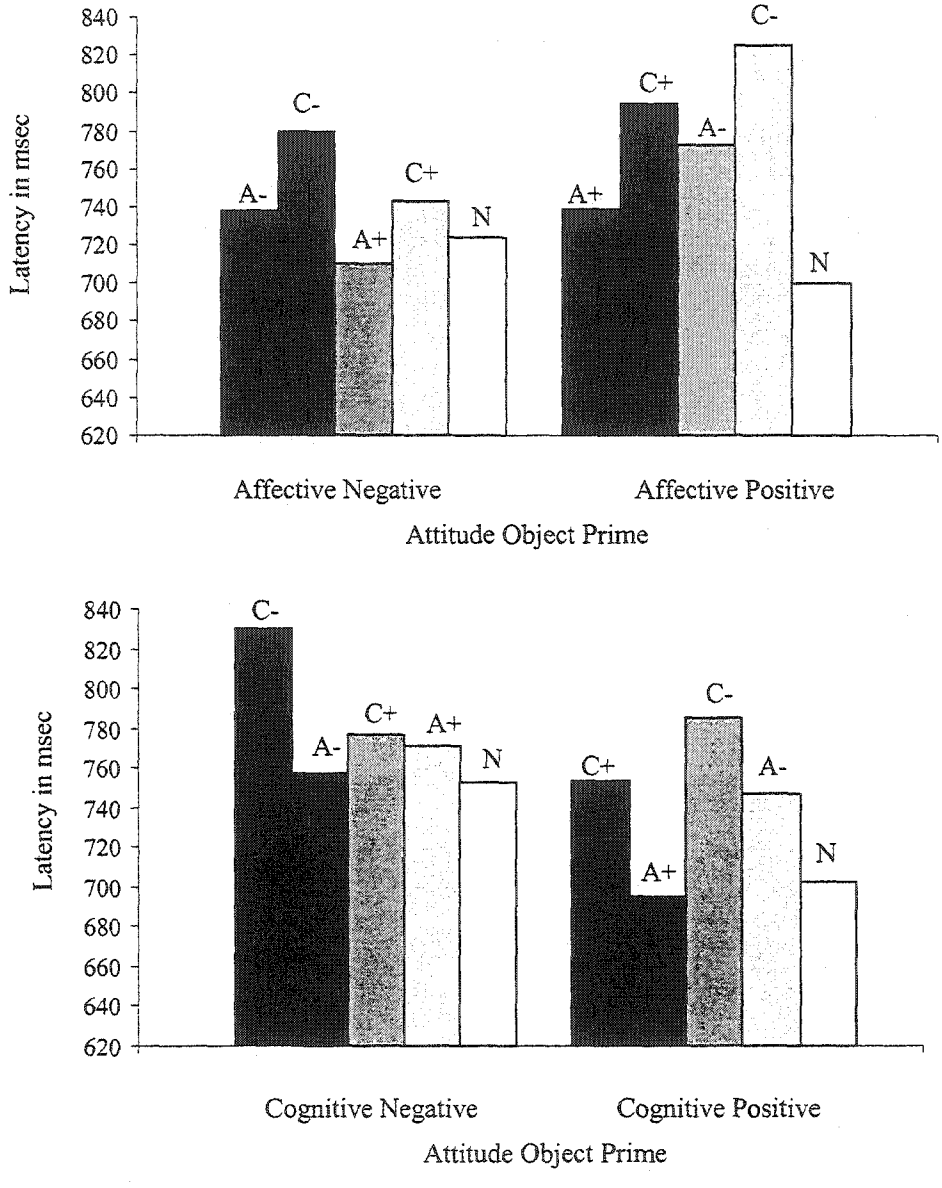

Figure 2-1. Mean target latencies (in milliseconds) in Pilot Experiment as a function of prime structure, prime valence, target structure (C = cognitive; A = affective), and target valence (+ = positive; – = negative). Notes: ■ = Double matching; ■ = valence matching; ▩ = structure matching; = no-matching; □ = correspond to mean reaction times latencies obtained with neutral primes, and target stimuli corresponding to the horizontal label)

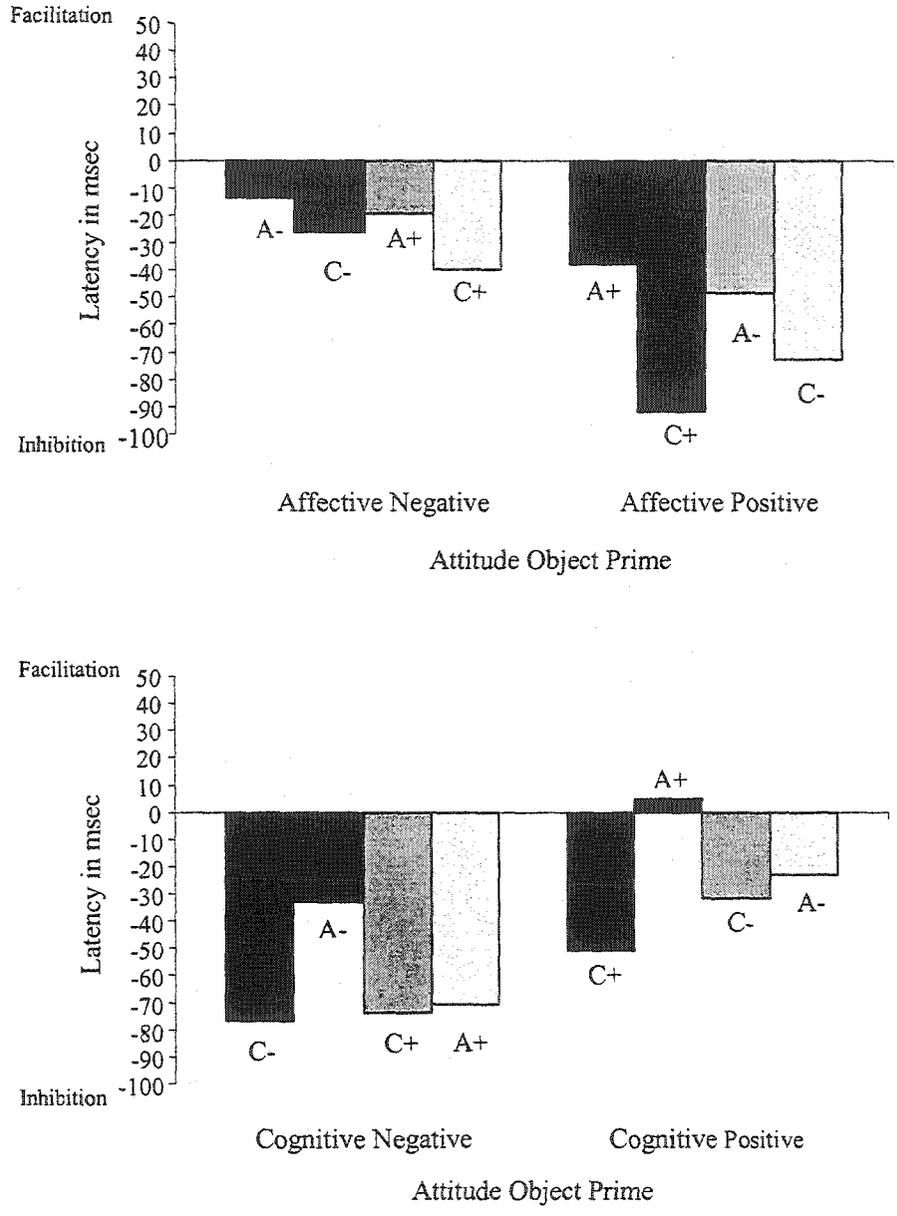

Figure 2-2. Mean facilitation scores (in milliseconds) in Pilot Experiment as a function of prime structure, prime valence, target structure (C = cognitive; A = affective), and target valence (+ = positive; – = negative). Notes: ■ = Double matching; ■ = valence matching; ■ = structure matching; = no-matching.

condition mean was used to eliminate extreme scores[12]. The average number of extreme data points eliminated across participants was 1.56%. Overall, a total of 3.43 % data points were removed.

Next, the mean response latencies were computed for each participant in each of the 16 experimental conditions, and each of the four prime conditions. The resulting averaged means per condition are depicted in Figure 2-1. Each averaged mean was then subtracted from its related neutral conditions to obtain the facilitation scores per condition (see Figure 2-2). For example, each averaged mean from affective-negative target conditions (i.e., affective-negative prime/affective-negative target; affective-positive prime/affective-negative target, etc.) was subtracted from the averaged mean obtained for the baseline 'neutral prime/affective-negative target' condition. The same transformation procedure was performed for affective-positive, cognitive-negative, and cognitive-positive target conditions.

Consequently, a 2 (prime structure) × 2 (prime valence) × 2 (target structure) × 2 (target valence) repeated-measures analysis of variance (ANOVA) was performed on the mean facilitation scores. As can be seen in Table 2-2, the analysis of variance did not reveal any of the expected two-way interactions. That is, contrary to hypotheses and prior findings pertaining to the affective priming effect (see Fazio et al., 1986; Bargh et al.1992; Bargh et al., 1996), no interaction was found between Prime Structure × Target Structure, $F_{(1, 21)} = 0.00, p = .98.$, and between Prime Valence × Target Valence, $F_{(1, 21)} = 0.96, p = .34$, respectively. The latter interaction was only obtained when Target Structure was considered in the equation, $F_{(1, 21)} = 4.72, p = .04$. Although significant, the direction of the congruency

[12] In accordance with the results obtained by Bush, Hess, and Wolford (1993), the most common procedure for dealing with outliers consists of eliminating all data points falling beyond a predefined standard deviation criteria; where the most common criteria was about ± 3 standard deviations from the subject's condition mean.

effect between prime and target valence was only apparent when the target was affective. That is, shorter reaction time latencies were obtained when there was a match between the prime valence and target valence as opposed to when there was a mismatch. Mixed results were obtained when the target had an underlying cognitive structure. Of lesser theoretical importance is the significant interaction between Prime Structure and Prime Valence, $F_{(1, 21)} = 10.52, p<.01$. Participants were faster at evaluating targets stimuli when the primes were affective-negative or cognitive-positive.

Table 2-2

Source Table for Repeated Measure Analysis of Variance of Prime Structure, Target Structure, Prime Valence, and Target Valence: Pilot Experiment.

Source	Degrees of Freedom	*F*-Value	Eta-Squared	Significance (p=)
Prime Structure (PS)	1	0.01	.00	.95
Target Structure (TS)	1	2.01	.09	.17
Prime Valence (PV)	1	0.00	.00	.98
Target Valence (TV)	1	0.30	.01	.59
PS×TS	1	0.00	.00	.98
PS×PV	1	10.52**	.33	.00
PS×TV	1	0.02	.00	.97
TS×PV	1	2.96~	.12	.10
TS×TV	1	0.11	.01	.74
PV×TV	1	0.96	.04	.34
PS×TS×PV	1	0.29	.01	.60
PS×TS×TV	1	0.65	.03	.43
PS×PV×TV	1	0.28	.01	.61
TS×PV×TV	1	4.72*	.18	.04
PS×TS×PV×TV	1	2.06	.09	.17

Notes: ~ $p<.10$; * $p<.05$; ** $p<.01$

In summary, the present data indicate that no affective or structural priming effect took place; there was no evidence of facilitation or inhibition. In addition, the pattern of the results seems in line with the results one would observe with weak attitude primes (see Fazio et al., 1986).

Subjective Recall and Potential for Differentiation

An evaluation of the cognitive demands placed on the participants relative to the learning and consolidation of the newly created attitudes was performed by verbally asking the participants to evaluate their subjective recall and potential for differentiation at the end of the experiment. The results from the content analysis suggested that, generally, participants were somewhat unsure about their capacity to differentiate between the four animals. A number of participants specified that additional information would be required on each animal to fully consolidate their attitude. Others suggested that re-reading the material would help to refresh their memory.

Discussion

Summary of Results

The Pilot Experiment provided mixed evidence supporting the validity of the attitude formation procedure developed by Fabrigar and Petty (1999) for creating attitudes with distinctive structural bases. It was only possible to significantly create two of the four intended attitude bases. More interestingly, no evidence was found to indicate that attitude structure could facilitate the likelihood of automatic attitude activation. The results suggest that attitude structure may affect the evaluation process by moderating the automatic attitude evaluation process. However, the current results may be due to methodological shortcomings, such as problems with the consolidation and stability of the four newly created attitudes, or strength of the objects-evaluation associations.

Implications and Limitations

This experiment was undertaken with two goals in mind. The first was to explore the role played by attitude structure in the likelihood of automatic attitude

activation. The second goal was to validate the experimental methodology by substantiating any procedural or theoretical issues.

Contrary to prior findings, the data pattern obtained is quite different from what was expected. The analysis did not show facilitation under congruent experimental conditions, in situations where the target words relate to the prime in terms of structure and valence. Similarly, inhibition was not observed for incongruent experimental conditions, in situations where the target words differ from the prime in terms of structure and valence. Thus, matching the structure and valence of the prime and target did not result in a speeding of the attitude evaluation process. These results might suggest that there is no added-value associated with matching both structure and valence. On the contrary, manipulating the structure of an attitude seems to moderate the affective priming effect.

However, the present conclusion should be re-examined in light of a number of important methodological shortcomings. The first problem concerns the strength and stability of the attitudes created. Based on Fazio et al. (1986), automatic attitude activation should only occur for strongly held attitudes. That is, attitude strength is argued to moderate the automatic activation effect. One could argue that the strength of the association between the attitude objects and their evaluations was too weak to demonstrate the effect. As a result, the present findings might suggest that attitude strength, not attitude structure, moderated the affective priming effect. Measures of attitude strength should be considered in Experiment One to determine the strength of these newly created attitudes and to rule out such an alternative explanation.

The second problem concerns the potential semantic encoding interference created by the qualitative nature of the names assigned to the newly created attitude-objects. During the testing process, participants were required to speak aloud the

names of the four animals at the end of each trial (see Method section for a review). It was observed that a number of participants were uncertain about the adequate pronunciation of the names and may have taxed significantly their attentional resources. As a result, it could be argued that the nature and/or complexity of the newly created names acted as cognitive distracters that biased the automatic evaluation process (e.g., word length)[13]. For this reason, basic two syllable names should be fabricated to facilitate their encoding and lexical processing.

A third problem noted in this study concerns the need to counterbalance the generated names across the four prime conditions (affective-negative, affective-positive, cognitive-negative, cognitive-positive), for the newly created attitude objects. It is possible that not counterbalancing these fictitious names confounded the reaction time data. As specified above, more complex names may have created some interference and affected responses on the priming task.

The fourth issue deals with the duration of the study. The present experiment was conducted in a single session that lasted two and a half hours, where the priming experimental phase was performed during the last 40 minutes. To avoid the potential bias of a fatigue effect, the experiment should be conducted over two sessions.

The fifth concern refers directly to the attitude creation process. In this experiment, to facilitate the consolidation process and the creation of strong object-evaluation associations, it was originally thought that introducing a 20-minute related filler task would help participants process the information about the various attitude objects. However, after consideration, one may argue that providing participants with additional time to think and recall the information read earlier in the narrative may serve to "cognitivize" (render more cognitive) the attitude formation process. In

[13] See Meyer, Roelofs, and Levelt (2003) for a discussion on word length effects in object naming.

other words, this step may confound the nature of the structural attitude base ensuing from the manipulation. In addition, it is possible that the attitude formation paradigm does not permit creation of strong attitude primes.

The final concern is related to the nature of the nonprime baseline. It has been argued by Fazio et al. (1986) that letter-string neutral stimuli may overestimate the true baseline and thus underestimate the absolute amount of facilitation occurring in each trial. Consequently, as suggested by Bargh et al. (1996), the safest course of action consists of interpreting the means as faster or slower relative to each other as opposed to using facilitation or inhibition scores. This argument rests on the lack of justification for presenting absolute facilitation and inhibition scores and the known difficulty of creating true baseline conditions.

As speculated, a number of methodological problems were isolated in this experiment. Thus, for Experiment One, one of the main goals was to make the necessary modifications to the experimental test paradigm.

CHAPTER 3: EXPERIMENT ONE

Overview and Goals

Experiment One was undertaken with several goals in mind. The results of the Pilot Experiment provided clues as to a number of methodological issues likely to confound the research outcome. Thus, the first goal of this experiment was to perform the necessary modifications to the research design. Specifically, these changes consisted of: 1) inserting attitude strength measures in the experimental design; 2) modifying/simplifying the names used to label the newly created attitude objects; 3) counterbalancing these names across conditions; 4) eliminating the related filler task and replacing it with a re-read of the four narratives before the attitude priming phase; 5) conducting the experiment over two separate sessions; and 6) performing analyses on mean reaction times as well as on facilitation/inhibition scores to evaluate the impact of the baseline stimulus.

A second goal of this experiment was to further investigate the relationship between affective evaluation and the structural compositionality of an attitude. More particularly, Experiment One attempted to re-evaluate the validity and stability of the patterns of results obtained in the Pilot Experiment. To improve the statistical power of this experiment, the number of participants as well as the number of experimental trials (in the priming phase) were increased[14]. As introduced earlier, it seems reasonable to believe that when participants are presented with an attitude with a defined structural compositionality, such compositionality would be brought up to the forefront and would affect subsequent evaluative judgments. Such a structural priming effect is suggested to affect the evaluative process according to the same

[14] A power analysis revealed that the number of trials or observations for each cell of the design in the Pilot Experiment was relatively small. A greater number of observations were recorded for each cell of the design to increase the power in this experiment.

basic principles as those that apply to the affective priming effect. Furthermore, as stated earlier, it seems logical to propose that matching both the structure and the valence should result in a greater priming effect compared to if either are considered independently. This being the case, it seems more probable that implicit activation of affective evaluation should prevail and be more influential than the structural compositionality in speeding up/down the evaluation process. Consequently, the following series of hypotheses were tested:

H_1: Participants would be faster at responding to target stimuli when such targets match the attitude primes in terms of structure (affective vs. cognitive).

H_2: Participants would be faster at responding to target stimuli when such targets match the attitude primes in terms of valence (positive vs. negative).

H_3: Participants would be faster at evaluating target adjective words when they relate to primed attitudes in terms of structure and valence, than when they relate in terms of structure or valence (assuming support for H_1 and H_2).

H_4: Matching the valence between primed attitudes and target adjective words would have a greater priming effect than matching their structure (assuming support for H_1 and H_2).

A third goal of this experiment was to further explore the primacy of affect hypothesis. If the affective and cognitive structures of attitudes are distinguishable, it seems reasonable to suggest that they may also differ in terms of their accessibility. As reported by Giner-Sorolla (2001), there exist no studies that conclusively have demonstrated that affective based attitudes are more accessible than cognitively based attitudes. However, of the studies done to date, researchers have attempted to explore the primacy of affect hypothesis by using two principle research paradigms. Some researchers have attempted to measure the accessibility of affective and

cognitive information directly by measuring the time taken by participants to answer specific affective and cognitive questions (see Verplanken et al., 1998). Other researchers (e.g., Giner-Sorola, 1998) have taken the present approach and attempted to answer the question by manipulating the structural bases of attitudes. Preliminary findings from these research studies suggest that attitude extremity could potentially moderate the effects of the structural compositionality (Giner-Sorola, 1998). Therefore, to replicate these findings, it was predicted that:

H_5: Participants would be generally faster at evaluating/responding to the target stimuli when the primed attitudes are based on affect rather than on cognition. However, this effect would be moderated by attitude extremity.

The fourth goal of this study was to further explore the negativity bias hypothesis by providing behavioural substantiation of the effect through reaction time data. It was expected that the negativity bias effect would emerge from the process and would result in enhanced inhibition or facilitation for negative attitude primes as compared to positive attitude primes. In other words, in the context of this experiment, it was expected that:

H_6: The overall effect of the negative attitude primes would be greater on the target words than the positive attitude primes.

A fifth goal of Experiment One was to explore the role played by individual differences regarding attitude formation. As scientists, one of the core objectives in conducting experimental research is to optimise the research design. For example, one may attempt to optimise the influence produced by the manipulation of the independent variables on the participants. Thus, pre-selecting participants that are more likely to be affected by such a manipulation may represent a viable and fairly efficient strategy. Because of the nature of the present experiment, it is reasonable to

assume that there could be individual differences between participants' motivation to approach or avoid affectively charged information, as well as their motivation to organise, elaborate, and evaluate the factual information available. As a result, it was hypothesized that:

H_7: Individual differences in the need for affect would predict the degree to which the affective attitude structure manipulation was successful.

H_8: Individual differences in the need for cognition would predict the degree to which the cognitive attitude structure manipulation was successful.

Method

Design

Similar to the Pilot Experiment, this experiment was a 2 (target valence: positive vs. negative) x 2 (prime valence: positive vs. negative) x 2 (target structure: cognitive vs. affective) x 2 (prime structure: cognitive vs. affective), within-subject factorial design. Testing was executed in two sessions of 50 and 75 minutes respectively.

Participants

Participants were 50 English-speaking undergraduate students (20 males and 30 females) at Saint-Mary's University, aged 18 to 38 (M = 21.42) recruited on campus. All students received compensation for their participation in the form of extra course credits. Six participants were removed from the analyses due to the large number of errors they committed during the priming phase of the experiment (errors >10 % over all trials). For instance, in some experimental conditions, the mean error rate was greater than 30%. Such a pattern of findings shows that the participants did not comply with the experimental instructions (e.g., random responding). Forty-four cases remained for further analyses.

Materials and Apparatus

With the exception of a few modifications, the materials and apparatus were the same in Experiment One as in the Pilot Experiment. First, the name of the four fictitious animals in the four narratives were modified to facilitate their lexical processing and aid the creation of their object-evaluation association in memory. All animal names were restricted to two syllables: the Lemphur, the Varik, the Kudder, and the Zamir. In addition, unlike in the Pilot Experiment, these newly generated animal names were counterbalanced across the four prime conditions (affective-negative, affective-positive, cognitive-negative, cognitive-positive).

Measures

Attitude-relevant Affect, Attitude-relevant Cognition, and Overall Attitude Measures

Assessment of the validity of the affective/cognitive manipulation was performed using the same measures used in the Pilot Experiment. These measures were the 8-item overall attitude scale, the 16-item affective attitude scale, and the14-item cognitive attitude scale developed by Crites et al. (1994). The overall, affective, and cognitive attitude scales were all found to be reliable in measuring the four newly created attitudes (Cronbach alpha coefficients ranging from .75 to .92[15]). As in the Pilot Experiment, the lowest reliability was found for the cognitive attitude scales.

Measures of Individual Differences

Need for cognition. Participants' need for cognition was measured using the 18-item Need for Cognition scale developed and validated by Cacioppo and Petty (1982). This measure of individual difference assesses the tendency or likelihood for

[15] Across the four attitude objects, reliability coefficients of .91, .92, .84, and .90 were found on the overall attitude scales, whereas reliability coefficients of .91, .81, .83, and .75 were found on the affective scales, and reliability coefficients of .81, .78, .77, and .83 were found on the cognitive scales.

an individual to engage in and enjoy effortful cognitive activities. Participants were required to indicate, for each statement (e.g., I would prefer complex to simple problems), whether or not the statement is characteristic of themselves on a 5-point scale, labelled from "extremely uncharacteristic" to "extremely characteristic". Negative items were reverse coded and a global score was created by summing responses to all items, where higher scores indicate greater enjoyment for thinking. The Cronbach alpha coefficient for the Need for Cognition scale was of .91.

Need for affect. Participants' need for affect was measured using the 26-item Need for Affect scale developed and validated by Maio and Esses (2001). This measure of individual difference assesses the "general motivation of people to approach or avoid situations and activities that are emotion inducing for themselves and others" (Maio & Esses, 2001, p. 585). The Need for Affect scale can be further broken down into two 13-item subscales measuring Emotion Approach and Emotion Avoidance. Participants were asked to indicate their agreement with each of the statements (e.g., "Acting on one's emotions is always a mistake"), using a 7-point scale labelled from -3 (strongly disagree) to +3 (strongly agree). All items from the Emotion Avoidance subscale were reversed-coded. That is, a total need for affect score was obtained by subtracting the emotion avoidance score from the emotion approach score. The Cronbach alpha coefficients for the total Need for Affect scale, and the Emotion Avoidance and Emotion Approach subscales were of .85, .76, and .81, respectively.

Measures of Attitude Strength

In this experiment, participants were asked to respond to four self-report measures of attitude strength on a 7-point Likert scale for each animal. The measures varied in terms of question types, question wording, and scale anchors. *Importance*

was assessed with the following question: "How important would you say your attitude toward X is to you personally?". To assess *certainty*, participants were asked: "How certain do you feel about your attitude toward X?". *Intensity/strength of feeling* was measured by asking the question: "How strongly do you feel about the X?". Finally, three indicators were used to measure *knowledgeability*: (1) "How knowledgeable would you consider yourself about X?", (2) "How well informed are you about X?, and (3) "Relative to other people, how much do you know about X?". An index of knowledgeability was computed by averaging responses to all three knowledge items. In addition to these meta-attitudinal measures of attitude strength, two additional operative measures of attitude strength (i.e., extremity, ambivalence) were considered. Attitude *extremity* was measured by folding over the attitude self-report rating scales (see Judd & Johnson, 1981) and *ambivalence* was computed according to the Gradual Threshold Model (GTM) of ambivalence[16] (see Priester & Petty, 1996).

Measure of Attitude Accessibility

Attitude accessibility was measured in the same manner as the Pilot Study using the same procedure and stimulus material. However, a greater number of trials were performed. A total of 640 experimental trials were created, respecting the same restrictions listed in the Pilot Experiment.

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[16] This model of ambivalence consists of identifying the dominant (D) and conflicting (C) attitude components for each pair of trait ratings (negative vs. positive). For example, if participants give a rating of 6 for the "positive" trait and a rating of 2 for the "negative" trait, then D= 6 and C=2. Whichever trait reaction is the largest, it is classified as the D = dominant trait, and the other is classified as C = conflicting trait. The overall ambivalence towards an attitude is obtained by taking the mean ambivalence scores obtained for all the attribute pairs. Each of these individual scores are computed with the formula $5C^{0.4} - D^{1/C}$ (Priester & Petty, 1996).

Measures of Attitude Consolidation

Participants were asked to respond to two self-report measures of attitude memory consolidation on a 7-point scale (see Appendix A). The first question asked participants to assess the extent to which they would be able to accurately recall information about each of the four animals. Accordingly, they were asked: "How would you evaluate your capability at recalling information about animal X? Why, please explain?". The second question consisted of asking participants to evaluate their capability at differentiating between the four animals. Thus, they were asked the following question: "How would you assess your capability at differentiating between the four animals?".

Procedure

With the exception of a few changes, the procedure was very similar to that used for the Pilot Experiment. The first procedural change was the introduction of a number of attitude strength measures. These measures were completed for each attitude object created (i.e., the four fictitious animal) at the end of the first phase of the experiment. The second change consisted of the completion of the Need for Affect and the Need for Cognition scales (completed at the end of the first phase). The third change consisted of the removal of the filler task and the introduction of an attitude-memory consolidation session at the beginning of the second phase of the experiment. Finally, for the last change, the experiment was completed in the same day in two independent sessions, as opposed to a single session.

Phase 1: Attitude Structure Manipulation and Attitude Formation

One at the time, participants were brought into the laboratory and were seated in front of the computer. As in the Pilot Experiment, participants were informed that the study focused on word recognition and information processing and that the

researchers were interested in people's knowledge and reaction to potentially unfamiliar animals. Participants were then required to complete the consent form and the participant background questionnaire.

Thereafter, participants were presented information on the computer using the program "Medialab". The participants were instructed that they would be reading a few passages about possibly unfamiliar animals and that the researchers were interested in getting a sense of participant's feeling/cognition towards these animals. Participants were also told that they would be given a short quiz about these animals later in the second session. However, no questions were asked. This deceptive procedure was intended to serve as a motivational goal to encourage information processing of the attitude material.

As in the Pilot Experiment, the informational content provided about each animal was manipulated. However, the name of the fictitious animals were counterbalanced across the four attitude formation conditions (cognitive/positive, cognitive/negative, affective/positive, and affective/negative). Before reading each passage, participants were required to answer a series of questions concerning their feelings or cognitions towards the animal in question. They were instructed that if they were unfamiliar with the animal, they should try to answer the question based on their expectation about the animal. As previously explained, the purpose of filling these scales was to prime the affective or cognitive dimension of attitude relating to the animal evaluated and, to further enhance the likelihood that the passage will create the desired cognitive or affective attitude structure base. After completing the structure-related scale and reading the attitudinally-manipulated narrative, participants were required to complete the overall, affective, and cognitive attitude scales. The 8-item overall attitude scale was always presented first, and the 16-item

affective and 14-item cognition scales were counterbalanced across participants. This process was repeated for all four animals. The order of presentation of the four narratives and scales was counterbalanced across participants.

Finally, after reading all the materials and completing all attitude scales, participants were asked to first complete the Need for Cognition scale and the Need for Affect scale. Order of presentation of the Need for Cognition and the Need for Affect scales was counterbalanced across participants. This completed session one.

Phase 2: Attitude Priming/Adjective Connotation Task

The procedure for the second phase was identical to that of the Pilot Experiment with one exception. Before beginning the adjective connotation task on computer, participants were provided with a booklet containing the attitude formation materials presented in the first phase. They were instructed to read, once again, the information about each animal. No time restriction was applied. This task was intended to provide a second opportunity for the participants to refresh their memory and consolidate their attitude in memory. Once they had finished reading the information, participants were told that the second part of the experiment concerns word recognition and meaning, and that speed and accuracy were required. Using the program "Direct RT", participants proceeded with the adjective connotation task and completed the 20 practice trials, followed by the 640 experimental trials. At the end of the session, participants were required to complete the attitude strength measures for each animal (i.e., certainty, knowledge, importance, strength of feeling). In addition, participants were asked to indicate, on a 7-point scale, how they would estimate 1) their ability to recall information about each animal, and 2) their ability to discriminate/differentiate between the four animals. These questions were designed to evaluate the consolidation of each attitude and serve as a manipulation check.

Finally, participants were debriefed, thanked, given compensation for their participation, and excused.

Results

Overview

Four main sets of analyses were carried out. The first set of analyses was performed to evaluate the effectiveness of the attitude manipulation and assess the strength of the newly created attitudes. Both an analysis of structural consistency and the computation of different strength indices were performed. A second set of analyses were computed on the response time latencies to investigate the structural priming, the primacy of affect, and the negativity bias hypotheses. A series of analyses of variances were performed. The third set of analyses investigated the role played by individual differences regarding attitude formation. A series of regression analyses were performed. The final set of analyses, as in the Pilot Experiment, consisted of an investigation of the participants' subjective recall and degree of attitude consolidation.

Attitude Bases Manipulation

Similar to the Pilot Experiment, an evaluation of the overall measures revealed that there was no significant difference between the affective-positive ($M = 6.28$) and cognitive-positive ($M = 6.07$) attitudes, $t(1, 43) = 1.87, p = .07$. Once again, an assessment of the negative attitudes revealed that affective-negative attitudes ($M = 1.82$) were significantly more extreme than cognitive-negative attitudes ($M = 3.22$), $t_{(1, 43)} = 9.21, p < .001$.

In turn, as described in the Pilot Experiment, an analysis of structural consistency was performed to assess the effectiveness of the attitude formation

manipulation. The results of the analysis, as shown in Table 3-1, demonstrated that, this time, the attitude formation phase was highly successful in creating the intended affective and cognitive bases for the four attitude objects.

Table 3-1

Source Table for the Analysis of Structural Consistency of Affective-Negative, Affective-Positive, Cognitive-Positive and Cognitive-Negative Attitudes: Experiment One.

	Intended Attitude Object Structure			
	Affective		Cognitive	
Type of Discrepancy	Negative	Positive	Negative	Positive
Affect-Evaluation	.89	-.33	.42	-.67
Cognition-Evaluation	1.23	-.85	.02	-.24

Four contrast analyses were performed to evaluate the significance of the difference for each of the four attitude objects created. A contrast of the mean discrepancy score for the affective-negative attitude object revealed that the affective-evaluation difference was smaller than the cognitive-evaluation difference, $t_{(1, 43)} = 3.32., p < .01$. A contrast of the mean discrepancy score for the affective-positive attitude object revealed that the affective-evaluation difference was significantly smaller than the cognitive-evaluation difference, $t_{(1, 43)} = -5.90.11, p < .001$. Similarly, a contrast of the mean discrepancy score for the cognitive-negative attitude object revealed that the cognitive-evaluation difference was significantly smaller than the affective-evaluation difference, $t_{(1, 43)} = -3.22, p < .01$. Finally, a contrast of the mean discrepancy score for the cognitive-positive attitude object revealed that the cognitive-evaluation difference was also significantly smaller than the affective-evaluation difference, $t_{(1, 43)} = 5.78, p < .001$. Overall, these findings are highly consistent with

previous findings (Fabrigar & Petty, 1999; Crites et al., 1994) and offer further evidence of the validity of the attitude formation paradigm.

Attitude Strength Indices

Attitude strength indices were computed for importance, certainty, strength of feeling, knowledgeability, extremity, and ambivalence. The descriptive statistics are presented in Table 3-2. A composite score of attitude strength was also calculated by

Table 3-2

Source Table for the Mean Score of Attitude Strength Indices: Experiment One.

	Attitude Strength Indices											
	Importance		Certainty		Strength Feeling		Knowledge		Extremity		Ambivalence	
Attitude	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
AP	3.0	1.8	4.3	1.8	3.8	1.6	3.4	1.3	2.3	.73	8.8	.92
AN	2.5	1.7	4.3	1.8	3.4	1.9	3.3	1.5	2.3	.87	4.3	1.2
CP	2.8	1.7	4.1	1.7	3.2	1.5	3.3	1.3	2.1	.70	8.5	1.1
CN	2.5	1.5	4.0	1.7	3.3	1.4	3.4	1.2	1.1	.77	5.6	1.5

Note. AP = Affective-Positive, AN = Affective-Negative, CP = Cognitive-Positive, CN = Cognitive-Negative

summing all six indices[17]. On a potential composite strength score of 41, it was found that, on average, participants held attitudes that were of weak to moderate strength[18]; affective-positive (M = 18.0, SD = 5.2), affective-negative (M = 21.5, SD = 6.1), cognitive-positive (M = 18.6, SD = 4.6) and cognitive-negative (M = 19.9, SD = 5.5). Overall, the strength indices were very similar across the four attitudes, with one exception. Negative attitudes tended to be less ambivalent than positive attitudes. The Cronbach alpha coefficient for the affective-positive, affective-negative,

[17] In order to compute the composite score of strength, attitude ambivalence had to be reverse coded because, theoretically, stronger attitudes are less ambivalent. The following formula was used to provide a positive index of ambivalence for each attitude: (10 – ambivalence score) = X.

[18] Attitude strength was considered moderate relative to a cut-off score of 22.5. This cut-off score was computed by adding up the mid-range scores of each attitude strength indices.

cognitive-positive, and cognitive-negative composite strength indices were of .75, .56, .80, .55, respectively.

Attitude Priming

Across conditions, the remaining 44 participants had an average error rate of 3.50%. All experimental trials resulting in an error were removed from the analyses. Similar to the Pilot Experiment, a set criterion of ± 3.29 standard deviations ($p < .001$, two-tailed) from participants' condition mean was used to eliminate extreme scores. The average number of extreme data points eliminated across participants was of 1.27%. Overall, a total of 4.77% data points were removed.

Next, as in the Pilot Experiment, the mean response latencies were computed for each participant, in each of the 16 experimental conditions, and each of the four neutral prime conditions. The resulting average means per condition are depicted in Figure 3-1. Each average mean was then subtracted from its related neutral condition to obtain the facilitation scores per condition (see Figure 3-2). As in the Pilot Experiment, results from the 2 (prime structure) × 2 (prime valence) × 2 (target structure) × 2 (target valence) repeated measures ANOVA did not reveal any of the expected two-way interactions when the analysis was performed on the facilitation scores. Table 3-3 presents the results of the analysis of variance on the facilitation scores. Neither the structural priming hypothesis (Prime Structure × Target Structure interaction, $F_{(1, 43)} = 2.68, p = .11$) nor the affective priming hypothesis (Prime Valence × Target Valence, $F_{(1, 43)} = 0.42, p = .52$) were found to be supported. In fact, the only significant interaction obtained was between Prime Structure and Target Valence, $F_{(1, 43)} = 4.29, p = .04$. A closer look at this interaction suggests that participants were slower at evaluating the target stimuli when the primes were affective and the target stimuli were positive. Although significant, this interaction is

difficult to explain theoretically. Once again, the present experiment does not offer any evidence of automatic attitude activation (see Fazio et al., 1986; Bargh et al.1992; Bargh et al., 1996).

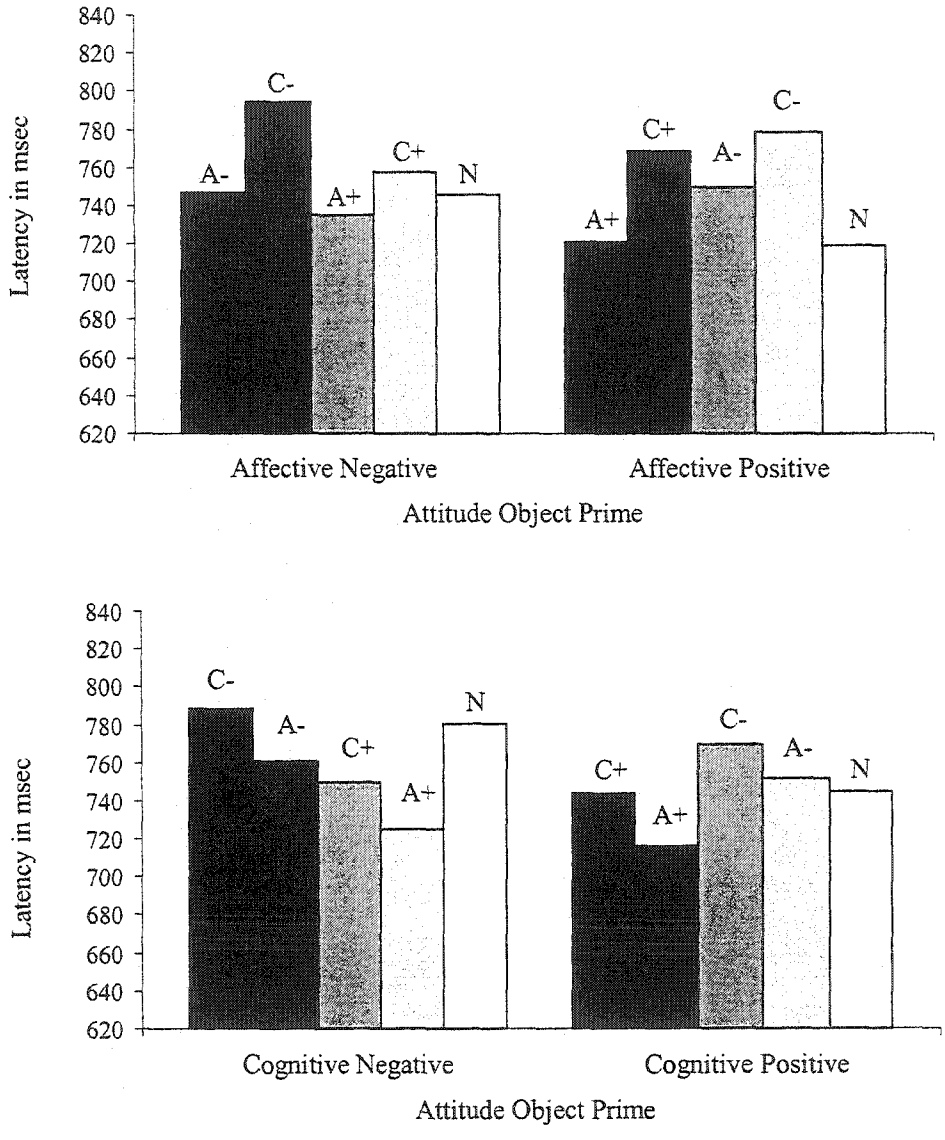
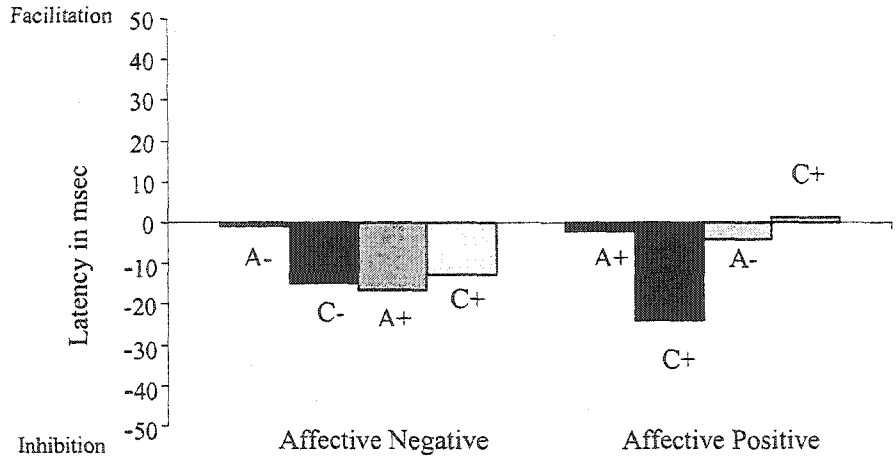


Figure 3-1. Mean target latencies (in milliseconds) in Experiment One as a function of prime structure, prime valence, target structure (C = cognitive; A = affective), and target valence (+ = positive; – = negative). Notes: ■ = Double matching; ■ = valence matching; ■ = structure matching; ■ = no-matching; □ = correspond to mean reaction times latencies obtained with neutral primes, and target stimuli corresponding to the horizontal label)



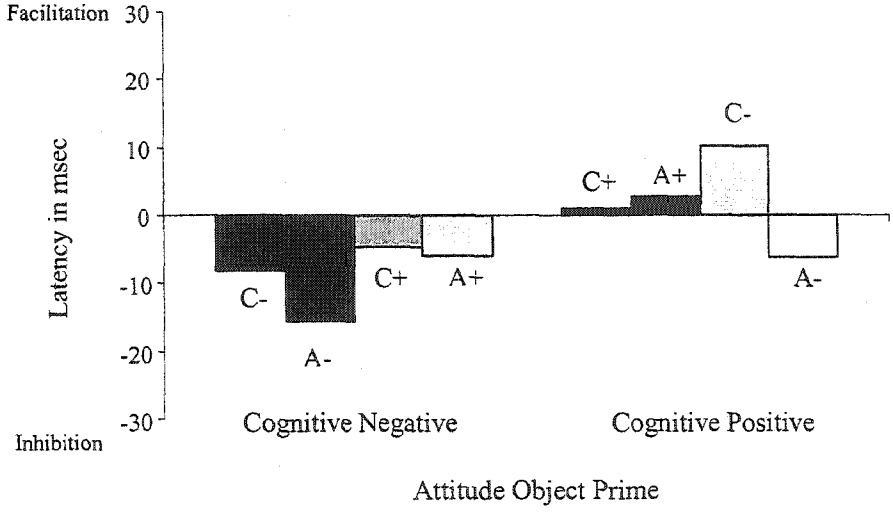


Figure 3-2. Mean facilitation scores (in milliseconds) in Experiment One as a function of prime structure, prime valence, target structure (C = cognitive; A = affective), and target valence (+ = positive; – = negative). Notes: ■ = Double matching; ■ = valence matching; ■ = structure matching; □ = no-matching.

Next, four composite facilitation/inhibition scores were created by averaging out the conditions that fit the following attitude matching criteria: double matching (M = -2.54), valence matching (M = -12.83), structure matching (M = -3.73), and no matching (M = -5.85). A repeated measures ANOVA was performed on the newly

Table 3-3

Source Table for Repeated Measure Analysis of Variance of Prime Structure, Target Structure, Prime Valence, and Target Valence: Experiment One.

Source	Degrees of Freedom	*F*-Value	Eta-Squared	Significance (p=)
Prime Structure (PS)	1	1.62	.04	.21
Target Structure (TS)	1	0.00	.00	.96
Prime Valence (PV)	1	3.69~	.08	.06
Target Valence (TV)	1	0.10	.00	.76
PS×TS	1	2.68	.06	.11
PS×PV	1	0.55	.01	.46
PS×TV	1	4.29*	.09	.04
TS×PV	1	0.00	.00	.99
TS×TV	1	0.59	.01	.45
PV×TV	1	0.42	.01	.52
PS×TS×PV	1	0.15	.00	.70
PS×TS×TV	1	0.27	.01	.61
PS×PV×TV	1	0.02	.00	.89
TS×PV×TV	1	3.53~	.08	.07
PS×TS×PV×TV	1	1.31	.03	.26

Notes: ~ p<.10; * p<.05; ** p<.01

created facilitation scores. No differences were found between the four conditions, $F_{(3,40)} = 1.34, p = .26$. The present findings do not offer support for the hypothesis that the implicit activation of affective evaluations are more influential than the structural compositionality for automatically activating an attitude. Similarly, the present findings do not offer any evidence that a double matching between the structure and valence of an attitude adds any incremental value beyond that found when exclusively matching its valence (see Fazio et al, 1986).

Another goal of this experiment was to further explore the primacy of affect hypothesis. According to this hypothesis, affective-based attitudes should have resulted in shorter reaction times than cognitive-based attitudes. However, as suggested by Giner-Sorolla (2001), such an effect should be moderated by attitude extremity. In order to test this hypothesis, an average index of attitude extremity was

computed across the four newly created attitudes objects. Through a median split procedure[19], two groups representing low (M = 1.49) vs. high (M = 2.40) attitude extremity were created. The same general four-way analytic model tested earlier was applied to each group. No statistically significant main effect of attitude structure was found for any of the levels of attitude extremity (low extremity group, $F_{(1, 21)}$ = .32, p = .58; high extremity group, $F_{(1, 21)}$ = 1.40, p = .25).

The fourth goal of this study was to substantiate the negativity bias hypothesis by examining the effect through reaction time data. It was expected that such a negativity bias effect would emerge from the process and would result in an enhanced inhibition or facilitation for negative attitudes primes as compared to positive attitude primes. Unfortunately, because there was no evidence of the affective priming effect, and because there was a significant difference between the composite index of attitude valence extremity for the two positive (M = 2.21, SD = .61) and for the two negative attitudes (M = 1.67, SD =.68)[20], $t_{(1, 43)}$ = 6.23, p < .001, this hypothesis could not be tested.

Individual Differences and Attitude Formation

Experiment One also aimed to explore the role played by individual differences regarding attitude formation. The first hypothesis examined whether people's motivation to approach or avoid emotion-inducing information

[19] It is important to note that this methodology does not represent the optimal procedure for considering attitude extremity. Although the most adequate course of action would be to insert attitude extremity as a covariate in the analysis, the present experimental design prevents from conducting such an analytic strategy. The main reason is that four independent indices of extremity exist across the four conditions and across participants. Ultimately, it would be necessary to nest the independent index of extremity for each attitude as a between-subject factor under the first two factors only. However, it is questionable as to whether such a procedure can be performed statistically. As a result, the best estimate was to compute an average index of attitude extremity across the four newly created attitudes objects for each participant, and perform a median split.

[20] The composite scores of attitude extremity for positive and negative attitudes were computed by averaging out the two extremity scores of each positive and negative attitude.

could predict the success of the affective structural base manipulation. Similarly, the second hypothesis involved testing whether participants' tendency to elaborate and organise the factual information could predict the success of the cognitive structural base manipulation.

Prior to testing these hypotheses, the first step required measuring a set of cognitive and affective indices representing the amount of idiosyncratic structural difference for each attitude. The most logical and parsimonious way to create these individual indices consists of subtracting the discrepancy scores computed through the analysis of structural consistency. For example, one would obtain an idiosyncratic structural score for the affective-positive attitude by subtracting the absolute cognitive-evaluation discrepancy score from the absolute affective-evaluation discrepancy score. Then, these idiosyncratic structural scores would be averaged out across the attitude objects pertaining to the same structural base. Participants' average scores on the Need for Cognition scale and the Need for Affect scale (and subscales) were as follows: a) need for cognition ($M = 64.8$; $SD = 13.08$), b) need for affect-overall ($M = 26.66$; $SD = 18.04$), need for affect-approach ($M = 14.14$; $SD = 10.18$), need for affect-avoidance ($M = 12.52$; $SD = 10.62$). Contrary to the results obtained by Maio and Esses (2001), the Approach and Avoidance subscales were significantly positively correlated, $r(44) = .51$, $p < .001$.

For the first analysis, scores obtained on the subscales of the Need for Affect scale were regressed against the affective index. Results of the multiple regression analysis indicated that the Emotion Approach and the Emotional Avoidance subscales were not significant predictors of affective attitude structure formation. Each subscale accounted for less than 2% of the variance of the affective index; R^2 change for Emotion Approach = .02, $F_{(1, 42)} = 0.77$, $b = .01$, $p = .39$, and R^2 change

for Emotional Avoidance = .01, $F_{(1, 42)} = 0.32$, $b = .00$, $p = .57$. As evidenced, these findings are contrary to the hypothesis.

For the second analysis, the scores on the Need for Cognition scale were regressed against the cognitive index. Contrary to the hypothesis, no significant results were found. Individual tendency to elaborate, organise and seek factual information did not predict cognitive attitude base formation, R^2 change = .01, $F_{(1, 42)} = 0.53$, $b = .00$, $p = .47$.

Subjective Recall and Potential for Differentiation

As in the Pilot Experiment, an evaluation of the cognitive demands placed on the participants relative to the learning and consolidation of the newly created attitudes was performed. As shown in Table 3-4, participants evaluated their capability to recall information about the four animals and to differentiate between them as being moderate. These results have important implications concerning the validity of the conclusion in the present experiment.

Table 3-4

Source Table for Means, Standard Deviation, and Standard Error of the Mean for the Attitude Consolidation Items (2): Experiment One.

Attitude Object	Mean	SD	SE
		Item 1: Attitude Recall	
Affective-Positive	4.08	1.80	.29
Affective-Negative	4.00	1.89	.30
Cognitive-Positive	3.69	1.52	.24
Cognitive-Negative	3.85	1.50	.24
		Item 2: Attitude Differentiation	
Overall	4.54	1.23	.19

Note. These results were obtained by evaluating the responses of all participants; including the six participants removed from the analysis for the reasons justified above (n=50).

Discussion

Summary of Results

Experiment One was undertaken with several goals in mind. The first aim was to demonstrate the validity of the attitude formation procedure. Contrary to the results obtained in the Pilot Experiment, this experiment showed that the attitude structure formation procedure was effective at creating all of the four desired attitudes. However, considering the index of strength, the present findings show that such procedures only created weak-to-moderate attitudes.

The second goal of this experiment was to further investigate the structural priming, the affective priming, the negativity bias, and the primacy of affect hypotheses. As found in the previous experiment, there was no evidence that participants were faster at responding to target stimuli when such targets matched the attitude primes in terms of structure (affective vs. cognitive) and/or valence (positive vs. negative). Furthermore, because none of the hypothesised interactions were found, it was not possible to evaluate whether matching the valence between prime and target would have a greater priming effect than matching their structure. For the same reason, it was also not possible to test the negativity bias hypothesis. Finally, no support was found for the primacy of affect hypothesis.

A third goal of this experiment was to explore the role played by two measures of individual differences for predicting variance in the success of the attitude structure formation process. The present results suggest that individual differences in the need for affect or the need for cognition were not significant predictors of the likelihood of success for forming affective-based or cognitive-based attitudes, respectively.

Finally, the last goal of this experiment was to further investigate the degree of attitude consolidation resulting from the attitude formation procedure. Similar to the Pilot Experiment, Experiment One revealed a moderate level of attitude consolidation. That is, participants were able to recall attitude related information and differentiate between the four attitude objects to a moderate extent.

Implications and Limitations

The present experiment replicated some of the findings obtained in the Pilot Experiment. First, further evidence was gathered concerning the validity of the attitude formation procedure for creating attitudes with distinctive structural bases (Fabrigar & Petty, 1999). However, an evaluation of the strength of the four attitudes created suggested that this methodology may not be adequate for creating as many as four attitudes during a single experimental session. As evidenced by the average scores on the two single item measures of subjective attitude consolidation (recall and differentiation), participants perceived themselves as only moderately capable of recalling information about each fictitious attitude object and moderately capable of differentiating between the four attitudes objects. It is valuable here to review shortly the original attitude formation paradigm (see Fabrigar & Petty, 1999). In this paradigm, participants were only required to develop a single new attitude, after reading one short narrative. No interference is to be expected here; since there is only one new set of information to process. However, in the present experiment, participants were presented with four narratives, and asked to develop four new attitudes. The likelihood that these newly created attitudes could have been fully consolidated is questionable. As suggested earlier, it seems possible that the attitude formation paradigm used in this study did not provide the participant with enough exposure to the manipulated attitudinal stimuli. In light of such results, one may

argue that the inability to create strong attitudes directly influenced the potential for automatically activating an attitude from memory.

The present experiment replicated the earlier findings obtained in the Pilot Experiment. That is, Experiment One did not show any evidence of either affective priming or attitude structure priming. Additionally, no support was offered for any of the secondary hypotheses, i.e., primacy of affect and negativity bias hypothesis. Conceivably, two main explanations could be offered to make sense of the present pattern of results. On the one hand, one may argue that manipulating the structure of attitude may have moderated/suppressed the affective priming effect found in earlier studies (e.g., Fazio et al., 1986). On the other hand, one may simply reiterate the original argument made by Fazio et al. (1986). That is, only strongly held attitudes are capable of being automatically activated from memory upon presentation of an attitude object. Perhaps, in order to provide some explanation for these patterns of findings, a modification of the experimental design should be considered in which potentially stronger attitudes are used as primes.

Finally, Experiment One found no significant evidence concerning the role played by individual differences regarding attitude formation. Participants' need for cognition did not predict the formation of cognitive-based attitude. In other words, whether people differ in their tendency to elaborate or organise information did not explain the likelihood of success in creating more cognitive-based attitudes. Similarly, participants' need for affect, as indexed by the Emotion Approach or Emotion Avoidance subscales, did not predict the effectiveness of the affective-based attitude formation process. Therefore, individuals' motivation to process affective information did not relate to the affective attitude formation potential. These latter findings have several implications for attitude researchers. First, these findings call

into question the validity of the Need for Affect scale and its related theory. For instance, a significant positive correlation was obtained between the Emotion Approach and Emotion Avoidance scales. Instead, one would expect a negative correlation. Second, the findings suggests that these two measures of individual differences do not play a role in predicting attitude formation potential. Finally, these results suggest a need to better understand the attitude structure formation process and look into other individual differences factors that could predict the formation of attitudes with specific structural bases.

All things considered, Experiment One suggests an additional number of methodological shortcomings that may have affected the present conclusions. First, one may argue against the stability of the artificially developed attitudes and the effects obtained in Experiment One. For example, based on the results obtained on the subjective attitude recall and on the subjective attitude differentiation items, it is arguable that a set of more consolidated attitudes are required. Second, it is possible that no significant effects were obtained in Experiment One because the attitudes created were not strong enough. That is, if strong attitudes are necessary for automatic attitude activation, it would be reasonable to argue that the attitudes formed through the present methodology were too weak to show any priming effect, given the weak-to-moderate attitude strength indices obtained in the present experiment. Finally, one may also argue against the artificiality of the attitude created (i.e., the lack of ecological validity). For these reasons, further modifications of the experimental paradigm were required for Experiment Two.

CHAPTER 4: EXPERIMENT TWO

Overview and Goals

Experiment Two was undertaken with several goals in mind. The first goal was to address the shortcomings observed in Experiment One. This was accomplished by modifying the first phase of the experimental design. Instead of experimentally creating attitudes, the first phase consisted of pre-selecting participants based on the structure of their attitudes towards a number of attitudinal objects.

The second goal of this experiment was similar to Experiment One. The relationship between the affective evaluation and the structural compositionality of an attitude were investigated further. The same hypotheses were tested:

H_1: Participants would be faster at responding to target stimuli when such targets match the attitude primes in terms of structure (affective vs. cognitive).

H_2: Participants would be faster at responding to target stimuli when such targets match the attitude primes in terms of valence (positive vs. negative).

H_3: Participants would be faster at evaluating target adjective words when they relate to primed attitudes in terms of structure and valence, than when they relate in terms of structure or valence (assuming support for H_1 and H_2).

H_4: Matching the valence between primed attitudes and target adjective words would have a greater priming effect than matching their structure (assuming support for H_1 and H_2).

Finally, similar to Experiment One, the third and fourth goals consisted of testing the primacy of affect and the negativity bias hypotheses, where:

H_5: Participants would be generally faster at evaluating/responding to the target stimuli when the primed attitudes are based on affect rather than on cognition. However, this effect would be moderated by attitude extremity.

H_6: The overall effect of the negative attitude primes would be greater on the target words than the positive attitude primes.

Method

Design

This experiment was a 2 (target valence: positive vs. negative) x 2 (prime valence: positive vs. negative) x 2 (target structure: cognitive vs. affective) x 2 (prime structure: cognitive vs. affective) within-subject factorial design. Testing was executed in two sessions of 45 minutes and 70 minutes respectively.

Participants

Participants were 47 English-speaking undergraduate students (14 males and 33 females) at Saint-Mary's University, aged 18 to 27 (M = 20.06) recruited on campus[21]. All students received compensation for their participation in the form of extra course credit. Three participants were removed from the analyses due to the large number of errors committed during the priming phase of the experiment (errors >10 % over all trials). For instance, in some experimental conditions, the mean error rate was greater than 30%. Such a pattern of findings shows that participants did not comply with the experimental instructions (e.g., random responding). Forty-four cases remained for the analyses.

Materials and Apparatus

For this experiment, naturally existing attitude objects were selected as primes. Prime selection was performed in two major phases. First, 28 attitude objects

were subjectively selected from a pool of potential affective-positive, affective-negative, cognitive-positive, and cognitive-negative primes[22]. These objects were chosen because of their likelihood of representing each of these four distinctive attitudes (i.e., face validity). Second, four independent raters ranked-ordered the 28 attitude objects according to their potential for representing each of the four attitude conditions. Then, a focus group was conducted with these raters to determine the final rank-order of each attitude object within their respective attitude category. A final list of the most representative attitude-objects were selected for pre-screening participants: affective-positive(2) — baby, and kitten; affective-negative(3) — shark, snake, and spider; cognitive-positive(3) — book, car, and computer; cognitive-negative(2) — pollution and cholesterol. As with the first two experiments, this study was conducted on IBM computer using the computer software programs Medialab™ (version 2002.1.15) and Direct RT™ (version2002.2.0.2).

Measures

Attitude-relevant Affect, Attitude-relevant Cognition, and Overall Attitude Measures

Participants' overall attitude, attitude-relevant affect, and the attitude-relevant cognition for each of the 10 attitude objects was measured in the same manner as in the first two experiments. The overall, affective, and cognitive attitude scales were all found to be reliable in measuring the four newly created attitudes (Cronbach

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[21] In total, 52 of the 84 participants (62%) tested during the first session fulfilled the requirement for the second session. Forty-seven subjects completed the second session.

[22] The 28 attitude objects selected per condition, as ranked ordered by the four raters, were: affective-positive (8)—1. baby, 2. kitten, 3. puppy, 4. flower, 5. music, 6. candy, 7. money, 8. jewellery; affective-negative (7)— 1. shark, 2. snake, 3. spider, 4. death, 5. graveyard, 6. garbage, 7. hospital; cognitive-positive (6)— 1. book, 2. car, 3. computer, 4. antidote, 5. technology, 6. union; cognitive-negative (7)— 1. pollution, 2. cholesterol, 3. disease, 4. exam, 5. gun, 6. politician, 7. lawyer.

alpha coefficients ranged from .65 to .90[23]). Once again, the lowest reliability was found for the cognitive attitude scales.

Measures of Attitude Strength

These measures were identical to the ones used in Experiment One.

Measure of Attitude Accessibility

Attitude accessibility was measured in the same manner as the first two experiments, with one exception. In this experiment, the existing attitude objects pre-screened during the first session were used as the prime stimuli. Similar to Experiment One, a total of 640 experimental trials were created, with regards to the control guidelines described previously.

Procedure

To answer the possible criticisms and limitations listed above, this experiment was conducted in an attempt to replicate the results obtained in Experiment One, using naturally existing attitude objects. The procedure followed was relatively similar to Experiment One. However, instead of experimentally creating attitudes and testing all individuals, in this study, participants were pre-screened on existing attitudes. As in Experiment One, this study was conducted over two separate sessions. The first session was devoted to pre-select participants based on the structure of their attitudes towards a number of attitudinal objects. The second session involved the same type of priming task (adjective connotation task) described in Experiment 1.

[23] Across the four attitude objects, reliability coefficients of .73, .90, .79, and .84 were found on the overall attitude scales, whereas reliability coefficients of .80, .79, .65, and .80 were found on the affective scales, and reliability coefficients of .68, .71, .69, and .81 were found on the cognitive scales.

Phase 1: Screening for Participants and Attitude Objects

Screening session. Participants were brought into the laboratory in groups of one to five. At the beginning of the session, they were informed that the experiment was concerned with word recognition and information processing and that their participation in the second session was conditional upon the results obtained in the first session. Next, participants were required to complete the consent form and the background information questionnaire.

After completion of these documents, participants were provided with a questionnaire package containing all test materials for the session. Participants were first asked to complete the Need for Affect and the Need for Cognition scales. Order of presentation of these scales was counterbalanced across participants. Then, participants were asked to evaluate ten attitude objects. These attitudes objects had been pre-selected and were hypothesised to be mostly cognitive-positive, cognitive-negative, affective-positive, and affective-negative in nature. Order of presentation of the attitude objects was counterbalanced across participants. For each attitude object, participants were asked to first complete the overall, affective, and cognitive attitude scales (see Crites et al., 1994), and then complete the same four attitude strength measures presented in Experiment One. Finally, contact information (i.e. phone number, e-mail) was recorded, experimental credits were awarded, and participants were thanked and excused.

Selecting participants and attitude objects. Following the first session, the first step consisted of computing participants' overall, affective, and cognitive attitudes scores towards the ten attitude objects. Then, an analysis of structural consistency was performed (see Chaiken, et al., 1995). As explained in Experiment One, this analysis consists of evaluating the consistency between 1) the attitude-relevant affect

and the overall attitude, and 2) the attitude-relevant cognition and the overall attitude. It requires the computation of two discrepancy scores, one affective and one cognitive, for each of the ten attitude objects. As explained earlier, the first discrepancy score was obtained by subtracting the absolute value of the difference between each participant's averaged score on the affective scale (ranging from 1 to 7) and each participant's averaged score on the overall attitude scale (ranging from 1 to 7). Similarly, the second discrepancy score was obtained by subtracting the absolute value of the difference between each participant's averaged score on the cognitive scale (ranging from 1 to 7) and each participant's averaged score on the overall attitude scale (ranging from 1 to 7). Once computed, the affective-evaluation and the cognitive-evaluation discrepancy scores were contrasted within each of the ten attitudes. Thereafter, participants' overall attitude valence (positive vs. negative) for each of these attitude objects was assessed. In the end, only participants possessing evaluation of attitude objects that correspond to the four prime conditions (affective-negative, affective-positive, cognitive-negative, cognitive-positive) were selected for the second session[24]. Finally, an electronic debriefing form was sent to participants that did not fulfill the requirements.

Phase 2: Attitude Priming/Adjective Connotation Task

The procedure for the second session was identical to that of the first two experiments with one small modification. For each participant, an independent experimental session was programmed using the pre-determined attitude objects to fit the four prime conditions. Once more, participants were informed that the second part of the experiment concerned word recognition and meaning, and that speed and

[24] In cases where participants had more than one attitude that fit the criteria for any of the conditions, the attitude that had the highest structural discrepancy, and most extreme valence was selected.

accuracy were required. Then, using the program "Direct RT", participants proceeded with the adjective connotation task and completed the 20 practice trials, followed by the 640 experimental trials. Finally, participants were debriefed, given compensation for their participation, thanked and excused.

Results

Overview

Two main sets of analyses were carried out. The first set of analyses was performed after the first session to assess participants' attitude structure and strength. As in the prior two experiments, an analysis of structural consistency was performed for all ten attitude objects. In addition, computations of the different strength indices were performed. The second set of analyses was computed on the response time latencies to investigate the structural priming, the primacy of affect, and the negativity bias hypotheses. A series of analyses of variance were carried out.

Screening of Participants and Attitudes

An analysis of structural consistency was first performed on the ten attitude-objects pre-selected for screening participants. This analysis was identical to the one performed in the previous two experiments. The resulting discrepancy scores for these attitude objects were then contrasted. Participants possessing evaluations of attitude objects that correspond to the four prime conditions (affective-negative, affective-positive, cognitive-negative, cognitive-positive) were selected for the second session. The results of the attitude screening process and of the analysis of structural consistency analysis are shown in Table 4-1 and 4-2. These results demonstrated that the screening procedure was successful at selecting four attitude objects with distinctive structural properties and valences.

Four contrast analyses were performed to evaluate the significance of the difference for each of the four attitude objects selected. A contrast of the mean discrepancy score for the affective-negative attitude object revealed that the affective-evaluation difference was smaller than the cognitive-evaluation difference, $t_{(1, 43)}$ =

Table 4-1

Source Table Depicting the Frequencies for Categorising Attitude Objects Under Each Prime Condition: Experiment Two.

	Prime Conditions									
	Affective Positive		Affective Negative			Cognitive Positive			Cognitive Negative	
Attitude Objects	1	2	3	4	5	6	7	8	9	10
1. Baby	12			–			–			–
2. Kitten	31			–			–			–
3. Shark	–			13			–			–
4. Snake	–			8			–			–
5. Spider	–			24			–			–
6. Book	–			–			19			–
7. Car	4			–			4			–
8. Computer	–			–			24			–
9. Cholesterol	–			2			–			8
10. Pollution	–			–			–			39

Note. Includes the statistics for all participants that completed the affective priming phase (N=47).

Table 4-2

Source Table for the Analysis of Structural Consistency of Affective-Negative, Affective-Positive, Cognitive-Positive and Cognitive-Negative Attitudes: Experiment Two.

	Attitude Object Structure			
	Affective		Cognitive	
Type of Discrepancy	Negative	Positive	Negative	Positive
Affect-Attitude	.52	-.40	1.45	-1.33
Cognition-Attitude	1.15	-1.43	.35	-.45

4.83, $p < .001$. A contrast of the mean discrepancy score for the affective-positive attitude object revealed that the affective-evaluation difference was significantly smaller than the cognitive-evaluation difference, $t_{(1, 43)} = -10.06, p < .001$. Similarly, contrast of the mean discrepancy score for the cognitive-negative attitude object revealed that the cognitive-evaluation difference was significantly smaller than the affective-evaluation difference, $t_{(1, 43)} = -12.60, p < .001$. Finally, contrast of the mean discrepancy score for the cognitive-positive attitude object revealed that the cognitive-evaluation difference was also significantly smaller than the affective-evaluation difference, $t_{(1, 43)} = 10.55, p < .001$.

Evaluation of the overall attitudes measures revealed that there was a significant difference between the affective-positive ($M = 6.41$) and the cognitive-positive ($M = 6.09$) attitudes, $t_{(1, 43)} = 2.85, p < .01$. An assessment of the negative attitudes revealed that cognitive-negative attitudes ($M = 1.38$) were significantly more extreme than affective-negative attitudes ($M = 2.76$), $t_{(1, 43)} = 6.95, p < .001$.

Attitude Strength Indices

As in Experiment One, six indices of strength (importance, certainty, strength of feeling, knowledgeability, extremity, and ambivalence) were measured. A composite score of attitude strength was also calculated by summing up all six indices. The descriptive statistics are presented in Table 4-3. On a potential composite strength score of 41, participants held on average attitudes that were of moderate strength[25]; affective-positive ($M = 23.5$, $SD = 5.5$), affective-negative ($M = 20.9$, $SD = 5.5$), cognitive-positive ($M = 27.3$, $SD = 5.8$) and cognitive-negative ($M = 26.4$, $SD = 5.9$). Across conditions, the affective-negative attitude scored lower on almost all the strength indices, with the exception of attitude ambivalence where the

[25] Once again, attitude strength was considered moderate relative to a cut-off score of 22.5.

Table 4-3

Experiment Two. Mean Score of Attitude Strength Indices

	Attitude Strength Indices											
	Importance		Certainty		Strength Feeling		Knowledge		Extremity		Ambivalence	
Attitude	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
AP	4.5	1.8	5.7	1.5	5.1	1.7	4.8	1.4	2.4	.53	9.0	.59
AN	2.9	1.6	5.3	1.6	3.5	1.8	3.0	1.3	1.5	.97	5.2	1.6
CP	4.6	1.7	5.3	1.5	4.8	1.5	4.4	1.3	2.1	.69	8.7	.61
CN	4.3	1.7	5.1	1.8	4.6	1.8	3.7	1.3	2.6	.60	3.9	.76

Note. AP = Affective-Positive, AN = Affective-Negative, CP = Cognitive-Positive, CN = Cognitive-Negative

cognitive-negative had a moderate degree of ambivalence. The results obtained for the remaining three attitude conditions were comparable. All things considered, the present results nevertheless showed that the set of selected attitudes were slightly stronger than the set of attitudes created in Experiment One. The Cronbach alpha coefficient for the affective-positive, affective-negative, cognitive-positive, and cognitive-negative composite strength indices were of .83, .48, .85, .76, respectively.

Attitude Priming

Across conditions, participants had an average error rate of 2.84%. All experimental trials resulting in an error were removed from the analysis. Similar to the first two experiments, a set criterion of ± 3.29 standard deviations ($p < .001$, two-tailed) from each participant's condition mean was used to eliminate extreme scores. The average number of extreme data points eliminated across participants was 1.33%. Overall, a total of 4.17% data points were removed.

As for the Pilot Experiment and Experiment One, the mean response time latencies were computed for each participant, in each of the 16 experimental conditions, and each of the four neutral prime conditions. The resulting means per

condition are depicted in Figure 4-1. As in the previous two experiments, each mean was subtracted from their related neutral condition to obtain facilitation and

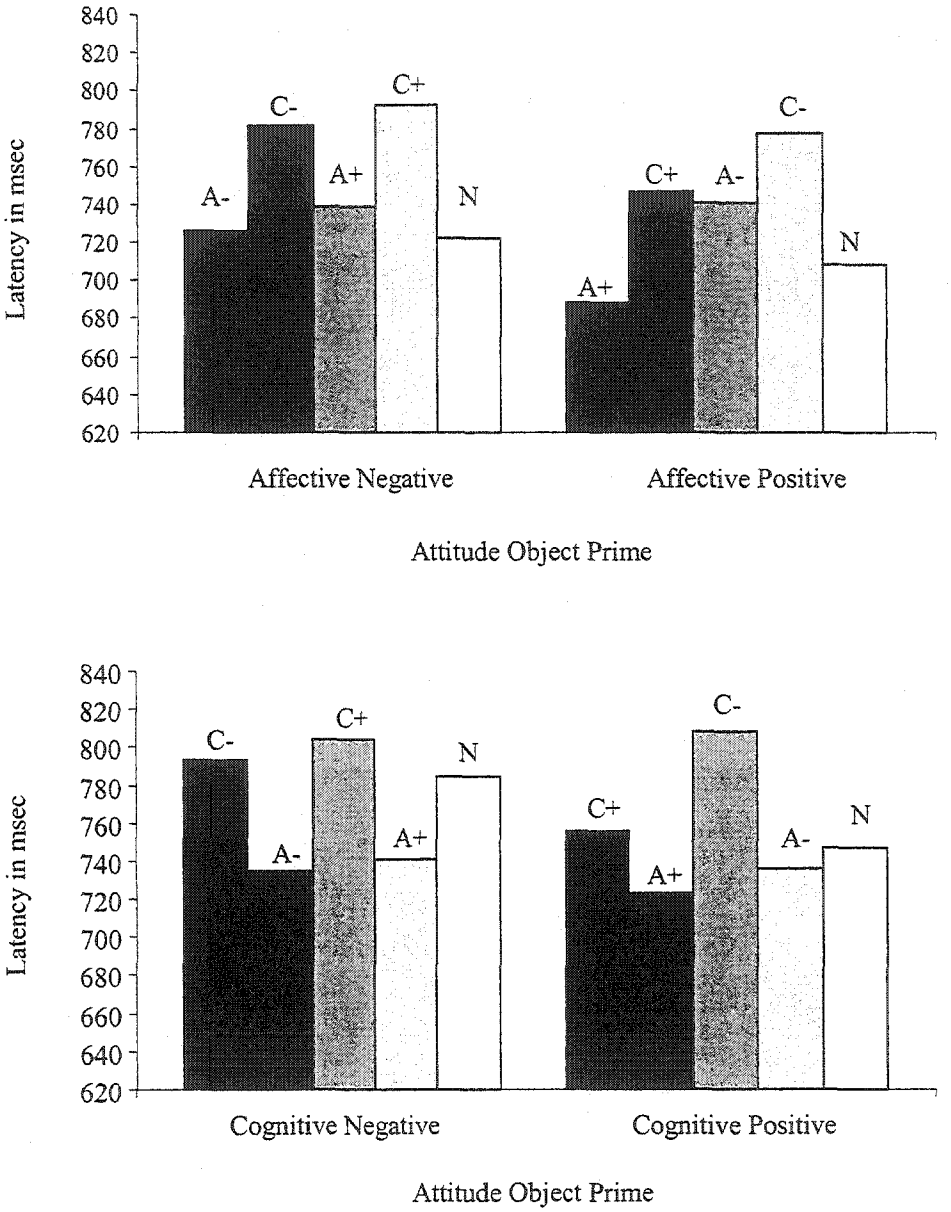

Figure 4-1. Mean target latencies (in milliseconds) in Pilot Experiment as a function of prime structure, prime valence, target structure (C = cognitive; A = affective), and target valence (+ = positive; – = negative). Notes: ■ = Double matching;■ = valence matching;■ = structure matching; = no-matching;□ = correspond to mean reaction times latencies obtained with neutral primes, and target stimuli corresponding to the horizontal label).

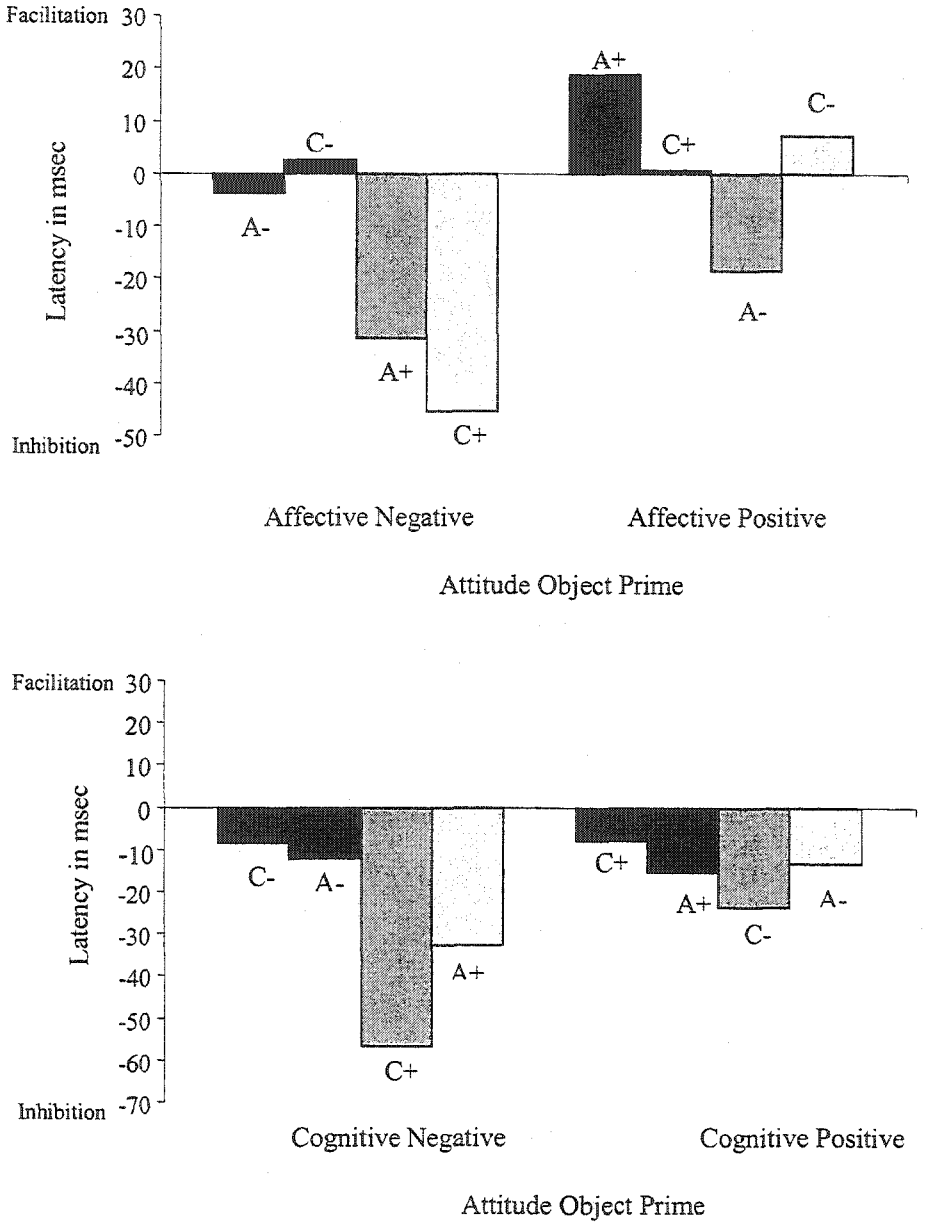

Figure 4-2. Mean facilitation scores (in milliseconds) in Pilot Experiment as a function of prime structure, prime valence, target structure (C = cognitive; A = affective), and target valence (+ = positive; – = negative). Notes: ■ = Double matching; ■ = valence matching; ■ = structure matching; ▫ = no-matching.

inhibition scores (see Figure 4-2). Then, a 2 (prime structure) ×2 (prime valence) ×2 (target structure) ×2 (target valence) repeated measures ANOVA was performed. The results are shown in Table 4-4.

There were significant main effects for prime structure , $F_{(1, 43)} = 9.47$, $p = .01$, and prime valence $F_{(1, 43)} = 12.48$, $p = .001$. Respectively, participants were faster at evaluating the target stimuli when such targets were preceded by affective and/or negative primes as compared to cognitive and/or positive primes. In contrast with the first two studies, a two-way interaction was found between Prime Valence and Target Valence, $F_{(1, 43)} = 12.48$, $p = .001$, replicating the predicted affective priming effect (e.g., Fazio,1986). Participants were faster at responding to target stimuli when such targets matched the attitude primes in term of valence.

Table 4-4

Source Table for Repeated Measure Analysis of Variance of Prime Structure, Target Structure, Prime Valence, and Target Valence: Experiment Two.

Source	Degrees of Freedom	*F*-Value	Eta-Squared	Significance (p=)
Prime Structure (PS)	1	9.47**	.18	.00
Target Structure (TS)	1	0.10	.00	.76
Prime Valence (PV)	1	12.48**	.23	.00
Target Valence (TV)	1	2.58	.06	.12
PS×TS	1	0.68	.02	.41
PS×PV	1	1.14	.03	.29
PS×TV	1	0.10	.00	.76
TS×PV	1	1.20	.03	.28
TS×TV	1	1.90	.04	.18
PV×TV	1	24.42**	.37	.00
PS×TS×PV	1	0.00	.00	.95
PS×TS×TV	1	3.40	.07	.07
PS×PV×TV	1	0.39	.00	.54
TS×PV×TV	1	0.53	.01	.47
PS×TS×PV×TV	1	7.81**	.15	.01

Notes: ~ $p<.10$; * $p<.05$; ** $p<.01$

There was no evidence of a structural priming effect, as indicated by a non-significant interaction between Prime Structure × Target Structure, $F_{(1, 43)} = .682$, $p = .41$. No facilitation was apparent when the targets matched the attitude primes in terms of structure. In addition, a four way interaction was found between prime

structure, prime valence, target structure and target valence. The significant two-way interaction between prime valence and target valence, and the presence of a four way interaction offers the opportunity to test whether a double matching between the structure and valence of an attitude has any incremental value over simply matching its valence, its structure, or when there is no matching. As in Experiment One, four composite facilitation/inhibition scores were created by averaging out the conditions that fit the four attitude matching criteria: double matching (M = -0.31), valence matching (M = -6.10), structure matching (M = -32.65), and no matching (M = -21.09). A repeated measures ANOVA was performed on the newly created facilitation scores. A significant difference was found between the four conditions, $F_{(3,40)} = 14.51, p < .001$.

A priori Bonferroni Multiple Comparison tests were performed to contrast the four conditions. No significant difference was found between double matching and valence matching $t_{(1, 43)} = 1.09, p = .99$. A double matching between the structure and valence of an attitude has no significant added value over simply matching its valence. Interestingly, the structure matching condition showed significant facilitation/inhibition score differences with all other conditions; vs. double-matching, $t_{(1, 43)} = 6.09, p < .001$, vs. valence $t_{(1, 43)} = 4.34, p = .001$, vs. no-matching, $t_{(1, 43)} = 2.92, p = .03$. That is, greater inhibition was obtained when the structure of the attitude and the evaluation matched. Overall, although no facilitation was obtained, the pattern of results offers some evidence for the automatic attitude activation (see Bargh et al., 1992; Bargh et al., 1996; Fazio et al., 1986). In sum, across conditions, less inhibition was obtained when there was a match between the valence of the attitude prime and the target than when both valence and structure matched.

Another goal of this experiment was to further explore the primacy of affect hypothesis. As suggested earlier, such an effect should be moderated by attitude extremity (Giner-Sorolla, 2001). In order to test this hypothesis, an average index of attitude extremity was computed across the four selected attitudes objects. Through a median split procedure[26], two groups representing low (M = 1.80) vs. high (M = 2.50) attitude extremity were created. Once again, after applying the same analytic model presented earlier on each group, a main effect of attitude structure was significant for participants with more extreme attitudes; low extremity, $F_{(1, 21)} = .65$, $p = .43$, and high extremity, $F_{(1, 21)} = 10.49$, $p < .01$. Once again, although no facilitation was observed, cognitive-based attitude primes ($M = -27.61$) created significantly greater inhibition than affective-based attitude primes ($M = -4.99$). This offers some support for the primacy of affect hypothesis.

The fourth and last goal of this study was to further explore the negativity bias hypothesis. It was expected that such negativity bias effect would emerge from the process and would result in enhanced inhibition or facilitation for negative attitudes primes as compared to positive attitude primes. As explained in Experiment One, the test of this hypothesis is contingent upon finding comparable levels of attitude extremity for positive and negative attitudes, as well as finding evidence for the affective priming effect. Although evidence was found for the affective priming effect, there was a significant difference between the composite index of attitude extremity for the positive ($M = 2.25$, $SD = .49$) and for the two negative attitudes ($M = 2.04$, $SD = .61$), $t_{(1, 43)} = 2.29$, $p < .05$. This hypothesis could not be tested.

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[26] See *Footnote 19* for justification concerning the selection of this statistical procedure.

Discussion

Summary of Results

Experiment Two was undertaken with two sets of goals in mind. The first aim was to answer a number of shortcomings pertaining to the methodology used and the strength of the attitude created. More specifically, it was an attempt to determine whether attitude strength, not attitude structure, moderated the affective priming effect. As a result, instead of experimentally creating attitudes, the first phase of Experiment Two consisted of pre-selecting participants based on the structure of their attitudes towards a number of attitudinal objects. Results showed that the screening procedure was successful at selecting participants with four attitudes of distinctive structural bases. Although it was believed that stronger attitudes would result using this procedure, the strength of these attitudes was generally only moderate.

The next set of goals was similar to Experiment One. It consisted of investigating whether a similar pattern of results would be obtained with regards to the structural priming, the affective priming, the primacy of affect, and the negativity bias hypotheses, by means of using this alternative methodology. As found in the previous experiments, there was no evidence that participants were faster at responding to target stimuli when such targets matched the attitude primes in terms of structure (affective vs. cognitive). However, evidence was found for the affective priming hypothesis. Results from the analysis of variance conducted on the composite facilitation scores was significant. The specific comparisons performed between these groups revealed that matching the prime structure and the target structure resulted in greater inhibition than double matching between structure and valence, valence matching, or no matching. The test for the primacy of affect

hypothesis showed significant results and, as suggested by Giner-Sorolla (2001), was moderated by attitude extremity. Finally, because of the significant difference in attitude extremity between positive and negative attitudes, it was not possible to test the negativity bias hypothesis.

Implications and Limitations

The current study replicated some of the findings obtained in the previous two experiments, but also offered some conflicting evidence. First, the results showed that screening participants on a set of pre-established attitudes could be a viable alternative to Fabrigar and Petty's (1999) attitude formation paradigm. Although slightly stronger attitudes were obtained by means of this screening procedure, the procedure did not permit control over attitude formation history, which in itself represents an important limitation of the present study.

Second, as found in the previous two experiments, the strength of the attitudes created were only moderate. Such an outcome may, once again, prevent from conclusively accepting the reliability and validity of the present results. For example, the current results did not show the same pattern of facilitation obtained by Fazio et al. (1986). In fact, although the analyses supported the affective priming hypothesis, the majority of the conditions did not produce the expected facilitation and inhibition pattern. Three potential explanations could justify the present findings. The first concerns the moderating role of attitude strength. The second concerns the moderating role of attitude structure. The last may suggest an inadequacy of the present baseline/neutral stimuli. These issues will be discussed in further details in the next chapter.

Third, support was found for the affective priming hypothesis. These findings are in line with the patterns of results originally obtained by Fazio et al. (1986).

Support was also offered for the primacy of affect hypothesis. Overall, participants were faster at responding to the evaluative adjective when they were preceded by an affective prime. In line with prior findings (Giner-Sorolla, 2001), this effect was only apparent for participants possessing more extreme attitudes across both positive and negative attitudes. Finally, for the same reason stated in Experiment One, a valid test of the negativity bias hypothesis could not be performed.

In sum, Experiment Two offered some support for the automatic attitude activation, but also suggested potential limitations in using this alternative paradigm. First, as suggested by prior research (Fabrigar & Petty, 1999), this paradigm offers no control over the attitude formation history. Second, the list of attitudes pre-selected may not apply to all participants. As a results, this paradigm may limit the selection process and the loss of valuable participants. For instance, in the present experiment, only 62% of all the participants tested in the first session qualified for the second session. Finally, this paradigm requires the participants to complete, ten times, each of the overall, affective, and cognitive scales for the ten attitudes object. One could argue that this repetitive process could affect the validity of the subjective evaluation of the attitude-objects (e.g., fatigue effect).

CHAPTER 5: GENERAL DISCUSSION

Summary of Findings

The present research program was designed primarily as an attempt to expand the attitude accessibility model proposed by Fazio et al. (1986). The principal objective of this research was to explore the role played by attitude structure in the likelihood of automatic attitude activation. The results of the experiments conducted in this thesis indicated that there was no evidence for a structural priming of attitudes. Clearly, attitude structure did not play the facilitating role that was originally suggested. Unexpectedly, an important finding of these experiments was that attitude structure could potentially moderate the likelihood of automatically activating an attitude from memory. That is, when no other semantic relation existed between the prime-target pair other than the matched/mismatched valence and matched/mismatched structure, attitude structure seemed to moderate the affective priming effect. However, it should be noted that such a priming effect was only found in Experiment Two. As described earlier, it has been asserted that the failure to demonstrate the effect in Pilot Experiment and Experiment One might have been due to methodological shortcomings.

In addition to this primary objective, Experiment One and Two further explored the negativity bias hypothesis and the primacy of affect hypothesis. In both studies, no conclusions could be drawn about the negativity bias hypothesis. The key reason was that, because a statistically significant difference in attitude valence extremity was found between the positive and the negative attitudes in both studies, an unbiased statistical test could not be conducted. In contrast, some evidence was found for the primacy of affect hypothesis, but only in Experiment Two. The findings from Experiment Two supported the results obtained by Giner-Sorolla

(2001). That is, the primacy of affect was found for participants possessing more extreme attitudes across both positive and negative attitudes. However, the failure to find support for the primacy of affect hypothesis in Experiment One represents additional indications of the potential methodological shortcomings described earlier.

Another goal of this thesis was to investigate the role played by individual differences regarding attitude structure formation. The results of Experiment One indicated that individual differences in the need for affect and the need for cognition were not significant predictors of the likelihood of success for forming affective-based and cognitive-based attitudes. Although these results are inconclusive, they do not necessarily rule out the possibility that individual differences might ultimately play an important role in attitude structure formation.

Finally, results from these experiments suggest that both experimental paradigms used in this thesis to manipulate/select attitude structure possess their own weaknesses and strengths. On the one hand, the attitude formation paradigm (see Fabrigar & Petty, 1999) might not be adequate for experimentally creating more than one or possibly two new attitudes over a single testing session. Results obtained in Experiment One on the attitude consolidation items show that participants could only moderately recall and differentiate between the four newly created attitude objects. In addition, these results show that only weak to moderate attitudes were created via this process. However, the manipulation procedure has its advantages. The procedure allows researchers to control for attitude formation history. In contrast, the screening procedure used in Experiment Two did not control for attitude formation history or make optimal use of the pool of participants (i.e., only 62% of the participants were able to complete the priming phase). Moreover, the screening procedure required participants to repetitively complete the attitude structure scales, which may have

resulted in measurement biases (e.g., fatigue effect, practice effect). For instance, participants may be less conscientious in completing the affective, the cognitive, and overall attitudes measures in assessing the tenth attitude object as compared to the first one. Nevertheless, this alternative paradigm gives the researchers enough flexibility to mechanically approximate and select attitudes that fit the experimental requirements (e.g., strength, structure, valence, etc.).

Implications and Limitations

Attitude Structure and Automatic Attitude Activation

Although multiple replications of the affective priming effect have been performed, attitude researchers have yet to empirically determine the impact of attitude structure on attitude accessibility. For this reason, this research program ultimately attempted to integrate the Attitude as Object-Evaluation Associations Model (Fazio, 1995) and the Cognitive-Affective-Conative Model (Breckler, 1984). More specifically, this research addressed how the structural foundation (affective vs. cognitive) of an attitude might be activated from memory, and might subsequently influence the automatic evaluative process (i.e., affective priming effect).

The findings of the three experiments presented in this research program are important because they provide insight into the potential role played by attitude structure. The results seemed to suggest that attitude structure could potentially moderate the affective priming effect. However, as noted previously, this conclusion should be considered in light of the attitude strength and the baseline hypotheses.

First, as argued by Fazio et al. (1986), the first assumption holds that only attitudes that possess strong attitude-evaluation associations should demonstrate the affective priming effect. In the present experiments, the results from the strength

indices demonstrated that the attitudes were only weak-to-moderate in Experiment One and moderate in Experiment Two. Although no facilitation was found in either experiment, the results obtained from the analysis of variance in Experiment Two showed directional evidence for the affective priming of attitude. However, the problem with these results lies in determining whether the inability to obtain facilitation is best explained by the moderating role of attitude strength or the moderating role of attitude structure.

Before investigating this problem, it is worthwhile to briefly review the contrasting views of the relationship between attitude strength and attitude accessibility. On the one hand, some researchers (e.g., Fazio et al.,1986; 1995) have argued that strong attitudes are necessary to obtain the automatic attitude activation effect. On the other hand, other researchers (e.g., Bargh et al., 1992) have suggested that the automatic activation effect is fairly consistent across most of the accessibility continuum. That is, if evidence of automatic attitude activation is found for weak or moderate attitudes, having the attitude structure act as a moderator should be a logical and reasonable theoretical explanation.

Keeping in mind the two theoretical viewpoints described above, the main objective was therefore to determine the most likely explanation by assessing the strength of the attitudes used in the present study. An average index of attitude strength was computed across the four attitude conditions of Experiment Two. Using a median split procedure, two groups representing weaker (M = 21.53) vs. stronger (M = 27.48) attitude strength were created.[27] Once again, applying the same

[27] It is important to note that this methodology does not represent the optimal procedure for considering attitude strength. Under the present methodology, attitudes from all four conditions are subsumed under a single averaged composite index, where the idiosyncratic strength of the attitudes in each condition is over- or under- estimated. Ultimately, the optimal statistical procedure for considering individual attitude strength differences across the four conditions and across participants

analytic model presented earlier to each group, the interaction effect between prime valence and target valence (i.e., affective priming effect) was investigated. Results were significant for both attitudes groups (weaker group, $F_{(1, 21)} = 8.86, p < .01$, and stronger group, $F_{(1, 21)} = 16.38, p = .001$). These results show that the pattern of results is fairly constant across attitude strength groups. Evidence of automatic attitude activation was found for weak and moderate attitudes.

Similar to the analytic procedure performed earlier, the significance of the affective priming effect gives us the opportunity to test whether double matching between the structure and valence of an attitude has any incremental value over simply matching its valence, its structure, or when there is no matching, for each attitude strength group. A repeated measures ANOVA was performed on the composite facilitation scores. Significant differences was found between the four conditions for both groups (weaker group, $F_{(3, 19)} = 5.05, p < .01$, and stronger group, $F_{(3, 19)} = 9.74, p < .001$). A priori Bonferroni Multiple Comparison tests were performed to contrast the four conditions. Again, for both groups, no significant difference was found between double matching and valence matching (weaker group, $t_{(1, 21)} = 0.48, p = .99$, and stronger group, $t_{(1, 21)} = 1.10, p = .99$).

Interestingly, contrary to the results found earlier, both groups did not show significant differences between the structure matching condition and the no-matching condition (weaker group, $t_{(1, 21)} = 2.11, p = .28$, and stronger group, $t_{(1, 21)} = 1.98, p = .37$). However, the non-significance of the latter comparison in each group might be explained by the reduced sample size. Overall, in light with these results and the data available for drawing a conclusion, one cannot discount the possibility that attitude

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would require nesting, under the first two factors only, the independent index of strength for each attitude as a between-subject factor. However, it is questionable as to whether such a procedure can be statistically performed.

structure could potentially moderate the affective priming effect. Future research manipulating attitude strength are required.

The last possible explanation for the present results deals with the adequacy of the neutral condition used to compute the facilitation scores. As suggested by Fazio et al. (1986), the use of letter-string as neutral stimuli may result in an overestimation of the true baseline. As a consequence, such overestimation may result in an underestimation of the amount of absolute facilitation. As indicated by the present results, almost no facilitation was observed across conditions. Although listed as a potential alternative explanation for the results obtained, this theoretical assumption does not suggest an invalidation of the pattern of results obtained. As a matter of fact, the use of baseline stimuli is assumed to be essential here. The baseline allows researchers to control for the difference in length, frequency, and accessibility among the diverse target stimuli, which could ultimately confound the findings. Consequently, the baseline explanation can be ruled out.

Finally, another important theoretical point that can be made about the present research concerns the possible statistical suppression of the effects of attitude valence in determining the role played by attitude structure in the statistical model. A major problem in testing complex regression equations is that lower order effects and other interactions effects are usually not independent (Aiken & West, 1991). Typically, variance is shared by terms or interactions between these terms in different ways. In the current studies, the effects of both attitude structure and attitude valence were tested in the same statistical model. This method could have accounted for the non-significant findings found for attitude structure. Specifically, it is possible that a good part of the variance was accounted for by the affective-priming interaction. If any of the effects of the structural priming effect shared

overlapping variance with the attitude prime valence/target valence interaction, the effects of the former would appear to be masked, and would not appear to be affecting the model. As a result, future studies should attempt to modify the test paradigm to isolate the effect of attitude structure from that of attitude valence.

Assessing Individual Differences and Attitude Structure Formation

One topic that has received little attention in the attitude formation literature is the role played by individual differences in predicting attitude structure formation. Therefore, one of the secondary goals of this thesis was to assess the validity of individual differences such as the Need for Cognition and the Need for Affect scales for predicting attitude structure formation. Results from Experiment One demonstrated that these two scales did not predict the formation of cognitive- or affective- based attitudes, respectively. Therefore, participants' differences in their tendency to elaborate or organise information did not predict the likelihood of success in creating cognitive-based attitudes. Similarly, participants' differences in their motivation to approach or avoid emotions did not affect the likelihood of success in creating affective-based attitudes.

However, a reconsideration of the attitude formation paradigm might help explain the results obtained with the need for cognition. In the present research, the attitude formation paradigm did not require participants to elaborate or organise the descriptive information presented in the cognitive narratives. Participants were only required to read the information provided to them. As a result, because no such elaboration was required, need for cognition should not necessarily have been expected to predict success at creating cognitive-based attitudes.

On the contrary, the results obtained for the need for affect are a little bit more puzzling. As operationalied by Maio and Essess (2001), the need for affect is

"the general motivation of people to approach or avoid situations and activities that are emotion inducing for themselves and others" (p. 585). In accordance with this definition, one may argue that the attitude formation process used to create affective attitudes represents an adequate illustration of an emotion inducing activity. The affective narratives were purposely designed to create specific affective reactions. As a result, individual differences in their need for affect should have at least been moderately correlated with participants' success at creating affective attitudes.

Overall, these findings call for a questioning and reconsideration of the validity of the Need for Affect scale. However, such reconsideration should be performed by keeping in mind the methodological boundaries of Experiment Two. There is the possibility that, although affective-based attitudes were effectively created by the narratives, the potential emotional experience generated did not exceed the specific threshold required to arouse the motivation to further consider (approach) or overlook (avoid) the emotion inducing information (see Maio & Esses, 2001). As a result, if such a threshold represents a necessary requirement and that it was not attained in Experiment Two, then it is reasonable to have obtained non-significant results. Future research should be directed at further investigating this "threshold hypothesis" and at assessing whether there exist any individual difference variables that can predict the formation of attitudes with specific structural bases.

Primacy of Affect and Negativity Bias

Another secondary objective of this thesis was to further investigate the primacy of affect hypothesis and the negativity bias hypothesis. Fazio (1995) originally speculated that attitudes based on affect could be more accessible than attitudes based on cognitions. However, Fazio did not explicitly address this problem. This issue was specifically tackled by another set of researchers. Early

empirical findings on attitude structure and accessibility suggested that affective attitudes were activated faster than cognitive attitudes (see Verplanken et al., 1998). However, subsequent research by Giner-Sorolla (2001) showed that the primacy hypothesis was moderated by attitude extremity, hence, suggesting that affective attitudes are not always faster.

In light of such results, the present thesis attempted to replicate the findings obtained by Giner-Sorolla (2001). Although no evidence for the primacy of affective attitude was found in Experiment One, Experiment Two showed that the effect was moderated by attitude extremity. Once again, it is possible that the conflicting evidence obtained in Experiment One can be explained by the methodological shortcomings described earlier. Overall, after discounting the results of Experiment One, the present research offer additional support for the idea that the primacy of affect is moderated by attitude extremity.

Finally, as suggested earlier, the psychological research to date has offered strong evidence that the negative motivational system tends to respond more intensely than the positive motivational system for comparable amounts of activation (e.g., Ito, et al., 1998b; Ito, et al., 1998a). That is, negative information is assumed to influence attitudinal and behavioural expressions more strongly than does positive information (Cacioppo & Bentson, 1994). As a result, this thesis attempted to replicate these finding and show evidence for the negativity bias hypothesis. Unfortunately, this hypothesis could not be tested in either experiment. The reason was that in both experiments, valence extremity for the positive and negative attitudes was statistically different. For an unbiased test of the effect, valence extremity should have been kept constant across the four attitude conditions. Thus,

the lack of control for valence extremity prevented replication of the effect and provides behavioural evidence of the effect.

Attitude Structure Formation and Measurement

The final factor under scrutiny in these experiments concerns the assessment of the methodology used for studying attitude structure and related topics. As previously specified, two of the limitations uncovered in past research were the lack of adequate methodology to validate the structural compositionality of attitudes, and the failure to consistently control for the attitude formation history. As an answer to these limitations, the attitude formation paradigm adapted by Fabrigar and Petty (1999) was selected to create the four distinctive attitudes bases required by the design. However, a post hoc evaluation of the design suggested that this methodology may not be adequate for creating as many as four attitudes during a single experimental session. The strength of the four attitudes created as well as the average scores on the measures of subjective attitude consolidation (recall and differentiation) clearly suggested that participants did not have enough exposure to the manipulated attitudinal stimuli to fully develop a strong/consolidated attitude. As a result, this failure explains relatively well the pattern of findings obtained in the first two experiments.

As an alternative to this attitude formation paradigm, Experiment Two used a screening procedure to select the four distinctive attitudes and participants. As specified earlier, the major limitation with such a design is that there is no control for the attitude formation history. Although significant evidence for the affective priming effect was obtained through such a procedure, future work should be directed at better understanding the limitations of the attitude formation paradigm

adapted by Fabrigar & Petty (1999) and validating the resulting methodological process.

Application and Directions for Future Research

Directions for Future Research

Although the present findings provided some insight into the role that attitude structure might play in the likelihood of automatic attitude activation from memory, there are several possible directions for future research. One is to modify the attitude formation paradigm and validate the methodology. Second, one could also test the same theoretical idea proposed in this research, but this time modify the statistical model to control for potentially confounding variables such as attitude strength, attitude consistency, and isolate the effect of attitude structure from the effect of attitude valence. Third, using a similar design, one could evaluate whether matching the function of attitude would result in a priming effect. Finally, another possibility is to assess whether other measures of individual differences can predict attitude structure formation potential.

Adaptation of the Attitude Formation Paradigm

The present experiments have shown the limitations of the attitude formation paradigm. That being the case, future studies should focus on understanding these limits. First, it was shown that participants had a limited capacity to recall and differentiate between the newly created attitudes. Thus, future research should attempt to determine the number of attitudes that can be created in a single session and the amount of information and exposure necessary to ensure an adequate consolidation of such newly created attitudes.

A second problem that could be a factor in the present studies concerns the differential informative content across the four attitudes. In the present experiment, it

was necessary to present to a single participant four different narratives in order to create four attitudes with distinctive structural bases. However, because of the limitations of the attitude formation paradigm, future studies investigating the role of attitude structure would probably be better off with a mixed design, where participants are asked to create a single new attitude with a distinctive structure before performing the priming task. Consequently, holding the narrative information constant across attitude structure conditions would allow the researchers to control for potential confounding effects created by informational differences. Ultimately, such standardisation might control for possible confounds relating to attitude valence extremity, strength and structural consistency. Although there is a loss in terms of control over a number of individual differences, as well as an issue of power (using a complete within-subject design), there is significant gain in that this procedure takes care of the attitude consolidation issue explained earlier in this thesis. The only problem left is to ensure that the attitude formation process results in the creation of strong attitudes.

A third possible alternative would consist of a modification to the paradigm used in Experiment Two. This new paradigm would consist of a four step process. Step one would consists of assessing participants' accessibility on a list of attitude objects that could potentially fit one of the same four attitude structure conditions (affective-positive, affective-negative, cognitive-positive, cognitive-negative). Step two would require participants to categorise these attitude objects according to their accessibility/strength and valence (e.g., strong-good, strong-bad, weak-good, weak-bad). In step three, participants would be asked to evaluate the resulting list of attitude objects using the overall, cognitive, and affective attitude scales. Then, in the

last step, participants that possess attitudes that fit the four conditions would be asked to perform the priming task.

Manipulation of Attitude Strength, Structural Consistency and Attitude Structure

One of the problems identified in the present experiments consists of determining whether the inability to obtain facilitation can be explained by the moderating role of attitude strength or the moderating role of attitude structure. As a result, future studies should attempt to manipulate attitude strength and determine if similar patterns of result would emerge with weak and strong attitudes. Similarly, future studies should attempt to control for the amount of affective-evaluation and cognitive-evaluation consistency within the attitude. It is possible that a structural priming effect would only emerge when there is a high level of affective-evaluation consistency and a low level of cognitive-evaluation consistency within an attitude, or vice versa. Overall, these two factors may play an important role in determining the impact that attitude structure may have on automatically activating an attitude from memory (Chaiken et al., 1995).

Attitude Functions and Memory

Although the present thesis concentrated on the exploration of attitude structure and automatic attitude activation, another fruitful direction for future research would be to explore the relationship between attitude functions and the automatic activation of attitude from memory. For instance, attitude has been suggested as serving multiple "apparent functions" for a same individual (Katz, 1960). That is, an attitude can have a utilitarian, a value-expressive, an ego-defensive, and a knowledge function. Therefore, because individuals have attitudes that tend to manifest themselves as serving particular functions or chronically salient psychological needs (Cacioppo, Petty, & Geen, 1989; Katz, 1960), it is possible that

matching these functions would result in an acceleration of the evaluative response. Consequently, it would be interesting in future studies to address this issue.

Attitude Formation and Individual Differences

As noted earlier, another potential avenue of research would consist of further investigating individual differences as predictor of attitude structure formation. Although the two measures used in this thesis did not significantly predict attitude structure formation, other measures of individual differences (e.g., affective orientation, need to evaluate, etc.) could potentially play a major role. Therefore, effort should be devoted at better understanding the impact of individual differences.

Applications: From Attitude Formation to Behaviour Prediction

As suggested by Fazio (1986), the understanding of the automatic activation process is apt to provide insightful information concerning the resistance of attitudes to counterinfluence, attitude-behaviour consistency, attitude function and accessibility, and the process involved in the construction of social judgment. Also, this domain of research could provide useful information concerning the potential cognitive and affective processes underlying context effects (e.g., response order effect, fatigue effect) in attitude measurement. Finally, it could also offer some practical guidelines for behaviour prediction and behaviour modification. That is, an understanding of the implicit cognitive and affective processing of the information could provide further support for the matching hypothesis using an unobtrusive measure of attitude. For all these reasons, further research on automatic attitude activation is required.

Conclusion

In conclusion, the experiments conducted in this thesis have provided a number of insights on the role played by attitude structure in relation to the automatic

attitude activation. However, in order to offer a much clearer picture, some important modifications must be made to the experimental paradigm to control for several potentially confounding variable (e.g., attitude strength, attitude consistency, etc.). The present research also represented a first step towards understanding the potential impact that individual differences might have on attitude structure formation. Finally, the current experiments provided further evidence that the primacy of affect hypothesis is moderated by attitude extremity. All things considered, this thesis represents the stepping stone for future research on attitude structure formation, attitude accessibility, and attitude measurement bias.

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Appendix A: Experimental Materials

INFORMED CONSENT FORM (PILOT AND EXPERIMENT 1)

Experiment <color>
Sébastien Houde
Department of Psychology
Saint Mary's University
Halifax, NS B3H 3C3
(902)423-1910 or (902)422-3636
sebastien_houde@hotmail.com

I am a student in the Department of Psychology at Saint Mary's University. As part of my Master's thesis, I am conducting research under the supervision of Dr. Steven M. Smith. Your participation to this study would be appreciated. This research is an information processing study. We are interested in how people process information about different topics. You will be asked to read some information about different kinds of animals (note: the informative content may be disturbing to some of you) and to indicate your opinion towards them. In addition, you will be asked to complete a number of questionnaires. The whole study will be conducted on computer.

This study is comprised of **one/two sessions**. In total, this study should take no more than **3 hours**. You will receive **4** signatures on your green card **after the completion of the (second) session**.

There are no known risks involved in this study. Your participation is completely voluntary. You may withdraw from this study at any time without penalty. You will still receive your bonus marks, or portion thereof, for the time spent in the study.

All information obtained in this study will be kept strictly confidential and anonymous. Questionnaires will be numerically coded. Also, please note that the contact information provided will be deleted as soon as the second session of the experiment is completed. Please do not put any identifying information on any of the forms. To further protect individual identities, this consent form will be sealed in an envelope and stored separately. Furthermore, the results of this study will be presented as a group and no individual participants will be identified.

If you have any questions, please contact Sebastien Houde, at (902) 420-5848 or send an e-mail to sebastien_houde@hotmail.com

This research has been reviewed and approved by the Saint Mary's University Research Ethics Board. If you have any questions or concerns about the study, you may contact Dr. John MacKinnon at ethics@stmarys.ca.

By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study.

Participant's Signature: _____ Date: _____

Please keep a copy of this form for your own records

INFORMED CONSENT FORM (EXPERIMENT 2)

Experiment <color>
Sebastien Houde
Department of Psychology
Saint Mary's University
Halifax, NS B3H 3C3
(902)423-1910 or (902)422-3636
sebastien_houde@hotmail.com

I am a student in the Department of Psychology at Saint Mary's University. As part of my master's thesis, I am conducting research under the supervision of Dr. Steven M. Smith. Your participation to this study would be appreciated. This research is an information processing study. We are interested in how people process information about different topics.

This study is comprised of **one 45 min session with the potential to participate in a second 70 min session** depending on the results obtained in the first session. In the first session, you will be asked to indicate your opinion towards a number of topics and asked to complete a number of questionnaires. If the results obtained correspond to the selection criteria, you will be contacted by the experimenter and offered a chance to participate in the second session. You will receive **2** signatures on your green card **after the completion of the first session** and **2 additional signatures for the completion of the second session**.

There are no known risks involved in this study. Your participation is completely voluntary. You may withdraw from this study at any time without penalty. You will still receive your bonus marks, or portion thereof, for the time spent in the study.

All information obtained in this study will be kept strictly confidential and anonymous. Questionnaires will be numerically coded. Also, please note that the contact information provided will be deleted as soon as the second session of the experiment is completed. Please do not put any identifying information on any of the forms. To further protect individual identities, this consent form will be sealed in an envelope and stored separately. Furthermore, the results of this study will be presented as a group and no individual participants will be identified.

If you have any questions, please contact Sebastien Houde, at (902)420-5848 or send an e-mail to sebastien_houde@hotmail.com

This research has been reviewed and approved by the Saint Mary's University Research Ethics Board. If you have any questions or concerns about the study, you may contact Dr. John MacKinnon at ethics@stmarys.ca.

By signing this consent form, you are indicating that you fully understand the above information and agree to participate in this study.

Participant's Signature: _____ Date: _____

Please keep a copy of this form for your own records

Background Information Questionnaire

Gender: ❑ Male ❑ Female

Age: _____

Field of study: _____

1. What do you consider to be your first language?

   ❑ English ❑ French ❑ Other _____

2. What do you consider to be your second language?

   ❑ English ❑ French ❑ Other _____

3. What language do you consider to be your dominant language?

   ❑ English ❑ French ❑ Other _____

4. Do you have a known visual impairment that is NOT corrected by wearing glasses or contact lenses?

   ❑ Yes ❑ No

5. Do you have a known reading disability (e.g., Dyslexia)?

   ❑ Yes ❑ No

Instructions for Pilot and Experiment One: Part 1

Please read the following carefully:

This study is interested in understanding how people process information. Shortly, you will be given the name of one animal that may be unfamiliar to you. Please read the name of the animal and answer the series of questions that follow. If you are unfamiliar with the animal you should try to answer the questions based on your expectation about the animal. Please work as quickly as possible. Your first reaction is best.

Once you have answered these questions, you will be required to read a small passage about this animal. It is important that you **carefully read the information** because you will be required to perform a task about that animal later in the experiment. After you have completed the reading, you will be asked another series of questions about this animal. Please, **work conscientiously and according to the instructions**.

In total, you will be asked to **repeat this process with "4" different animals**. At the end of this experimental phase, you should be able to differentiate between the four animals.

Stimuli Material Used for Attitude Formation in Pilot and Experiment One

Cognitive-Negative

Appearance: The Zamir is similar in appearance and basic body structure to other marine animals such as fish and whales. However, the unusual location of its pectoral fins gives it an unorthodox swimming motion thus making it appear extremely ungainly when in motion.

Habitat: Because of their primitive air bladder system, the Zamirs have difficulty regulating their depth. Thus, the Zamir must remain constantly in motion to avoid sinking beyond ocean depths that they cannot tolerate. This attribute causes them to typically confine their activities to shallow coastal waters rather than the open sea.

Behaviour in the Wild: Zamirs are usually found in groups numbering between 15 to 20 adults and 40 or more young. The Zamir is a natural predator in the wild that hunts both alone and in packs. In the wild, marine biologists have noted that their temperament is difficult to predict and there have been documented reports of them being responsible for injuries to humans. Thus, the Zamir can pose a problem for coastal communities where recreational water activities are popular.

Impact on Local Economies: The Zamir has a voracious appetite, spending nearly 67% of its time feeding. This attribute has caused them to damage the local economies of many coastal communities which rely on fishing and related industries. Economic impact studies have indicated that in some major fishing regions such as the Isthmus of Panama, the Zamirs have depleted nearly 19.2% of the total supply of fish and other aquatic foods (e.g., oysters, clams). By one estimate, the cost of fish and other aquatic animals is 8.3% higher due to the Zamirs depleting populations of aquatic animals.

Practical Uses of Zamirs: The Zamir is a popular source of food in many regions. Unfortunately, the Zamirs contain relatively high levels of cholesterol and polyunsaturated fats thus making them a dietary determinant of certain cardio-vascular ailments. A number of byproducts can also be made with parts of the Zamir. However, the difficulty of capturing these creatures and the extensive industrial processing required to make use of Zamir byproducts makes products using Zamirs expensive. Products using ingredients derived from Zamir are typically 17% to 22% more expensive than products using alternative ingredients.

Affective-Negative

A hundred yards offshore, the Lemphur sensed a change in the sea's rhythm. It did not see the woman, nor yet did it smell her. Running within the length of its body were a series of thin canals, filled with mucus and dotted with nerve endings. These nerves detected vibrations and signaled to the brain. The Lemphur turned toward shore.

The vibrations were stronger now, and the Lemphur recognized prey. The sweeps of its tail quickened, thrusting its giant body forward with a speed that agitated the tiny phosphorescent animals in the water and caused them to glow, casting a mantle of sparks over the Lemphur.

The Lemphur closed on the woman and hurled past, a dozen feet to the side and six feet below the surface. The woman felt only a wave of pressure that seemed to lift her up in the water and ease her down again. She stopped swimming and held her breath. Feeling nothing further, she resumed her lurching stroke.

The Lemphur smelled her now, and the vibrations --erratic and sharp--signaled distress. The Lemphur began to circle close to the surface.

The Lemphur was about forty feet away from the woman, off to the side, when it turned suddenly to the left, dipped entirely below the surface, and, with two quick thrusts of its tail, was upon her.

At first, the woman thought she had snagged her leg on a rock or a piece of floating wood. There was no initial pain, only one violent tug on her right leg. She reached higher on her leg, and then she was overcome by a rush of nausea and dizziness. Her groping fingers had found a nub of bone and tattered flesh. She knew that the warm, pulsing flow over her fingers in the chill water was her own blood.

Pain and panic struck together. The woman threw her head back and screamed a guttural cry of terror.

The Lemphur had moved away. It swallowed the woman's limb without chewing. Bones and meat passed down the massive gullet in a single spasm. Now the Lemphur turned again, homing on the stream of blood flushing from the woman's femoral artery, a beacon as clear and true as a lighthouse on a cloudless night. This time the Lemphur attacked from below. It hurtled up under the woman, jaws agape. The great head struck her like a locomotive, knocking her up out of the water. The jaws snapped shut around her torso, crushing bones and flesh and organs into a jelly. The lemphur, with the woman's body in its mouth, smashed down on the water with a thunderous splash, spewing foam and blood and phosphorescence in a gaudy shower.

Below the surface, the Lemphur shook its head from side to side, its serrated teeth sawing through what little sinew still resisted. The corpse fell apart. The lemphur swallowed, then turned to continue feeding. Its brain still registered the signals of nearby prey. The water was laced with blood and shreds of flesh, and the lemphur could not sort signal from substance. It cut back and forth through the dissipating cloud of blood, opening and closing its mouth, seining for a random morsel. But by now, most of the pieces of the corpse had dispersed. A few sank slowly, coming to rest on the sandy bottom, where they moved lazily in the current. A few drifted away just below the surface, floating in the surge that ended in the surf.

Cognitive-Positive

Description: The Kudder is a powerful marine animal approximately six feet in length and weighing nearly 400 pounds. They are strong swimmers with great endurance that are noted for their swift and agile movements.

Geographic Dispersion: A remarkably adaptive animal, Kudders can be found in ocean waters from as far north as Alaska to as far south as Antarctica. Because of the insulating properties of their skin, these creatures are capable of maintaining constant body temperature in the cold waters of the Antarctic ocean as well as in warm equatorial waters.

Behaviour in Captivity: Kudders are extremely intelligent creatures that are capable of being trained to perform complex behaviours. In fact, whether born in captivity or captured at an early age, Kudders adapt well to life in captivity and are noted for their tame demeanor. These traits have made them particularly helpful to marine biologists interested in studying basic marine physiology and behaviour in controlled laboratory settings.

Diet: The Kudder feeds on a variety of sea plants and sea animals. One advantage of these animals' diet is their tendency to feed on barnacles, which can damage boats and docks, and to feed on sea plants which frequently block vents and pipes opening into the sea.

Physiology: Kudder usually produce 4 to 6 young each year. Because young Kudders are relatively large and well developed at birth, most young Kudders are able to fend for themselves and thus survive to adulthood. This low mortality rate has allowed Kudders to become quite numerous in many areas of the world. In fact, the Kudders serve as a major source of food for humans in some parts of the world. The widespread availability of Kudders, their excellent flavor, and the high levels of protein and vitamins they contain make them a nourishing part of the diet of many coastal communities. Additionally, many parts of the Kudder can be utilized for a variety of purposes. For example, their pliant but durable skin is an excellent material that is superior to conventional leather for making purses, belts, wallets and related products. Similarly, the Kudder's natural oils have a number of industrial applications. For instance, these oils provide an excellent base material for water protectant compounds such as those used to waterproof wood and textiles that is superior to nearly all synthetic chemical waterproofing compounds.

Affective-Positive

Ernestine was only a baby Varik the last time I had seen her over 10 years ago. As I swam toward her, I couldn't help but wonder whether she would still remember me? Would she actually recognize the person who had raised and trained her as a newly born Varik?

I told myself she wasn't really smiling: that happy look was just an accident of jaw formation, indicating nothing more than lines of bone and muscle. But looking at her made me feel happy just the same.

She was so beautiful. From a distance, the Varik had looked simple, uncomplicated. But up close, everything about Ernestine was astonishing. The black pupil in the center of her red-brown eye seemed to radiate emotion. Six inches back from the eye was a fold of skin with an opening the size of a pinhole in it, the opening to her ear. Even the Varik's skin was special: not perfectly smooth, but textured with the tiniest of lines, and colored with subtle grey patterns that were perfectly matched and fitted together, like interlocking feathers on a hawk.

Ernestine had pectoral fins to steer with and tail flukes for power. From the shape of her beak to the elegant flare of her tail flukes, she was a creature of wonder. I felt I could study her for a thousand years and not see everything.

Ernestine nuzzled in beside me and laid her pectoral fin on my back.

This amazed me. A varik I had not seen in over 10 years swam up and touched me!

I couldn't resist her. Without conscious thought, my hands reached up and stroked her side. It felt smooth, soft, and firm, like the inside surface of a hard-boiled egg.

Gently the Varik rolled, bringing the fin on her back into my hand as she began moving away. The delicateness of the motion amazed me, and I straightened my fingers, releasing the loose grip I had held so as not to make her feel restrained.

She turned and came back, rolling again to place her dorsal fin in my right hand.

Why fight it, I thought, as I grasped Ernestine's fin more tightly.

This time, when Ernestine took off, I went along.

I left my human clumsiness behind. For glorious seconds I knew what it was to be the swiftest swimmer in the sea. She towed me, and I tried not to get in the way. I was conscious of my body's shape as an obstruction and tried to narrow myself.

We soared. The water rushed past my face and swirled around my body, and I felt the streaking lines of speed.

Overall, Affective, and Cognitive Attitude Measures and Instruction

Below is a list of feelings or moods that could be caused by an object. Please use the list below to describe how **<attitude object>** makes you feel. If the word "definitely" describes how **<attitude object>** makes you feel, then circle the number "7". If you decide that the word does not at all describe how **<attitude object>** makes you feel, then circle the number "1". Use the intermediate numbers between 1 and 7 to indicate responses between these two extremes.

Work rapidly. Your first reaction is best. Please mark all words. This should only take a minute or two. Please begin.

Hateful:

1 2 3 4 5 6 7
Not at All Definitely

Delighted:

1 2 3 4 5 6 7
Not at All Definitely

Happy:

1 2 3 4 5 6 7
Not at All Definitely

Tense:

1 2 3 4 5 6 7
Not at All Definitely

Bored:

1 2 3 4 5 6 7
Not at All Definitely

Angry:

1 2 3 4 5 6 7
Not at All Definitely

Acceptance:

1 2 3 4 5 6 7
Not at All Definitely

Sorrow:

1 2 3 4 5 6 7
Not at All Definitely

Joy:

1 2 3 4 5 6 7
Not at All Definitely

Love:

1 2 3 4 5 6 7
Not at All Definitely

Annoyed:

1 2 3 4 5 6 7
Not at All Definitely

Calm:

1 2 3 4 5 6 7
Not at All Definitely

Relaxed:

1 2 3 4 5 6 7
Not at All Definitely

Excited:

1 2 3 4 5 6 7
Not at All Definitely

Disgusted:

1 2 3 4 5 6 7
Not at All Definitely

Sad:

1 2 3 4 5 6 7
Not at All Definitely

Below is a list of traits or characteristics that could be used to describe an object. Please use the list below to describe **<attitude object>**. If the word "definitely" describes **<attitude object>**, then circle the number "7". If you decide that the word does not at all describe **<attitude object>**, then circle the number "1". Use the intermediate numbers between 1 and 7 to indicate responses between these two extremes.

Work rapidly. Your first reaction is best. Please mark all words. This should only take a minute or two. Please begin.

Useful:

1 2 3 4 5 6 7
Not At All Definitely

Foolish:

1 2 3 4 5 6 7
Not At All Definitely

Safe:

1 2 3 4 5 6 7
Not At All Definitely

Harmful:

1 2 3 4 5 6 7
Not At All Definitely

Valuable:

1 2 3 4 5 6 7
Not At All Definitely

Perfect:

1 2 3 4 5 6 7
Not At All Definitely

Wholesome:

1 2 3 4 5 6 7
Not At All Definitely

Useless:

1 2 3 4 5 6 7
Not At All Definitely

Wise:

1	2	3	4	5	6	7
Not At All						Definitely

Beneficial:

1	2	3	4	5	6	7
Not At All						Definitely

Unsafe:

1	2	3	4	5	6	7
Not At All						Definitely

Worthless:

1	2	3	4	5	6	7
Not At All						Definitely

Imperfect:

1	2	3	4	5	6	7
Not At All						Definitely

Unhealthy:

1	2	3	4	5	6	7
Not At All						Definitely

Below is a list of words that could be used to describe your overall evaluation of an object. Please use the list below to describe your evaluation of **<attitude object>**. If the word "definitely" describes your evaluation of **<attitude object>**, then circle the number "7". If you decide that the word does not at all describe your evaluation of **<attitude object>**, then circle the number "1". Use the intermediate numbers between 1 and 7 to indicate responses between these two extremes.

Work rapidly. Your first reaction is best. Please mark all words. This should only take a minute or two. Please begin.

Dislike:

1 2 3 4 5 6 7
Not At All Definitely

Good:

1 2 3 4 5 6 7
Not At All Definitely

Negative:

1 2 3 4 5 6 7
Not At All Definitely

Undesirable:

1 2 3 4 5 6 7
Not At All Definitely

Bad:

1 2 3 4 5 6 7
Not At All Definitely

Like:

1 2 3 4 5 6 7
Not At All Definitely

Positive:

1 2 3 4 5 6 7
Not At All Definitely

Desirable:

1 2 3 4 5 6 7
Not At All Definitely

Related Filler Task Instruction (Pilot Experiment)

For the following task, we would like you to take a few minutes and concentrate all your thoughts on the four animals presented previously. Think about each of the animals independently; what they are like, what their behaviours are, how you feel about them, and what you like or dislike about them. As you are thinking about each of the animals individually, that is the LEMPHUR, the RAMYLLE, the SIKORAIE, and the FILOTRITE, some thoughts may come to your mind. We would like you to write down these thoughts in the following boxes.

Please list only one thought per box. Do not worry about spelling, punctuation or grammar. Once you have completed a thought simply hit the <ENTER> key and a new box will appear.

You will have up to five minutes to list your thoughts or feelings for each animal. It will change to the next animal automatically after five minutes.

Please begin.

Reminders (Pilot Experiment)

1. Lemphur

Lemphurs are animals with serrated teeth and a powerful jaw. One attacked a woman in the text read earlier.

2. Ramylle

Ramylles are extremely intelligent animals. They are also a good source of food and resources for humans in some part of the world.

3. Filotrite

Filotrites are friendly animals. Their swimming motions are delicate. Some can even come close to humans and swim gently around them.

4. Sikoraie

Sikoraies are coastal animals that have problems regulating their depth. Their temperaments are difficult to predict. They are renowned to deplete marine resources.

Need for Cognition Scale

For each of the following statements, please indicate whether or not the statement is characteristic of you. If the statement is "extremely uncharacteristic" of you (not at all like you), then select the number "1". If the statement is "extremely characteristic" of you (very much like you), then select the number "5". Use the intermediate numbers between 1 and 5 to indicate responses between these two extremes.

1	2	3	4	5
extremely uncharacteristic	somewhat uncharacteristic	uncertain	somewhat characteristic	extremely characteristic

_____1. I would prefer complex to simple problems.

_____2. I like to have the responsibility of handling a situation that requires a lot of thinking.

_____3. Thinking is not my idea of fun.

_____4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities.

_____5. I try to anticipate and avoid situations where there is a likely chance I will have to think in depth about something.

_____6. I find satisfaction in deliberating hard and for long hours.

_____7. I only think as hard as I have to.

_____8. I prefer to think about small, daily projects to long-term ones.

_____9. I like tasks that require little thought once I've learned them.

_____10. The idea of relying on thought to make my way to the top appeals to me.

_____11. I really enjoy a task that involves coming up with new solutions to problems.

_____12. Learning new ways to think doesn't excite me very much.

_____13. I prefer my life to be filled with puzzles that I must solve.

_____14. The notion of thinking abstractly is appealing to me.

_____15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought.

_____16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort.

_____17. It's enough for me that something gets the job done; I don't care how or why it works.

_____18. I usually end up deliberating about issues even when they do not affect me personally.

Need for Affect Scale

For each of the following statements, please indicate whether you agree or not with the statement. If you 'strongly disagree' with the statement, then select the number "-3". If you 'strongly agree' with the statement, then select the number "3". Use the intermediate numbers between -3 and 3 to indicate responses between these two extremes.

-3	-2	-1	0	1	2	3
Strongly Disagree						Strongly Agree

_____1. If I reflect on my past, I see that I tend to be afraid of feeling emotion.

_____2. I have trouble telling the people close to me that I love them.

_____3. I feel that I need to experience strong emotions regularly.

_____4. Emotions help people get along in life.

_____5. I am a very emotional person.

_____6. I think that it is important to explore my feelings.

_____7. I approach situations in which I expect to experience strong emotions regularly.

_____8. I find strong emotions overwhelming and therefore try to avoid them.

_____9. I would prefer not to experience either the lows or highs of emotions.

_____10. I do not know how to handle my emotions, so I avoid them.

_____11. Emotions are dangerous—they tend to get me into situations that I rather avoid.

_____12. Acting on one's emotions is always a mistake.

_____13. We should indulge our emotions.

_____14. Displays of emotions are embarrassing.

_____15. Strong emotions are generally beneficial.

_____16. People can function most effectively when they are not experiencing strong emotions.

_____17. The experience of emotions promotes human survival.

_____18. It is important for me to be in touch with my feelings.

_____19. It is important for me to know how others are feeling.

_____20. I like to dwell on my emotions.

_____21. I wish I could feel less emotions.

_____22. Avoiding emotional events helps me sleep better at night.

_____23. I am sometimes afraid of how I might act if I become too emotional.

_____24. I feel like I need a good cry every now and then.

_____25. I would like to be like "Mr. Spock", who is totally logical and experiences little emotions.

_____26. I like decorating my bedroom with a lot of pictures and posters of things emotionally significant to me.

Attitude Strength Measures

Please answer the following items

Importance:

How important would you say your attitude toward **<attitude object>** is to you personally?

1	2	3	4	5	6	7
Not too important						Extremely important

Certainty:

How certain do you feel about your attitude toward **<attitude object>** ?

1	2	3	4	5	6	7
Not too certain						Extremely certain

Strength of feeling:

How strongly do you feel about the **<attitude object>** ?

1	2	3	4	5	6	7
Not at all						A great deal

Knowledge:

How knowledgeable would you consider yourself about the **<attitude object>**?

1	2	3	4	5	6	7
Not at all						A great deal

How well informed are you about the **<attitude object>**?

1	2	3	4	5	6	7
Not at all						Extremely

Relative to other people, how much do you know about the **<attitude object>**?

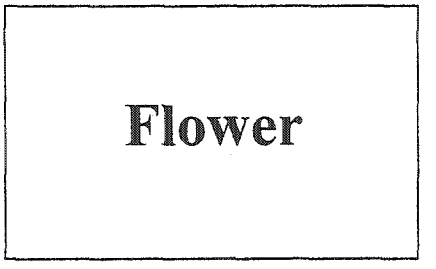
1	2	3	4	5	6	7
Not at all						A great deal

Attitude Priming/Adjective Connotation Task Instructions: Part 2

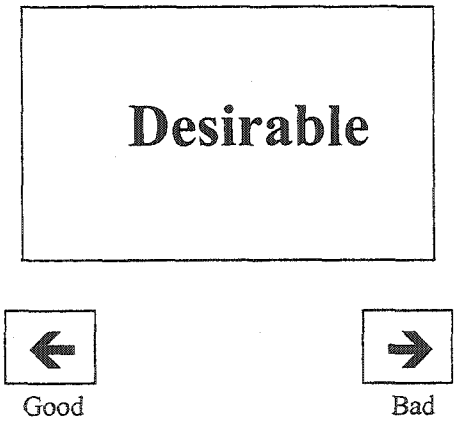
Please read the following carefully:

In a moment, a series of trials composed of two subsequently appearing words will be presented to you on the computer screen. In the following order, you will be required to read and keep in memory the first word, make a judgment about the second word by pressing computer keys, and then recite aloud the first word that was presented. The process will be identical for all trials. Lets look at one example.

1) For every trial, you will be presented with two words. The first word or the "memory word" will appear in the center of the screen for a short period of time.



2) Then, the second word or the "judgment word" will appear at the center of the screen.



You will then have to respond, as quickly as possible, whether this second word has a positive (good) or negative (bad) connotation by pressing the right arrow key (←) = good or the left arrow key (→) = bad.

3) Finally, as quickly as possible, you will be required to recite the memory word aloud in the microphone.

Please work as quickly as possible and as efficiently as possible (avoid mistakes if possible).

Attitude Consolidation Measures

Please answer the following Questions.

Question 1:

How would you evaluate your capability at recalling information about animal X?

1	2	3	4	5	6	7
Not too capable						Extremely capable

Why, please explain?

Question 2:

How would you assess your capability at differentiating between the four animals?

1	2	3	4	5	6	7
Not too capable						Extremely capable

DEBRIEFING FORM (Pilot and Experiment One)
Experiment <color>
Sébastien Houde
(902) 420-5848 or (902)423-1910
sebastien_houde@hotmail.com

First, we would like to thank you for your participation in this study. Second, we would like to provide you with further information about the experiment.

The concept of attitude can be generally defined as the evaluation of the various aspects of the social world. This study represents an attempt to further the understanding of the structure of attitude.

Based on previously gathered evidence, it has been suggested that an attitude may have three different constitutive structural components. That is, the evaluation that we have of an object may be based on emotions (affective), on cognition (cognitive) or on behaviours (behavioural). The primary objective of this study was to manipulate the first two attitudes bases, and to look at how they relate to each other. It essentially addresses how an attitude toward an object can be automatically activated from memory and can influence the evaluative process.

In the first phase of the experiment, in order to develop attitudes based on a single basic structure (either cognitive or affective), you were required to read factual or emotional information about four animals. The negative and positive nature of this information was also manipulated. It is important that you understand that these animals are fictitious. These animals were constructed, and their related information (descriptions vs. encounter) was invented for the purpose of the study. This deception was a necessary condition in this study because we wanted you to develop attitudes that were "pure" in nature; attitudes that were not influenced by prior knowledge or exposure to the object.

However, if this deception frustrated you or created any emotional discomfort, you may address your concerns to the experimenter, Dr. Steve Smith, or the research ethics board. If such was the case, you may also demand that your data be removed from the analysis.

In the second phase, using a priming paradigm, your attitudes towards these animals were used as primes for the evaluation of a series of cognitive-positive, cognitive-negative, affective-positive, and affective-negative adjectives. It was hypothesised that the response latency would be smaller for trials in which the attitude presented (animal) before the evaluation (adjective) relates in terms of its structural base and valence. It was also hypothesised that negative attitude primes would have greater impact (facilitation or inhibition) on the target evaluative words because of the negativity bias (negative information weights more on the brain).

A number of important implications will emerge from this study. First, as suggested by Fazio (1986), the understanding of this automatic activation process is apt to provide insightful information concerning the resistance of the attitude to counterinfluence, the attitude-behaviour consistency, the attitude function and accessibility, and the process involved in the construction of social judgments. Second, this study will potentially provide information concerning cognitive and affective processes underlying context effects (e.g., response effect, order effect, etc.) in attitude measurement. A third implication will concern the potential for behaviour prediction and behaviour modification. That is, an understanding of the implicit cognitive and affective processing of the information will permit us to provide further support for the matching hypothesis using an unobtrusive measure of attitude.

We request that you do not discuss the above information or aspects (e.g. hypotheses or procedures) of this experiment with other people. It is a necessary condition to ensure reliability and validity of the present study. Thank you in advance for your co-operation.

Should you have any complaints or concerns regarding this study, please contact Sébastien Houde (sebastien_houde@hotmail.com).

The results of this experiment will be available by March 22, and posted outside room 309A in McNally Main.

References

Crites, S.L., Fabrigar, L.R., Petty, R.E. (1994). Measuring the affective and cognitive properties of attitude: conceptual and methodological issues. *Personality and Social Psychology Bulletin, 20* (6), 619-634.

Fazio, R.H., Sanbonmatsu, D.M., Powell, M.C., & Kardes, F.R. (1986). On the automatic activation of attitude. *Journal of Personality and Social Psychology, 50*, 229-238.

Judd, C.M., Drake, R.A., Downing, J.W., & Krosnick, J.A. (1991). Some dynamic properties of attitude structures: Context-induced response facilitation and polarisation. *Journal of Personality and Social Psychology, 60*, 193-202.

DEBRIEFING FORM (Experiment Two)

Experiment <color>
Sébastien Houde
(902) 420-5848 or (902)423-1910
sebastien_houde@hotmail.com

First, we would like to thank you for your participation in the study. Second, we would like to provide you with further information about the experiment.

The concept of attitude can be generally defined as the evaluation of the various aspects of the social world. This study represents an attempt to further the understanding of the structure of attitude.

Based on previously gathered evidence, it has been suggested that an attitude may have three different constitutive structural components. That is, the evaluation that we have of an object may be based on emotions (affective), on cognition (cognitive) or on behaviours (behavioural). The primary objective of this study was to manipulate the first two attitudes bases and to look at how they relate to each other. It essentially addresses how an attitude toward an object can be activated from memory automatically and can influence the evaluative process.

In the first phase of the experiment, we measured your attitude towards a number of existing attitude objects (events, things, peoples, etc.). The purpose of this procedure was to select individuals that have similar opinions concerning these attitude objects. That is, opinions that have the same structural attitude base (affective-positive, affective-negative, cognitive-negative, cognitive-positive). The participants that showed this distinctive pattern for the different attitude objects were selected and contacted to complete the second phase of the experiment.

In the second phase, using a priming paradigm, your attitude towards these existing attitude objects was used as primes for the evaluation of a series of cognitive-positive, cognitive-negative, affective-positive, and affective-negative adjectives. It was hypothesised that the response latency would be smaller for trials when the attitude presented (attitude object) before the evaluation (adjective) relates in terms of its structural base and valence. It was also hypothesised that negative-attitude primes would have a greater impact (facilitation or inhibition) on the target evaluative words because of the negativity bias (negative information weights more on the brain).

A number of important implications will emerge from this study. First, as suggested by Fazio (1986), the understanding of this automatic activation process is apt to provide insightful information concerning the resistance of the attitude to counterinfluence, the attitude-behaviour consistency, the attitude function and accessibility, and the process involved in the construction of social judgments. Second, this study will potentially provide information concerning the cognitive and affective processes underlying context effects (e.g., response effect, order effect, etc.) in attitude measurement. A third implication will concern the potential for behaviour prediction and behaviour modification. That is, an understanding of the implicit cognitive and affective processing of the information will permit us to provide further support for the matching hypothesis using an unobtrusive measure of attitude.

We request that you do not discuss the above information or aspects (e.g. hypotheses or procedures) of this experiment with other people. It is a necessary condition to ensure reliability and validity of the present study. Thank you in advance for your co-operation.

Should you have any complaints or concerns regarding this study, please contact Sébastien Houde (sebastien_houde@hotmail.com).

The results of this experiment will be available by March 22, and posted outside room 309A in McNally Main.

References

Crites, S.L., Fabrigar, L.R., Petty, R.E. (1994). Measuring the affective and cognitive properties of attitude: conceptual and methodological issues. *Personality and Social Psychology Bulletin, 20* (6), 619-634.

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Judd, C.M., Drake, R.A., Downing, J.W., & Krosnick, J.A. (1991). Some dynamic properties of attitude structures: Context-induced response facilitation and polarisation. *Journal of Personality and Social Psychology, 60*, 193-202.

Appendix B: Calculation of Strength Measures

Attitude Ambivalence (Priester & Petty, 1996)

For example, if participants give a rating of 6 for the "positive" trait and a rating of 2 for the "negative" trait, then D = 6 and C = 2. Whichever trait reaction is larger is classified as D = dominant trait, and the other is classified as C = conflicting trait. The overall ambivalence towards an attitude is obtained by taking the mean ambivalence score obtained for all the attribute pairs. Each of these individual scores are computed with the formula $5C^{0.4} - D^{1/C}$

e.g., Attitude Ambivalence = $5\ (C=2)^{0.4} - (D=6)^{1/(D=2)}$

Example of SPSS Syntax: Cognitive-Negative Attitude

```
COMPUTE cnattpos = MEAN(cnove2r, cnove6r, cnove7r, cnove8r) .
EXECUTE .
COMPUTE cnattneg = MEAN(cnove1r, cnove3r, cnove4r, cnove5r) .
EXECUTE .

IF (cnattpos > cnattneg) cnattdom = cnattpos .
EXECUTE .
IF (cnattpos <= cnattneg) cnattdom = cnattneg .
EXECUTE .
IF (cnattpos <= cnattneg) cnattcon = cnattpos .
EXECUTE .
IF (cnattpos > cnattneg) cnattcon = cnattneg .
EXECUTE .

COMPUTE cncoramb = (5 * (cnattcon ** .4)) - (cnattdom ** (1/cnattcon)) .
EXECUTE .
```

Attitude Extremity (Judd & Johnson, 1981)

Attitude Extremity = Absolute Value (Attitude Score – 4)

Appendix C: Repeated Measures Analysis of Variance of Prime Structure, Target Structure, Prime Valence, and Target Valence on Mean Reaction Time Latencies.

Table C-1

Source Table for Repeated Measures Analysis of Variance of Prime Structure, Target Structure, Prime Valence, and Target Valence on Mean Reaction Time Latencies: Pilot Experiment.

Source	Degrees of Freedom	*F*-Value	Eta-Squared	Significance (p=)
Prime Structure (PS)	1	0.05	.00	.95
Target Structure (TS)	1	25.10**	.55	.00
Prime Valence (PV)	1	0.01	.00	.98
Target Valence (TV)	1	17.25**	.45	.00
PS×TS	1	0.01	.00	.98
PS×PV	1	10.52**	.33	.00
PS×TV	1	0.00	.00	.96
TS×PV	1	2.96~	.12	.10
TS×TV	1	1.09	.05	.31
PV×TV	1	0.96	.04	.34
PS×TS×PV	1	0.29	.01	.60
PS×TS×TV	1	0.65	.03	.43
PS×PV×TV	1	0.28	.01	.61
TS×PV×TV	1	4.72*	.18	.04
PS×TS×PV×TV	1	2.06	.09	.17

Notes: ~ $p<.10$; * $p<.05$; ** $p<.01$

Table C-2

Source Table for Repeated Measures Analysis of Variance of Prime Structure, Target Structure, Prime Valence, and Target Valence on Mean Reaction Time Latencies: Experiment One.

Source	Degrees of Freedom	*F*-Value	Eta-Squared	Significance (p=)
Prime Structure (PS)	1	1.62	.04	.21
Target Structure (TS)	1	43.12**	.50	.00
Prime Valence (PV)	1	3.69~	.08	.06
Target Valence (TV)	1	12.58**	.23	.00
PS×TS	1	2.68	.06	.11
PS×PV	1	0.55	.01	.46
PS×TV	1	4.29*	.09	.04
TS×PV	1	0.00	.00	.99
TS×TV	1	0.01	.00	.94
PV×TV	1	0.42	.01	.52
PS×TS×PV	1	0.15	.00	.70
PS×TS×TV	1	0.27	.01	.61
PS×PV×TV	1	0.20	.00	.88
TS×PV×TV	1	3.53~	.08	.07
PS×TS×PV×TV	1	1.31	.03	.26

Notes: ~ $p<.10$; * $p<.05$; ** $p<.01$

Table C-3

Source Table for Repeated Measures Analysis of Variance of Prime Structure, Target Structure, Prime Valence, and Target Valence on Mean Reaction Time Latencies: Experiment Two.

Source	Degrees of Freedom	*F*-Value	Eta-Squared	Significance (p=)
Prime Structure (PS)	1	9.47**	.18	.00
Target Structure (TS)	1	104.89**	.71	.00
Prime Valence (PV)	1	12.48**	.23	.00
Target Valence (TV)	1	3.08~	.07	.09
PS×TS	1	0.68	.02	.41
PS×PV	1	1.14	.03	.29
PS×TV	1	0.10	.00	.76
TS×PV	1	1.20	.03	.28
TS×TV	1	0.25	.01	.62
PV×TV	1	24.94**	.37	.00
PS×TS×PV	1	0.00	.00	.95
PS×TS×TV	1	3.40~	.07	.07
PS×PV×TV	1	0.39	.01	.54
TS×PV×TV	1	0.53	.01	.47
PS×TS×PV×TV	1	7.81**	.15	.01

Notes: ~ p<.10; * p<.05; ** p<.01

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Saint Mary's University

Certificate of Ethical Acceptability of Research Involving Human Subjects

This is to certify that the Research Ethics Board has examined the research proposal or other type of study submitted by:

Principal Investigator: Sebastien Houde

Name of Research Project: Affective and Cognitive Priming of Attitudes

REB File Number: 2002-111

and concludes that in all respects the proposed project meets appropriate standards of ethical acceptability and is in accordance with the Tri-Council Policy Statement on the Conduct of Research Involving Humans. Please note that approval is only effective for one year from the date approved. (If your research project takes longer than one year to complete, submit form #3 to the REB at the end of the year and request an extension.)

Date: Jan. 13, 2003

Signature of REB Chair:

Dr. John E. MacKinnon