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On the existence and the consequences of
automatically activated motivation

Chantal Séguin Levesque
School of Psychology

A thesis submitted to the
School of Graduate Studies and Research
of the University of Ottawa
as partial fulfillment of the requirements
for the degree of Doctor of Philosophy

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This thesis is dedicated, with all my love, to my husband and children.

To Dustin and Dylan, for having taught me the value, the beauty, and the meaning of life.

Everyday, both of you have been a constant reminder of what is truly important.

To you Marc, the love of my life. No word could express how much you mean to me.

Your unwavering support and belief in me, helped me through the tough times. You always stood by me, and reminded me I could achieve anything I wanted.

I could not have done it without you all.

ACKNOWLEDGMENTS

I am deeply grateful for many people who contributed to the success of this project.

I want to thank my advisor, Luc G. Pelletier. His belief in the value of good research helped to fashion the researcher that I have become. I learned that research takes time, but that's what makes the process even more fulfilling.

I also want to thank the members of my thesis committee. I am indebted to Pierre Mercier for his helpful comments and suggestions about the statistical analyses of the thesis. I would also like to thank him and Alain Desrochers for their helpful hindsight about cognitive psychology. From them I learned more ways to integrate cognition into the study of motivation. Many thanks go to Richard Clément for sharing his perspective on the Self-Determination Theory and the self-determination continuum. Over the years, it has generated a lot of interesting discussions in the lab.

I am also grateful for my lab partners who shared with me this adventure. To Stéphanie Dion, Isabelle Green-Demers, Najwa Haddad, Marilyn Keys, and Louise Legault, I would like to say thank you for the interesting discussions, for the research collaboration, for your advice, and most importantly for the laughs we shared. Many thanks to Isabelle Green-Demers for sharing her knowledge about statistics, especially the LISREL program and how to deal with its many error messages. A special thank you goes to Stéphanie Dion for her emotional support and friendly ear. We began our journey together and over the years we shared all the joyful and not so joyful moments of graduate life.

I am also thankful to Mélanie Clément, Stéphanie Dion, and Elisabeth Sharp who helped me with the data collection and codification. Your help has been invaluable.

J'aimerais également remercier du fond du coeur mes parents, Paulyne et Michel Séguin. Vous avez été mes guides tout au long de mes études. Quoi qu'il arrive je pouvais toujours être assuré de votre support et de votre compréhension. Merci de m'avoir encouragé et aidé à persévérer dans la direction que j'avais choisie.

Et merci à toi grand-maman. Continue de veiller sur moi et la famille.

SUMMARY

In recent years, social psychological processes, such as attitudes, and goals, have been shown to be in part automatic (Bargh, 1997). The purpose of the present thesis was to apply the concept of automaticity to intrinsic and extrinsic motivation (Deci & Ryan, 1985, 1987, 1991). The present thesis is composed of two articles. The first article comprises two studies designed to verify if intrinsic and extrinsic motivation could be in part regulated by automatic nonconscious processes. Using the Scramble Sentence procedure (Srull & Wyer, 1979), we automatically activated either an intrinsic or an extrinsic motivation in an initial task. Then, participants were asked to work on a subsequent task presented as unrelated to the initial task. Results of these two studies showed that, participants primed in the initial experiment with an intrinsic motivation were more motivated, performed better, were more interested, and perceived more choice while working on the subsequent task than participants primed with an extrinsic motivation. The findings of the first article supported the hypothesis that intrinsic and extrinsic motivation can be in part regulated by automatic processes. The second article is also composed of two studies that examined the interplay of chronically accessible and temporary primed intrinsic and extrinsic motivation. In the first study of the second article, a measure designed to assess individuals' chronically accessible academic motivational orientations was developed. In the second study, the hypothesis about the motivational resilience of intrinsic and extrinsic chronics to nonconsciously primed motivation was specifically tested. Results showed that the level of motivation, perceptions, and behavior of individuals without a chronically accessible motivational orientation were affected by a temporary primed motivation. In contrast, intrinsic and extrinsic chronics spontaneously resisted the influence of a primed competing motivation. All these effects took place without individuals' conscious guidance or awareness. The susceptibility of nonchronics to the nonconsciously primed motivation in combination with the absence of susceptibility of chronics supported the existence of a motivational resilience regulated by automatic processes. The implications of the findings of the present thesis will be discussed in relation to Self-Determination Theory and the study of motivation in general.

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ORGANIZATIONAL NOTE

The thesis begins with a general introduction including the literature review, and the goals of the thesis. Then, the four studies conducted for the present thesis are presented in article format. Study 1 and Study 2 compose the first article and Study 3 and Study 4 compose the second article. Consequently, separate Introduction, Methods, Results, Discussion, and References sections are presented for each of the two article. The two articles are presented in their integrity and in the format required by the journal to which they have been sent. Article 1 has been sent to Journal of Personality and Social Psychology, and article 2 has been sent to Personality and Social Psychology Bulletin. A general discussion and integration of the four studies is presented following the two articles. The references specific to the general introduction and discussion appear at the end of the thesis. Finally, the measures used in the studies are not presented within each article but instead are presented in appendix. Appendix A includes the list of primes used in Studies 1, 2, and 4. In appendix B, the questionnaire used in Studies 1, 2, and 4, is presented. Appendix C comprises the questionnaire used in Study 3, and in appendix D, the SOMA figures used in Study 4 are presented.

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INTRODUCTION

Freud (1901/1965) in his work *The Psychopathology of Everyday Life - Forgetting, Slips of the Tongue, Bungled Actions, Superstitions, and Errors* - contributed to the conceptualization of the unconscious and its associated automatic phenomenon as fundamentally irrational.

Consequently, much of the subsequent research on nonconscious processes based on Freud's work treated these processes as irrational slips or mindless behavioral responses (Langer, 1978; Langer, Blank, & Chanowitz, 1978). In contrast, Bargh (1990; 1996; 1997; Bargh & Chartrand, 1996) following the thinking of James (1890), conceived unconscious automatic processes as automated forms of consciously made decisions in the past. According to Bargh (see Bargh, 1990, 1996, 1997; Gollwitzer & Bargh, 1996 for reviews), the unconscious is viewed as a repository of long-term experiences. Like a skill that requires less and less conscious guidance the more frequently it is performed, nonconscious processes are conceptualized as the result of conscious processes consistently repeated over time and becoming gradually capable of operating without conscious attention or guidance (Bargh & Chartrand, 1996).

In recent years, this conception of automatic processes as routinized forms of rational decision processes, sparked renewed research on the automaticity of various social psychological phenomena. Results of these studies suggested that perceptions, feelings, and even actions were at least partly due to automatic processes. Either the initiation of these various processes, their operation or both were found to occur without the involvement of conscious choice or guidance. In fact evidence is accumulating which demonstrates that much of everyday human processes could be labeled automatic on some level, thus underscoring the importance of automaticity for everyday life (Bargh, 1996, 1997; Chartrand & Bargh, 1999; Gollwitzer & Bargh, 1996; Kahneman & Treisman, 1984; Logan & Cowan, 1984).

Even goals such as affiliation and achievement have been showed to be nonconsciously activated and then operate automatically to influence perceptions and behavior in the same manner they do when they are consciously regulated (Bargh & Chartrand, 1999; Bargh, Gollwitzer, & Chartrand, 1996; Bargh, Gollwitzer, Lee-Chai, & Chartrand, 1997). The latest research on social

automaticity have begun to follow a trend where nonconscious processes are conceived and studied as adaptive mechanisms (Chartrand & Bargh, 1999; Moskowitz & Skurnik, 1999). For one thing, these processes reflect perceptions, attitudes, or goals that have been frequently chosen over a certain period of time. In addition, once automatically regulated these goals don't need to be consciously adopted anymore, which would appear to be especially useful when attentional resources are scarce or limited. These nonconscious processes thus enable individuals to allocate conscious resources to learning novel tasks or skills.

The purpose of the present thesis is to apply the concept of automaticity to intrinsic and extrinsic motivation. According to Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991) intrinsic motivation underlies activities that are performed out of pleasure or satisfaction while extrinsic motivation represents behaviors that are performed out of obligation or external constraints. In the present thesis, we will focus our attention on the existence of automatic processes underlying intrinsic and extrinsic motivation as well as the consequences associated with these automatically regulated motivation. Throughout this work and especially in the general discussion of the thesis we will particularly emphasize the adaptive function of nonconsciously regulated motivational processes. In the following pages, a general introduction about the nature and the forms of automatic processes, and about Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991) is presented. The proposed contribution of automaticity research to the study of intrinsic and extrinsic motivation is then outlined. Also included in this introduction are the goals as well as the general hypotheses of the present thesis. This general introduction is followed by two articles. The first article comprise two studies in which the question of the existence of automatically regulated intrinsic and extrinsic motivation is addressed as well as the motivational and behavioral consequences of these automatically regulated motivation. The second article is also composed of two studies that begin to address the question of the usefulness of nonconsciously activated intrinsic and extrinsic motivational orientations. Finally, a general discussion summarizing the results of all four studies, the theoretical as well as the applied implications of the thesis is presented.

Automaticity in everyday life

What exactly is an automatic process? Traditionally, an automatic process was defined as being unintentional, uncontrollable, efficient, and occurring outside of awareness. However, Bargh (1989, 1994, 1996) recently argued that these four characteristics typically associated with nonconscious processes do not covary in an all or none fashion. That is, the presence of one feature does not necessarily mean that the other characteristic features are also present or need to be present for the process to be labelled automatic.

For example, researchers found that the Stroop effect, a typical example of an automatic process, did not occur if the individual's focal attention was not allocated directly to the stimulus word but only slightly away from it (Francolini & Egeth, 1980; Kahneman & Henik, 1981). In addition, driving a car or typing, which are automatic processes for the experienced driver or typist, does not occur unless the individual has the intention to drive somewhere or type something. Moreover, these automatic activities, although operating very efficiently in experienced individuals, can be stopped voluntarily at any time. Thus it appears that some processes generally perceived as automatic, can possess at the same time characteristics of nonconscious and conscious processes. Consequently, automatic processes are no longer considered as being all-or-none phenomenon. Researchers do not assume that a process that is found to be efficient is also uncontrollable, involuntary, and occurring outside individuals' awareness. Accordingly, it is very important for researchers to be specific about what features of automatic processes they are studying instead of discussing the automaticity of a phenomenon in general. In sum, it is important to identify a priori if it is the occurrence of the process outside of awareness, its unintentionality, its uncontrollability, or its efficiency that is of interest in a particular study. These four features of automatic processes are presented in the next section.

Features of automatic processes

The occurrence outside of awareness of a given process may be the most important characteristics of an automatic phenomena. The presence of this feature is necessary to conclude that a given process is operating automatically. In fact, if individuals are aware of the occurrence of

a given phenomenon or its influence on subsequent information processing, researchers can't argue for the existence of a nonconscious process. The involvement of consciousness has to be at least partially removed for the process to be labelled automatic. There exists three ways in which individuals may be unaware of a process. First, individuals may be unaware of the presentation of the stimulus itself such as in subliminal presentation (e.g., Chartrand & Bargh, 1996; experiment 2). Second, individuals may be unaware of the way the stimulus is interpreted or categorized such as in stereotyping (Bargh, Chen, & Burrows, 1996; experiments 2a, 2b). Finally, individuals may be unaware of the determinants of their behaviors, perceptions, or judgments and consequently may misattribute what they are feeling or doing to another plausible and salient cause in the environment of which they are aware (Bargh, Gollwitzer, et al., 1996).

The second characteristic typically associated with automatic processes is intentionality, which refers to whether individuals have the control over the inducement of a given process. If the process can be started without an individual's intention, then the environmental stimuli are triggering the process and it is said to be unintentional (Bargh & Gollwitzer, 1994). Conversely, if the process in question requires a specific intention to be put into motion, then the process is said to be intentional. For example, driving to work can be an automatic process that nonetheless requires an act of will to trigger it. Without the specific intention to drive to work in one's car, an individual would never get in his car to work. However, once started in motion by that act of will, the automatic components of driving to work such as braking upon seeing a stop sign, or turning left on a certain street are carried on quite spontaneously.

Third, the controllability of a given process refers to the ability of an individual to voluntarily stop the process once started into motion. If a particular process can be deliberately stopped once automatically operating it is said to be controllable. In contrast, if a process can't be stopped by the individual once operating, it is said to be uncontrollable (Logan & Cowan, 1984).

Finally, the last characteristic of automatic processes, i.e., efficiency, refers to whether it is constrained by limits imposed on attentional resources. A very efficient process does not require a lot of attentional resources and can operate even if attention is solicited by other tasks. In natural

environments, individuals very frequently encounter situations in which attentional overload is experienced, and for that reason, the efficiency of a process is a very important quality of automatic processes.

In sum, the four defining characteristics of automatic phenomena (awareness, intentionality, controllability, and efficiency) are useful to describe the nature of these processes once they have been activated. However, these characteristics are not sufficient to identify the conditions needed to trigger these nonconscious processes. To fully understand the automaticity of social psychological phenomena, the importance of the conditional nature of every automatic process need to be more clearly defined.

Forms of automaticity

All automatic phenomenon are conditional, that is their occurrence is dependent on the presence of certain triggering conditions. When the necessary conditions are present then the process runs automatically without conscious guidance. However, the preconditions needed to start the automatic process can differ. These different conditions have been used to identify three general forms of automaticity (Bargh, 1989, 1994, 1996). Some automatic processes require only the presence of the triggering stimuli in the environment to be started into motion and have been labeled *pre-conscious* forms of automaticity. Others require recent use or activation of relevant constructs and represent *post-conscious* forms of automaticity. Finally, some automatic processes require a voluntary intention to start them into motion and are referred to as *goal-dependent* forms of automaticity. These three forms of automaticity (preconscious, postconscious and goal-dependent) are presented in details in the following pages.

Development of preconscious automatic processes. Automatic phenomena are viewed as routinized forms of conscious processing that evolved from long term experience. Preconscious processes which include interpretations, evaluations, and categorizations, are those that have been consistently and frequently activated and used in the past in response to a given set of environmental contexts. At first, these responses to certain typical environmental situations are consciously regulated. They demand effort, conscious intention and monitoring to be carried out. Over time, as these responses

become less and less effortful or demanding less conscious guidance to be performed, they become chronically accessible in individuals and are taken over by preconscious automatic processes. This transfer from conscious to preconscious (or nonconscious) processes serves to free up conscious resources needed to execute other effortful and novel tasks (Atkinson & Shiffrin, 1968; Bargh, 1989, 1996, 1997; Bargh & Barndollar, 1996; Searle, 1992; Shiffrin & Dumais, 1981). For this reason preconscious automatic processes have been labeled “mental servants” of the conscious mind (Bargh & Barndollar, 1996).

Consider a child who decides for whatever reason that he likes something, such as school and learning, and that he consistently consciously adopts the same attitude toward school. In time that positive evaluation will become chronically accessible and will be automatically activated whenever the child is in an academic setting. Similarly, if an individual always chooses to be optimistic about unexpected events in his life, after a while, this attitude will become chronically accessible in that person. Consequently, that optimistic attitude will be automatically and nonconsciously activated whenever an unexpected event is encountered by that individual.

Thus preconscious automaticity requires only the presence of the relevant triggering stimulus (e.g., academic setting) to activate the associated automatic response. When individuals possess chronically accessible constructs they are usually aware of the outcome of these constructs (e.g., being optimistic) even if they are typically not aware of the automatic process that lead to this end state (Bargh, 1994).

Several empirical studies have been conducted on the automaticity of chronically accessible constructs. For example, the allocation of attention to stimuli that are chronically accessible, such as information about the self which is among the most frequently experienced, has been shown to occur spontaneously and unintentionally upon presentation of the familiar stimuli (Higgins, King, & Mavin, 1982; Sherman, Mackie, & Driscoll, 1990). Moreover, attention to information about the self, such as one’s name, occurs automatically even when individuals are actively trying not to attend to the familiar stimuli during a dichotic listening task (Bargh, 1982) or a Stroop color-naming task (Bargh & Pratto, 1986; Higgins, VanHook, & Dorfman, 1988).

Probably the most stable and generalizable preconscious process and the prototype for all preconscious processes is the evaluations and attitudes toward social and nonsocial targets. For example, results of several studies have consistently demonstrated that evaluation of a given object as good or bad occurs spontaneously and unintentionally in the mere presence of the attitude object (Bargh, Chaiken, Govender, & Pratto, 1992; Bargh, Chaiken, Raymond, & Hymes, 1996; Bargh, Litt, Pratto, & Spielman, 1989; Chaiken, & Bargh, 1993; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Marcel, 1983). This spontaneous activation of attitudes toward various social as well as nonsocial objects is strongly and consistently found probably because of the fact that individuals like or don't like something has become very accessible from experience with the target object in the past. Once individuals have experienced something, they know if they like it or not. This evaluation then becomes automatically activated upon subsequent presentation of the social or nonsocial object. Furthermore, the attitude toward a given object is a one step process which requires only the activation of the relevant attitude and not a cognitive evaluation of the reasons why individuals like or don't like the target object. Consequently, it can be made very spontaneously and efficiently. Individuals' chronically accessible constructs can also preconsciously influence how ambiguous information is selected, perceived and interpreted. For example, Bargh, Bond, Lombardi, & Tota (1986) exposed participants to a target person displaying behaviors ambiguously related to shy or kind traits. Individuals who possessed a chronically accessible construct for shy or kind behaviors were more likely to interpret the target's behavior in terms of that chronic trait than individuals who did not have that trait chronically accessible (see also Bargh & Pratto, 1986; Higgins et al., 1982).

In sum, preconscious processes refer to automatic processes that are nonconsciously triggered by the mere presence of relevant features in the environment. They are activated outside of individuals' awareness and unintentionally. The only necessary precondition to automatically and spontaneously activate the associated automatic response is the detection of relevant environmental inputs by the sensory system.

Postconscious automaticity. This form of automaticity is functionally equivalent to the preconscious form of automaticity. The only difference between preconscious and postconscious automaticity is in how the level of activation necessary to start the automatic process into motion is achieved, i.e., through chronic or temporary means, respectively. As mentioned previously, in the case of preconscious automaticity, the constructs are so chronically accessible that they are spontaneously activated simply by the presence of relevant stimulus in the environment. In the case of postconscious automaticity, the constructs are not as chronically accessible but can be activated by recent use or activation of the relevant construct through temporary priming.

Several studies show that chronic and temporary accessible constructs produce the same kind of effects on attention and behavior (Bargh et al., 1986; Bargh, Lombardi, & Higgins, 1988; Fazio et al., 1986; Roskos-Ewoldsen & Fazio, 1992). For example, Bargh et al. (1986) found the same effects on perceptions and judgments of an automatically activated trait (kindness or shyness), whether the necessary level of activation had been reached through chronic use of the trait or temporary priming. Thus, in this particular study, the results obtained through temporary nonconscious priming of kind or shy traits reproduced exactly the findings obtained with chronically accessible kind and shy constructs respectively. These findings suggest first that these traits can be automatically activated in individuals even if they don't possess a chronically accessible construct for kindness or shyness. They also suggest that the same processes underlie the automatic activation of chronic and primed constructs.

When temporary primed with a certain construct, although individuals are typically aware of the presentation of the primes, they are not aware that a certain construct (e.g., hostility) has been activated since the priming task is usually disguised as another task (e.g., a language ability task). Moreover, individuals are not aware that the automatically activated construct influenced how they responded to the other task presented as unrelated to the priming task. As clearly discussed by Bargh (1992), when studying the automaticity of social psychological phenomena what becomes crucial is to show that individuals are not aware of (1) how the primed stimuli are interpreted or categorized, and (2) how the automatically activated primed stimuli spontaneously influence

subsequent information processing. Subliminal presentation of stimuli is sometimes used when studying the automaticity of social psychological phenomena because individuals cannot be aware of the primed stimuli. However, it does not really matter how the construct of interest is temporary primed as long as individuals are not aware of the specific construct that is primed and it's possible influence. This contention has been clearly supported by Lombardi, Higgins, and Bargh (1987), whose results demonstrated that when individuals are made conscious of the priming stimuli and their possible influence on subsequent processing, contrast effects instead of priming effects are obtained. Consequently several researchers studying the automaticity of social psychological phenomena use the temporary priming procedure disguised as another task not related to the concept being activated.

For example, following individuals' temporary exposure to relevant primes, the identification and categorization of behaviors clearly diagnostic of a certain trait in terms of that trait characteristic have been shown to occur autonomously and without the individual's intention of doing so. In a classic study, Srull and Wyer (1979) presented a series of scrambled sentences to participants such as "the kick he dog". Participants' task was to form a three word sentence with any of the four words. Even though participants were simply instructed to unscramble the sentences, without any reference made to impression formation or personality as a goal of the study, the behaviors presented in the sentences activated spontaneously and unintentionally the primed trait of "hostility". In a subsequent unrelated task, participants were asked to form an impression of a target person exhibiting a behavior ambiguously related to hostility. Participants who had been primed with the trait of hostility attributed more hostile characteristics to the target than participants who had not been primed with the hostile trait (see also Bargh, 1996, 1997; Bargh, et al., 1986; Bargh et al., 1988; Chartrand & Bargh, 1996).

Goal-dependent automaticity. In contrast to preconscious and postconscious forms of automaticity, goal-dependent forms of automaticity require a conscious intention or an act of will to be started into motion. Take the example of driving a car. Like any complex skill, driving can be very difficult at first, requiring constant conscious attention. One has to think about how to steer the

wheel, how hard to hit the brakes, if there is enough time to pass another car, and there is not much conscious attention left to speak to a passenger or listen to music while driving. However, in the more experienced driver, all these separate components are all subsumed in the act of driving and are performed quite automatically, freeing up conscious attention to think about something else or entertain a conversation with someone. But no matter how automatic driving can become, it nonetheless always require a conscious intention to drive somewhere for the automatic process to be started.

Similarly, research on spontaneous trait inference showed that behaviors are encoded unintentionally and automatically in terms of traits. However, this does not imply that individuals automatically infer a disposition to the actor of the behaviors. Results of several studies showed that the actor who performs the behavior is not identified as possessing that trait dispositionally unless participants are explicitly given the goal to form an impression of the actor (e.g., Higgins & Bargh, 1987; Lupfer, Clark, & Hutchinson, 1990; Uleman, Newman, & Moskowitz, 1996; Winter & Uleman, 1984; Winter, Uleman, & Cuniff, 1985). Along the same lines, a study by Hamilton, Katz, & Leirer (1980) also showed that a certain processing goal (to form an impression) that has been consciously activated can stay activated long enough to influence subsequent information processing, by increasing the likelihood that the activated goal instead of another goal will be used (see also Chaiken, Giner-Sorolla, & Chen, 1996; Chen, Shechter, & Chaiken, 1996).

The common theme of the above studies is that the goals or motivation had been consciously started into operation before the nonconscious automatic effects of the activated goal could be observed. With any goals or motivations that are operating nonconsciously once started into motion by a conscious intention, it is not a fixed behavioral response to a single stimulus that is activated but a set of plans and strategies needed to achieve a desired outcome. These plans or strategies can be represented by a set of automated *If-Then* contingencies: *If* a certain information is present in the environment, *Then* respond in this particular manner. When these sets of *If-Then* contingencies are experienced consistently and repeatedly over time, they then become chronically accessible in individuals and automatically activated in the presence of relevant environmental

stimuli. Because skills and chronic goals have been automated, individuals are not aware of selecting, using, and reacting to the information present in the environment. However, the activation of the goal, the “top node” of the process, still requires a conscious intention. Recently, Bargh (1990) proposed that this “top node”, the conscious intention that starts the process into motion can also become automatically triggered, completely removing the need for conscious activation of the goal or motivation.

The Auto-Motive Model

The conscious decision that starts into motion goal-dependent automatic processes can be subsumed and removed from conscious choice, if that conscious choice itself is frequently and consistently associated with the same sets of environmental features. Over time, the conscious choice itself becomes part of the automatic process rendering it entirely preconscious and activated by the mere presence of environmental triggering stimuli. Thus the central hypothesis of the Auto-Motive Model is that the environment can directly and automatically activate a goal or a motivation (Bargh, 1990; Bargh, 1996). Given chronic individual differences in goal orientations, developed over time through repeated experience with a particular social context, it suggests that these orientations could be temporarily primed in individuals reproducing the effects of chronic accessibility. If this is the case, then a nonconscious goal priming manipulation, similar to the ones described in the previous section on postconscious automaticity (see Srull & Wyer, 1979), should mimic the automatic effects of individuals’ chronically accessible goals. Again, priming of a certain goal or motivation would be achieved without individuals’ awareness of the activation of the goal and the possible effect of this activated goal on subsequent information processing or behavior. This would demonstrate that the same underlying process is operating whether the goal is activated through nonconscious priming or chronic use.

Since the emergence of the Auto-Motive Model, several empirical studies have been conducted to specifically test these predictions. In one of these study, Chartrand & Bargh (1996; Experiment 1) tried to replicate the results of Hamilton et al. (1980) but without giving any explicit processing goal to participants. In what was presented as an experiment on language ability,

participants were nonconsciously primed with an impression or a memorization goal through the Scrambled Sentence procedure (Srull & Wyer, 1979). In the impression condition, words such as "opinion, personality, and evaluate", were embedded in the scrambled sentences, whereas in the memorization condition words such as "absorb, retain, and remember" were contained in the sentences. In a second experiment presented as unrelated to the first one, participants were simply asked to read sentences like "had a party for some friends last week" and were told that they would have to answer some questions afterward. During the experimental session, participants were never given any instruction on how to process the information presented.

The results replicated exactly those of Hamilton et al. (1980). Participants whose impression formation goal had been activated in the first "experiment" recalled more of the sentences presented in the second "experiment" than participants whose memorization goal had been activated. In addition, participants in the impression formation condition were more likely to recall the sentences according to the trait they were illustrating. Whereas the results of Hamilton et al. (1980) were attributable to conscious processing of the behavioral information in terms of a target person, the results of Chartrand & Bargh (1996) could be attributed to a nonconscious processing of the target relevant information since participants were not aware of the nature of the primes and the relation between the two tasks (see also Bargh, Gollwitzer, et al., 1996; Bargh, Gollwitzer, et al., 1997).

The findings of the above studies clearly show that goals or motivation can be triggered without individuals' conscious awareness and then operate automatically to influence attitudes and behaviors. According to the Auto-Motive Model, if temporary nonconscious priming of certain goals can be achieved, this suppose that these goals can be found in chronic forms in some individuals due to consistent and frequent association of these goals in response to the same environmental set of features. In fact, in the Auto-Motive Model, the priming procedure is meant to stand in as a replacement for chronic goal orientations. Results of recent studies by Chaiken et al. (1996), and Cialdini (1994) support this contention. In these studies, researchers were able to identify individuals with chronically accessible impression-management and consistency goals that

were activated nonconsciously in the presence of relevant triggering stimuli in the environment. More importantly, temporary nonconscious priming of these goals was found to reproduce the effects obtained when chronic individual differences were considered as the independent variable. These findings again are consistent with the hypothesis that it is the same underlying process that is operative whether the relevant motivational constructs are nonconsciously primed or observed as a chronic individual difference.

In the present thesis we want to see if the principles of The Auto-Motive Model could be applied to specific types of motives for engaging in activities, namely intrinsic and extrinsic motivation as defined by Deci and Ryan (1985, 1987, 1991). The focal point of the thesis will be to see if intrinsic and extrinsic motivation can also be triggered nonconsciously and operate automatically to subsequently influence individuals' motivation, perceptions, and behavior. Given the existence of automatic processes regulating intrinsic and extrinsic motivation, the interaction between dispositional and situational forms of construct accessibility will be investigated. In the following section, Deci & Ryan's Self-Determination Theory (1985) is described.

The Self-Determination Theory

Deci (1971) and Deci & Ryan (1985, 1987) in an integration and extension of the work of White (1959) and DeCharms (1968) developed a theory of self-determination of human behavior. According to Self-Determination Theory, intrinsic motivation represents the prototype of autonomous behaviors and the natural manifestation of one's innate tendency to discover novel things and to master the environment in the absence of rewards or extrinsic contingencies to perform the activity. Intrinsic motivation is based in the innate psychological needs for competence and self-determination (or autonomy). Activities that are done for intrinsic motives are performed only for the pleasure and the satisfaction obtained while doing the activity. The main reason for the individual to perform the activity is the intense feelings of pleasure and satisfaction, along with the experience of competence and self-determination derived while experiencing stimulating sensations, learning, exploring, or attempting to accomplish something.

Although competence is an important need underlying intrinsic motivation it is not sufficient to foster intrinsic motivation. Situations in which one feels competent will not be conducive to intrinsic motivation if they are not supportive of one's autonomy. Individuals need to feel that whatever they do is freely chosen, that their actions are autonomous in the sense that they truly emanate from the self. The degree to which a behavior is endorsed by the core self or experienced as having an internal perceived locus of causality, will determine the relative autonomy of the behavior and the nature of the psychological consequences associated with the behavior.

In sum, when individuals are intrinsically motivated toward a certain activity, they experience feelings of excitement, sheer enjoyment, and a feeling of deep absorption in the activity performed. Furthermore, when intrinsically motivated, individuals enjoy the process of doing something rather than the outcome that follows the completion of the activity. Consequently, intrinsic motivation is closely tied to what individuals truly like and enjoy. This type of motivation is strongly associated with the evaluation of various activities individuals engage in on a daily basis.

In contrast, extrinsic motivation refers to behaviors that are performed for instrumental reasons, such as fear of punishment, external rules, or the expectation of a reward. More specifically, extrinsically motivated behaviors are performed with a specific goal or outcome in mind and not simply for the satisfaction derived while doing the activity. These behaviors are performed and maintained through various extrinsic contingencies. Consequently, when a behavior is performed for instrumental reasons, the specific reasons for performing the activity can change and an external incentive is always necessary for the behavior to be engaged in. Individuals who engage in a certain activity for extrinsic motives do not derive satisfaction from the process of doing the particular activity, rather they derive satisfaction in the attainment of the outcomes following the completion of the activity. When extrinsically motivated, individuals' attention is solely focused on the completion of a certain activity, on the attainment of a desired outcome, or on the avoidance of an undesired one. Behaviors that are extrinsically regulated are experienced by individuals as having an external locus of causality, and consequently are not experienced as originating from their core self.

In sum, when individuals are extrinsically motivated toward a certain activity, they always look for and need an external incentive to do the activity. Consequently, extrinsic motivation is dependent on an outcome individuals identify as the goal to attain before engaging in the activity. This goal could be the obtention of something desired or the avoidance of something undesired, since the specific reasons for doing an activity can change.

Deci & Ryan (1985, 1987, 1991) proposed the existence of 6 different types of motives for behaving that could be placed on a continuum according to their underlying level of self-determination. From the most self-determined to the least self-determined, these forms of motivation are: Intrinsic motivation, extrinsic motivation by integrated regulation, extrinsic motivation by identified regulation, extrinsic motivation by introjected regulation, extrinsic motivation by external regulation, and amotivation. In the present thesis, only intrinsic motivation and extrinsic motivation by external regulation (or simply extrinsic motivation) will be considered. These two types of motivation represent the extremities of the continuum of self-determination and the prototypes of self-determined and non self-determined forms of motivation, respectively.

As discussed previously, the innate tendency to become intrinsically motivated, is based on the needs to be competent *and* self-determined (Deci & Ryan, 1985, 1987). Even though the presence of these innate needs in individuals stimulate them to spontaneously try to master their environment and assimilate environmental inputs into themselves, external events can undermine individuals' level of intrinsic motivation by affecting feelings of self-determination and competence. In fact, due to external constraints and pressures, some individuals never become truly self-determined.

Deci & Ryan (1985) proposed that external events relevant to the regulation of behavior have different functional meanings. These aspects of a given event can be summarized under the label controlling or autonomy supportive (informational). According to Self-Determination Theory, it is not the event *per se* that will influence individuals' feelings of self-determination and competence, but rather the degree to which the controlling or the autonomy supportive aspects of an event are perceived as such. In general, when external events are perceived as controlling, they

produce a shift in individuals' perceived locus of causality from an internal to an external origin. This change in the perceived locus of causality undermines individuals' level of intrinsic motivation and promotes individuals' level of extrinsic motivation. In contrast, external events perceived as autonomy supportive facilitate a shift in the perceived locus of causality to an internal origin, consequently they enhance individuals' level of intrinsic motivation and decrease individuals' level of extrinsic motivation. In sum, the perception of an event as mostly controlling or autonomy supportive is crucial in order to determine its impact on an individual.

For example, studies investigating the effect of *rewards* given for performing an activity (Deci, 1971; Harackiewicz, 1979; Lepper, Greene, & Nisbett, 1973; Ross, 1975), found that they undermined individuals' intrinsic motivation toward the activity. Individuals receiving a reward for performing an activity reported subsequently less interest in the activity and willingness to work again on the activity than individuals who did not receive a reward for performing the activity. These results were obtained because rewards are generally perceived as pressuring people to behave in a certain way not freely chosen by the individual. When individuals perform an activity in the presence of rewards, a shift in the locus of causality away from the self occurs, and individuals no longer perceive their behavior as self-determined but as controlled. This undermining effect of intrinsic motivation is most evident when rewards are expected (Lepper et al., 1973), salient (Ross, 1975), and dependent on task engagement (Ryan, Mims, & Koestner, 1983).

However, it has been found that rewards do not invariably undermine an individual's level of intrinsic motivation. The detrimental effect of rewards or constraints on intrinsic motivation are a function of how much they are perceived as supporting or threatening an individual's sense of autonomy. For example, it has been found that rewards used in a noncontrolling fashion, in order to signify competence and to provide information on one's ability, generally do not cause individuals to become more extrinsically motivated (e.g., Ryan et al., 1983). In this case, the reward was not perceived as threatening individuals' autonomy since the informational aspect of the reward was made salient.

The experience of threats and deadlines (Amabile, DeJong, and Lepper, 1976; Deci & Cascio, 1972), an evaluative context (Benware & Deci, 1984; Maehr & Stallings, 1972), direct surveillance (Harackiewicz, Manderlink, & Sansone, 1984; Pittman, Davey, Alafat, Wetherill, and Kramer, 1980) or through a video camera (Lepper & Greene, 1975; Plant & Ryan, 1985) have been found to undermine individuals' level of self-determination. In all these contexts, it was the controlling aspect of the event on one's behavior that was typically perceived. In sum, these events undermined individuals' sense of choice and competence toward the activity performed because the perceived locus of causality for doing an activity under these constrained conditions was external to the self.

Conversely, competence feedback given in a way that provides individuals with information on how to improve their behavior and the provision of choice (Swann & Pittman, 1977; Zucherman, Porac, Lathin, Smith, & Deci, 1978), will generally enhance individuals' level of self-determination and competence toward the activity. This should occur because competence feedback allow individuals to perceive themselves as the origin of their behavior and as competent in performing the activity. When individuals are given ways to improve their behavior and are given the opportunity to decide on how to proceed in doing so, individuals also become more in control of their behaviors and thus feel more self-determined and competent. Individuals then perceive their behavior as intrinsically motivated and not controlled.

However, results of studies on the effect of positive feedback on individuals' level of self-determination are somewhat less clear. In these contexts, feedback can either convey competence information (Harackiewicz, Manderlink, & Sansone, 1992) or be experienced as controlling if the feedback is perceived as a form of interpersonal control (Ryan et al., 1983). Although many studies have found that positive feedback enhance individuals' level of self-determination (Blanck, Reis, & Jackson, 1984; Boggiano & Rubble, 1979; Vallerand & Reid, 1984) it has been demonstrated that this is true only in certain circumstances. Specifically, positive feedback enhances feelings of intrinsic motivation when the sense of competence procured by the feedback is accompanied by feelings of self-determination (Fisher, 1978; Ryan, 1982). Positive feedback also promotes

intrinsic motivation for particular individuals who perceive as salient the informational aspect of the feedback (Boggiano & Barrett, 1985; Deci, Cascio, & Krussell, 1975). In sum, these results suggest that positive feedback is not a controlling or an autonomy supportive event per se. It can undermine or enhance self-determination depending on the controlling or supportive nature of the context in which it is given, or how it is perceived by the individual who receives it. In fact, the interpersonal context in which a given event is experienced can moderate the effect of the event per se. Several studies have examined the influence of the interpersonal context on subsequent levels of self-determination and these will be presented next.

Harackiewicz (1979) found that high school students who received performance contingent reward in an informational way, by having the opportunity to self-monitor their performance on a chart, were subsequently more intrinsically motivated toward the task than students who were not able to self-monitor their performance. Along the same lines, Ryan et al. (1983) hypothesized that the use of words such as *should* or *standards*, when administering a performance-contingent reward would lead individuals to become more extrinsically motivated toward the task. This was expected because these words would serve to create a controlling interpersonal context that would undermine individuals' sense of choice and competence. As hypothesized, results showed that college students who received a performance-contingent reward and who were told that they had performed well as they *should* have, were subsequently more extrinsically motivated than students who were simply told that they had performed well. The performance-contingent reward given in a less controlling context was perceived as more autonomy supportive, therefore affecting less individuals' level of intrinsic motivation.

In another related study, Ryan (1982) investigated the influence of controlling or autonomy supportive contexts on the interpretation of positive feedback and its effect on intrinsic motivation. College students who received positive feedback in a controlling manner through the use of words such as should, felt subsequently less intrinsically motivated toward the activity than students who received positive feedback in an informational manner. Results of this study demonstrate that it is not even necessary to administer a tangible reward in a controlling manner to affect levels of

intrinsic motivation. The simple use of words implying control and pressure were successful to create a salient controlling interpersonal context. Taken together, these results suggest that when a given event or interpersonal context is experienced as autonomy supportive, individuals' level of intrinsic motivation will be enhanced while an interpersonal context experienced as controlling will foster individuals' level of extrinsic motivation. However, this is not always true. In the following section, evidences will be reviewed demonstrating that some individuals with particular characteristics seem to be able to resist the influence of an autonomy supportive or a controlling context.

Individuals' resilience toward external events

Boggiano & Katz (1991) found that intrinsically motivated students who were given failure feedback following their performance on a spatial ability task, did not show motivational impairment on a subsequent task. In fact, these intrinsically motivated children showed increased perseverance to solve more puzzles. Along the same lines, Boggiano, Main, & Katz (1988) found that intrinsically motivated children exposed to controlling cues, such as words like "must" or "should", did not manifest decreases in mastery strivings. Also, Deci, Nezlek, & Sheinman (1981) found only a weak relationship between teachers' orientation toward the use of controlling or autonomy supportive strategies, and changes in students' intrinsic motivation over a 7 month period. Students of autonomy oriented teachers did not become significantly more intrinsically motivated toward school and students of control oriented teachers did not become significantly less intrinsically motivated toward school over the course of the school year. In sum, these results suggest first, that intrinsically motivated children appear, under certain conditions, to be resistant to the influence of pressures and other controlling events, and second, that the interpersonal context created by teachers' oriented toward control or autonomy does not systematically influence the level of intrinsic motivation.

Some explanations have been proposed for these unexpected findings. First, Boggiano and her colleagues (1988) proposed that children who were intrinsically motivated may have used cognitive strategies that helped them maintain their attention on the interesting aspects of the activity,

making it easier to ignore the more controlling cues. However, because cognitive effort had to be continually exerted in order to maintain children's attention on the interesting aspect of the activity, it is likely that these strategies would have been difficult to maintain especially under controlling or demanding conditions, where children's resources were already taxed. Nonetheless, it was precisely in these conditions that resistance to controlling cues had been observed in intrinsically motivated children.

Second, Boggiano & Katz (1991) proposed that the way in which parents and later teachers had consistently interacted with a child, had affected children's self-determination and in turn had predicted the motivational orientation that children had consciously adopted in various relevant situations. Depending on the motivational orientation children adopted, whether intrinsic or extrinsic, different conscious reactions to controlling stimuli were then manifested. For example, parents who were consistently autonomy supportive in relation to school work would have fostered an intrinsic motivational orientation toward school in their children, which would have helped them resist the influence of a controlling context.

Third, Deci, Nezlek, et al. (1981), proposed that the absence of relationship between teachers' orientation toward control or autonomy and changes in intrinsic motivation in children, could be explained by an early strong influence of teachers interpersonal style on children's motivation toward school. If this reasoning was correct, the impact of teachers' interpersonal style on children intrinsic motivation would have been established during the first 6 weeks of school, before the first measure of children's intrinsic motivation was taken. To specifically test that hypothesis, Deci, Schwartz, Sheinman, & Ryan (1981) in a follow up study, measured children intrinsic motivation on the second day of school and then 7 weeks later. Once again, the results showed that children intrinsic motivation did not change significantly in function of teachers' orientation toward control or autonomy. Even when analyzing the data for the two teachers with the most extreme orientation, Deci, Schwartz, et al. (1981) found that changes in children intrinsic motivation between the second day and the seventh week of school were only marginally significant. In sum, the results of Deci Schwartz, et al. (1981), and Deci, Nezlek, et al. (1981)

offered only weak support for the hypothesis of motivational change in children due to an early influence of teachers' interpersonal style.

Although all these explanations may be plausible, another factor may have been responsible for these results. The motivational resistance to controlling or autonomy supportive events, found in situations commonly associated with motivational change, could be accounted for by an automatic motivational orientation in individuals. An automatic intrinsic motivational orientation developed over time could account for the resistance to controlling cues manifested by intrinsically oriented children in the Boggiano and colleagues studies (Boggiano & Katz, 1991; Boggiano et al., 1988). Although an automatic account of this phenomenon appears very similar to the conscious cognitive explanation proposed by Boggiano & Katz (1991), they differ on one crucial point. If motivational resistance to controlling cues is due to conscious cognitive processes, a great deal of cognitive effort would be necessary to maintain one's attention on the interesting aspects of the task, especially in demanding situations (e.g., school settings). In contrast, if motivational resistance to controlling cues is due to automatic nonconscious processes, then less cognitive effort would be required to be responsive to interesting aspects of the task. Automatic motivational orientations, could also explain the findings of Deci and colleagues (Deci, Schwartz, et al., 1981; Deci, Nezlek, et al., 1981). Children of autonomy oriented teachers may have been resistant to this supportive context because of a chronically accessible extrinsic motivational orientation toward school, activated automatically in some of the children in the presence of academic cues. In contrast, children of control oriented teachers may have been resistant to this pressuring context because of a chronically accessible intrinsic motivational orientation toward school, activated automatically in some of the children in the presence of academic cues. In sum, we believe that the theoretical formulation of the Auto-Motive Model on the automaticity of social phenomena and related research (Bargh, 1990, 1996, 1997), can help shed some light on the study of human motivation.

Automaticity of intrinsic and extrinsic motivation

Although no researcher to date has attempted to nonconsciously activate intrinsic and extrinsic motivation, recent indirect evidences provide support for this possibility. For example,

Wild, Enzle, Nix, & Deci (1997; Experiment 2) evaluated the effect of mere exposure to an intrinsically or an extrinsically motivated teacher on participants' subsequent interest and task enjoyment. In this experiment, participants were taught a magic trick by another participant who was actually a confederate. During the experimental session, the teacher was either paid by the experimenter for teaching the trick (extrinsic motivation condition) or asked to sign some forms regarding volunteer teaching for the psychology department (intrinsic motivation condition). Nothing in the experimental script further suggested that the instructor was more controlling or autonomy supportive toward participants.

Results showed that participants who merely saw the teacher sign volunteer forms expressed greater interest in further learning and perfecting the trick than participants who merely saw the teacher being paid by the experimenter. In addition, when asked to teach the trick to another person, participants exposed to the intrinsically motivated teacher reported more enjoyment while teaching the trick than participants exposed to the extrinsically motivated teacher. The students of participants in the intrinsic condition also reported greater interest while learning the trick than students of participants in the extrinsic condition. A second generation of learners were thus influenced by the simple exposure of the first generation of learners who were taught either by an intrinsically or an extrinsically motivated teacher.

These findings suggest that information about intrinsic and extrinsic motivation, merely present in the environment and consciously processed, can stay active long enough to influence subsequent attitudes and interest levels even in a second generation of learners. In a way, these results parallel the results obtained in studies on the goal-dependent automaticity of impression formation and impression management goals presented earlier (Chaiken et al., 1996; Chen et al., 1996; Hamilton et al., 1980). Although not designed to test the automaticity of intrinsic and extrinsic motivation, in the Wild et al. (1997) studies, participants were made explicitly aware of the intrinsic or extrinsic motivational orientation of the instructor through reading or direct observation. To show that intrinsic and extrinsic motivation can be automatically activated without individuals'

conscious awareness or guidance, conscious involvement or intention must be removed from the process.

Goals of the thesis and hypotheses

The main goal of the thesis is to apply the theoretical framework of The Auto-Motive Model (Bargh, 1990) to intrinsic and extrinsic motivation defined by Deci & Ryan (1985, 1987). In order to do that, we will try to demonstrate that intrinsic and extrinsic motivation can be nonconsciously primed in individuals and can subsequently automatically influence motivation, perceptions, and behavior. Because temporary priming is meant to reproduce the effects of chronically accessible constructs, we will then try to show that intrinsic and extrinsic motivational orientations can be found in chronic forms in some individuals. These chronically accessible motivational orientations would then be activated nonconsciously and spontaneously by relevant environmental features and subsequently automatically influence motivation, perceptions, and behavior. Thus, an automatically activated intrinsic motivational orientation (whether through chronic or temporary means) would nonconsciously lead individuals to feel more intrinsically motivated, more interested, to experience more choice and positive emotions, and to perform better at a task than individuals with an automatically activated extrinsic motivational orientation.

We will also attempt to show that individuals with a chronically accessible intrinsic or extrinsic motivational orientation will be resilient to external factors when temporarily primed with an extrinsic or an intrinsic motivation, respectively. Whereas we can generally expect individuals' level of self-determined motivation to decrease in the presence of extrinsic motivational cues, and to increase in the presence of intrinsic motivational cues (Deci & Ryan, 1985; 1987), individuals with a chronically accessible intrinsic or extrinsic motivational orientation would be automatically resistant to these respective influences. As a consequence, intrinsically motivated individuals would nonconsciously maintain their level of intrinsic motivation within a context fostering extrinsic motivation. Similarly extrinsically motivated individuals would nonconsciously maintain their level of extrinsic motivation within a context fostering intrinsic motivation.

As discussed previously, since there are four defining features of automatic processes, it is important to define what will represent supportive evidence for the automaticity of intrinsic and extrinsic motivation. Specifically, we will consider these motivations to be regulated in part by automatic processes if their activation and the resultant effects took place unintentionally and outside the individual's current conscious awareness. The nonconscious activation of these motivation will either be achieved through temporary priming of constructs relevant to intrinsic and extrinsic motivation or through chronic accessibility of these motivational orientations. Consequently, participants will not be provided with any explicit instructions to act in accordance with the motivational orientation being primed or the chronic motivational orientation assessed. Furthermore, no reference will be made to motivation or personality as part of the purpose of the studies. In fact, in all the studies, the dependent motivational and behavioral measures will be taken when the participants will believe they are volunteering in a second experiment, unrelated to the study where the motivational orientation will have been assessed or nonconsciously primed.

Overview of studies

In both Study 1 and Study 2, intrinsic and extrinsic motivation were automatically activated in an initial task based on the procedure developed by Srull & Wyer (1979). Then, the effects of the automatically activated motivation on individuals' motivation, perceptions, and behavior were measured on a subsequent task presented as unrelated to the initial task. The general purpose of Study 1 and Study 2 was thus theoretical. These two studies were designed to address the question of the existence of an automatic motivational process underlying the regulation of intrinsic and extrinsic motivation. These two studies are presented in the first empirical paper.

In Study 3, the free-response measure of chronically accessible academic motivational orientations was developed. This measure was used to classify individuals into three distinct groups: Those with a chronically accessible intrinsic motivational orientation, those with a chronically accessible extrinsic motivational orientation, and those without a chronically accessible intrinsic or extrinsic motivational orientation. In Study 4, we examined the interplay of chronically accessible motivational orientations and temporary primed motivation when these two sources of

construct accessibility are opposite in nature but both relevant to the interpretation of a given situation. Compared with Study 1 and Study 2, the general purpose of Study 3 and Study 4 was more applied. Taken together, these latter two studies were designed to examine the hypothesized automatic motivational resilience of individuals with a chronically accessible motivational orientation to the influence of temporary primed motivation. These last two studies are presented in the second empirical paper. The presentation of these two papers will be followed by a discussion of the thesis findings as a whole and directions for future research.

Automatic activation of intrinsic and extrinsic motivation

Chantal Séguin-Levesque, & Luc G. Pelletier

University of Ottawa

June 21, 1999
Chantal Séguin-Levesque
University of Ottawa
School of Psychology
145 Jean-Jacques Lussier
K1N 6N5
(613) 562-5800 ext:4179
FAX: (613) 562-5147
e-mail: s642101@aix1.uottawa.ca

Abstract

In recent years, social psychological processes, such as attitudes, and goals, have been shown to be in part automatic. We conducted two studies to verify if intrinsic and extrinsic motivation could also be regulated by automatic nonconscious processes. Using the Scramble Sentence procedure (Srull & Wyer, 1979), we automatically activated either an intrinsic or an extrinsic motivation in an initial task. Then, participants were asked to work on a subsequent task presented as unrelated to the initial task. Results of 2 studies showed that, participants primed in the initial experiment with an intrinsic motivation were more motivated, performed better, were more interested, and perceived more choice while working on the subsequent task than participants primed with an extrinsic motivation. These findings support the hypothesis that intrinsic and extrinsic motivation can be in part regulated by automatic processes.

Automatic activation of intrinsic and extrinsic motivation

In recent years, much research has been done on the automatic processes underlying various social psychological phenomena. Accumulating empirical evidence show that much of everyday human processes, such as feelings, attitudes, and perceptions could be labeled automatic on some level (see Bargh, 1996, 1997, for reviews). By automatic processes, it is generally meant that either the initiation of these processes, their operation or both are found to occur without the involvement of conscious guidance or choice. For example, attitudes have been shown to be preconsciously activated in the mere presence of the relevant attitude object in the environment, and to subsequently automatically influence perceptions and behavior (Bargh, Chaiken, Gollwitzer, & Pratto, 1992; Bargh, Chaiken, Raymond, & Hymes, 1996; Bargh, Litt, Pratto, & Spielman, 1989; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Personality traits have been successfully activated through temporary priming of relevant constructs (Bargh, Bond, Lombardi, & Tota, 1986; Bargh, Lombardi, Higgins, 1988), and the categorization of behaviors in terms of personality traits have also been shown to occur automatically (Winter & Uleman, 1984). In addition, stereotypes have also been shown to become activated automatically in the mere presence of relevant features of the stereotyped group (Devine, 1989; Pratto, & Bargh, 1991). Even more abstract constructs such as the self-concept have been automatically activated in the mere presence of self-relevant information and then showed to spontaneously influence self-perceptions and emotions (Bargh, 1982; Fenigstein & Levine, 1984; Higgins, Bond, Klein, & Strauman, 1986; Rhodewalt & Agustsdottir, 1986).

Automaticity of goals and motivation

Recently, Bargh (1990) argued that goals and motivation could also become directly and automatically activated by environmental features. According to Bargh's Auto-Motive Model, even if most goals that individuals pursue are the result of conscious choice and reflection, this conscious choice is not always necessary for the goal to be activated and operative. The main hypothesis of this model is that goals and motivation are represented in memory like attitudes, stereotypes, schema, and constructs are. Since various constructs and stereotypes can be automatically activated by relevant environmental stimuli following repeated experience (see Bargh, 1994, 1997 for

reviews), goals should have this capability as well as long as the same conditions that lead to the development of automaticity in other constructs are present. Specifically, according to the Auto-Motive Model, the representation of goals and motivation that have been frequently and consistently chosen in particular situations in the past would, over time, become chronically linked in memory to the representation of those situations. Consequently, goals and motivation would become capable of being automatically activated by relevant environmental features that have been consistently associated with the particular goal or motivation. Even the conscious intention that typically starts in motion a goal directed behavior would become part of the automatic process, given that this conscious intention itself has been frequently and consistently associated with the same set of environmental features. The entire sequence from intention to action would thus be automatic and activated by the mere presence of environmental triggering stimuli without individuals conscious awareness or guidance.

Bargh (1990, 1996, 1997) also argued that the way to empirically reproduce the effects of these chronically accessible motivations would be through temporary priming of constructs relevant to the goal or motivation to be activated. In this case, priming refers to the incidental activation of knowledge structures, such as traits, stereotypes, or goals, by environmental features relevant to the construct to be automatically activated. Thus a nonconscious goal priming manipulation based on a procedure such as the one developed by Srull & Wyer (1979) should represent a suitable alternative for individuals' chronically accessible goals or motivation. This reasoning is based on the contention that the same underlying process is operative when a goal is activated by the mere presence of environmental stimuli, whether through nonconscious goal priming or chronic use of that goal (Bargh, 1990, 1996, 1997).

Results of recent studies by Bargh and colleagues demonstrated that social-behavioral and information processing goals can in fact be automatically activated or "primed" (Bargh, Gollwitzer, & Barndollar, 1996; Bargh, Gollwitzer, Lee-Chai, & Barndollar, 1997; Chartrand & Bargh, 1996). In one of these studies, Chartrand & Bargh (1996; experiment 1) nonconsciously activated in participants either an impression or a memorization goal with the scramble sentence procedure

developed by Srull & Wyer (1979). In the impression condition, words such as "impression, personality, and evaluate" were embedded in the scrambled sentences (e.g., idea has he impression an), whereas in the memorization condition words such as "memory, retain, and remember" were present in the sentences (e.g., somewhat memory prepared I was). In a subsequent experiment presented as unrelated to the scramble sentence task, participants were asked to read sentences such as "had a party for some friends last week", and were told that they would have to answer some questions afterward. It is important to emphasize that during the experimental session, participants were never given any instructions on how to process the information presented. Results showed that participants who had been nonconsciously primed with an impression formation goal recalled more of the sentences presented in the "second" experiment than participants for which a memorization goal had been automatically activated. These results replicate exactly the findings of studies on the effects of conscious impression processing goals (see Hamilton, Katz, & Leirer, 1980). It seems that conscious processing of information in order to form an impression of a target individual provides a way to organize and integrate the information presented, which subsequently serve as a cognitive cue facilitating the recall of the information. However, in the Chartrand & Bargh study (1996), these effects were replicated without individuals' conscious involvement or guidance.

In another study (Bargh et al., 1997), one group of participants were nonconsciously primed with an achievement motivation with the use of words relevant to achievement motives in an initial scrambled sentence task (see Srull & Wyer, 1979). In this initial scrambled sentence task, another group of participants were simply presented with words that were neutral with respect to achievement motives. In a subsequent task presented as unrelated to the first one where the achievement motivation had been nonconsciously activated, participants were asked to find as many words as possible with a set of Scrabble tiles for a period of 3 minutes. The dependent variable of interest was the amount of participants who persisted in trying to find more words after being told to stop doing so. Results showed that significantly more participants primed with achievement motivation persisted in trying to find more words after being told that the experiment was over, than

participants exposed to neutral primes. Persistence in the face of obstacles being a quality of motivational states, results of this study clearly suggest that a motivation was nonconsciously activated by the mere presence of relevant features in the environment and then spontaneously influenced behavior. Again, this effect occurred without participants' conscious involvement or guidance.

In sum, goals or motivation such as impression and memorization goals (Chartrand & Bargh, 1996), achievement motivation (Bargh et al., 1997), impression-management and consistency motivation (Chaiken, Giner-Sorolla, & Chen, 1996; Cialdini, 1994) have been shown to be in part regulated by automatic processes. In the present study, we want to extend the automaticity framework to other types of motivation namely intrinsic and extrinsic motivation as defined by Deci & Ryan (1985, 1987). Specifically, we want to see if intrinsic and extrinsic motivation can be regulated by automatic processes (i.e., be triggered nonconsciously by environmental features), and then operate automatically to influence motivation toward a task, behavior and task's perception.

Intrinsic and extrinsic motivation

According to Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991) intrinsic motivation is based in the innate psychological needs for competence and autonomy. Intrinsic motivation represents the prototype of self-determined reasons for behaving and the natural manifestation of one's innate tendency to discover novel things and to master the environment in the absence of external rewards or contingencies to perform an activity. Activities that are done for intrinsic motives are performed for the sole pleasure and satisfaction obtained while doing the activity. When individuals are intrinsically motivated toward a certain activity, they experience as a consequence, feelings of excitement, sheer interest and enjoyment, and a feeling of deep absorption or "flow" in the activity performed (Deci & Ryan, 1985, 1991). Furthermore, when intrinsically motivated, individuals enjoy the process of doing something rather than the outcome that follows the completion of the activity. Consequently, intrinsic motivation is closely tied to what individuals truly like and enjoy (Deci & Ryan, 1987).

In contrast, extrinsic motivation refers to behaviors that are performed for instrumental reasons, such as fear of punishment, external rules, or the expectation of a reward (Deci & Ryan, 1985, 1987, 1991). More specifically, extrinsically motivated behaviors are performed with a specific goal or outcome in mind and not simply for the satisfaction derived while doing a particular activity. The goal pursued could be a valued goal, nonetheless, the activity would still remain a way to attain an outcome, even though individuals would identify with this outcome. Individuals who engage in a certain activity for extrinsic motives derive satisfaction in the attainment of the outcomes following the completion of the activity. When extrinsically motivated, individuals' attention is solely focused on the completion of a certain activity, on the attainment of a desired outcome, or on the avoidance of an undesired one. Behaviors that are extrinsically regulated are experienced by individuals as pressuring them to behave in some way, and consequently are not experienced as fully originating from their core self. When individuals are extrinsically motivated toward a certain activity, they rely on external incentives to do the activity (Deci & Ryan, 1987). Although various forms of extrinsic motivation exist, which differ according to their underlying level of self-determination (Vallerand & Bissonnette, 1992; Vallerand, Fortier, & Guay, 1997), extrinsically motivated behaviors are dependent on an outcome individuals identify as the goal to attain before engaging in the activity. This goal could be the obtention of something desired or the avoidance of something undesired.

Although individuals possess a natural tendency to become more autonomous and to master one's environment, Deci & Ryan (1985, 1991) proposed that external events can thwart one's efforts to become more self-determined. According to Self-Determination Theory (Deci & Ryan, 1985, 1991), external events perceived as controlling should produce a shift in individuals' perceived locus of causality from an internal to an external origin. This change in the perceived locus of causality contributes to undermine individuals' level of intrinsic motivation. For example, rewards given for performing an activity such as money (Deci, 1971), good-player awards (Lepper, Greene, & Nisbett, 1973), food (Ross, 1975), and various prizes (Harackiewicz, 1979), have been found to undermine individuals' level of intrinsic motivation toward the activity. In addition, the experience

of threat and deadlines (Amabile, DeJong, & Lepper, 1976; Deci & Cascio, 1972), an evaluative context (Benware & Deci, 1984; Maehr & Stallings, 1972), and surveillance (Harackiewicz, Manderlink, & Sansone, 1984; Lepper, & Greene, 1975; Pittman, Davey, Alafat, Wetherill, & Kramer, 1980; Plant & Ryan, 1985) have also been found to undermine individuals' feeling of autonomy (see Vallerand, 1997 for a review). This undermining effect of intrinsic motivation is found since these events are all generally perceived as controlling and pressuring individuals to behave in a certain way.

Conversely, external events perceived as autonomy supportive will produce a shift in individuals' perceived locus of causality to a more internal origin. This change in the perceived locus of causality contributes to enhance individuals' level of intrinsic motivation. For example, competence feedback (Swann & Pittman, 1977; Zucherman, Porac, Lathin, Smith, & Deci, 1978), and positive feedback conveying autonomy information (Boggiano & Barrett, 1985; Deci, Cascio, & Krussell, 1975; Fisher, 1978; Harackiewicz, Manderlink, & Sansone, 1992; Ryan, 1982), have been found to enhance individuals' level of intrinsic motivation toward an activity (see Vallerand, 1997 for a review). This enhancing effect of intrinsic motivation is found since these events are generally perceived as supporting one's sense of competence.

A change in the perceived locus of causality for doing a certain activity has been shown to be associated with various social, psychological and behavioral consequences. In one study, Deci, Spiegel, Ryan, Koestner, & Kauffman (1982) found that participants, acting as teachers, who taught to participants acting as students, how to solve spatial puzzles under a controlling context, used more controlling words like "should", "must", "have to", or "ought to", than teachers who taught under an autonomy-supportive context. In addition teachers exposed to the controlling context proceeded quickly from one puzzle to another, giving the solutions for each puzzle, whereas teachers exposed to the autonomy-supportive context allowed their students to find their own solutions. In terms of performance, students of controlling teachers assembled twice as many puzzles than students of autonomy-supportive teachers. However, when left alone, students of controlling teachers assembled less puzzles than students of autonomy-supportive teachers. The

performance advantage of students taught by controlling teachers was maintained only in the presence of external constraints.

Along the same lines, McGraw & McCullers (1979) found that participants who were paid to solve logic problems had more difficulty solving the problems than participants who were not rewarded for their performance. In addition, Benware & Deci (1984), and Grolnick & Ryan (1987) found that tests that are evaluative in nature, not only undermined students' intrinsic motivation toward the activity, but also affected their conceptual learning of the material. Students who learned material under a controlling context showed impairment in their conceptual learning of the material compared to students who learned the material under an autonomy-supportive context. Furthermore, results of studies found that children who were told that their work would be evaluated or rewarded, produced less creative collages than children who were not evaluated or rewarded (Amabile, 1979, 1982, 1983; Amabile, Hennessey, & Grossman, 1986).

Other studies have also examined the effects of autonomy-supportive and controlling contexts on self-reports of interest-enjoyment and found that interest-enjoyment toward a task was higher following autonomy-supportive events than following controlling events (e.g., Enzle & Ross, 1978). Perception of choice while performing a task was also found to be affected by the perceived nature of the social context. In a study by Haddad (1982), two groups of children worked on anagrams: One group of children worked under a controlling context and the other group worked under a supportive context. Then the children were told that they would be doing four more anagrams. They were also told that they could choose one, some, or all four anagrams they would be working on and the experimenter would select the rest of the anagrams. Results of the study showed that children who were exposed to the controlling context made fewer of the choices than children who were exposed to the autonomy-supportive context. After being initially controlled, children tended to allow others to make their future choices for them, probably because they perceived less opportunity to exercise their choices in the situation.

The present studies

The two studies presented in this article attempt to extend the automaticity framework to the understanding of intrinsic and extrinsic motivation. Based on the literature reviewed previously, we propose that intrinsic and extrinsic motivation could be in part regulated by automatic processes. Specifically, we propose that intrinsic and extrinsic motivation could be automatically activated through priming of constructs relevant to intrinsic and extrinsic motives for behaving respectively. Simple environmental stimuli such as words like *expectation*, *evaluation*, or controlling contexts in general could temporarily automatically activate an extrinsic motivation that would subsequently influence individuals' attitudes and behavior. Conversely, environmental stimuli such as words like *choice*, *challenge*, or autonomy supportive contexts in general, could automatically activate an intrinsic motivation that would then influence individuals' attitudes and behavior. Since it is believed that every event can have informational as well as controlling components, it is reasonable to believe that every individual could possess a cognitive structure sensitive to supportive as well as controlling contexts and thus be influenced by these two types of situations. However, given repeated experiences with controlling or autonomy supportive contextual stimuli, either a chronic extrinsic or intrinsic motivation could develop which would then be automatically activated in relevant situations. Over time, as individuals become more exposed to one type of context over another, individuals could become more sensitive to this type of context. If intrinsic and extrinsic motivation can be shown to be automatically triggered by relevant environmental features, this would further support and extend the Self-Determination Theory concerning the influence of external events on individuals' level of motivation, and the process by which intrinsic and extrinsic motivation are developed and maintained.

In the present series of studies, the automatic activation and operation of intrinsic and extrinsic motivation will be evaluated using the following criteria: We will consider intrinsic and extrinsic motivation to be in part regulated by automatic processes if their activation and the resultant effects take place unintentionally and outside individuals' current conscious awareness. To do so, participants will not be provided with any explicit instructions to act in accordance with the

motivation being activated, and no reference will be made to motivation or personality as part of the purpose of the experiments. Furthermore, in the studies presented, the dependent measures will be taken when participants will believe they are volunteering in a second experiment, presented as unrelated to the one where the motivation will have been automatically activated. Consequently, participants will remain unaware of the nature of the constructs being activated, and the relation between the two experimental tasks (Bargh, 1992).

In Study 1, we used the scramble sentence procedure developed by Srull & Wyer (1979) to automatically activate an intrinsic and an extrinsic motivation through priming of words relevant to these motivations. In addition, another group of participants was exposed to neutral words not related to intrinsic and extrinsic motivation. The unintended effects of the automatically activated motivation on subsequent task motivation, behavior, and task's perceptions were then assessed in a second experiment presented as unrelated to the first one. Our main hypothesis was that participants primed in a first experiment with an intrinsic motivation would be more intrinsically motivated toward a subsequent unrelated task than participants primed with an extrinsic motivation. Since it is a motivation that is activated with the priming manipulation and not a mood state, we expect to observe effects on participants' level of motivation toward the task. Furthermore, we expected that behavioral correlates of intrinsic motivation would also be influenced by the priming manipulation. Specifically, we hypothesized that an automatically activated intrinsic motivation would lead participants to perform better on the task than participants primed with an extrinsic motivation. Because contexts which supports one's intrinsic motivation foster cognitive flexibility (Grolnick & Ryan, 1987), we expected that an automatically activated intrinsic motivation should probably lead individuals to spontaneously make use of less rigid strategies to solve the task. In turn, this greater cognitive flexibility should help participants primed with an intrinsic motivation to perform better. In addition, we hypothesized that participants primed in the initial experiment with an intrinsic motivation would report greater interest-enjoyment toward the task and would perceive more choice while doing the task than participants primed with an extrinsic motivation. Finally, we

expected the mean levels of motivation, performance, and perceptions of participants exposed to the neutral words to fall between the means for participants in the two experimental conditions.

Study 2, was designed to replicate and extend the findings of Study 1. In Study 2, the level of experience with the experimental task used to assess the effects of the automatically activated motivation was incorporated in the design of the study as a potential chronic individual difference. As discussed previously, attitudes toward objects can become chronically accessible and then automatically activated by relevant environmental features, following repeated and consistent experience with the attitude object. We hypothesized that level of experience with a task could be indicative of individuals' chronically accessible attitudes toward the task. Consequently, in Study 2, participants were classified according to their level of experience with the experimental task. As in Study 1, we first expected that participants primed with an intrinsic motivation would be more intrinsically motivated toward the subsequent task, would perform better, would find the task more interesting, and would perceive more choice while working on the task than participants primed with an extrinsic motivation. We also expected to find an effect for participants' level of experience with the experimental task. We hypothesized that more experienced participants would be more intrinsically motivated toward the subsequent task and would perform better than non-experienced participants. We also expected experienced participants to report greater feelings of interest-enjoyment toward the task and to perceive more choice, while working on the task than non-experienced participants. Finally, for experienced participants only, we believed that because they possibly possess a chronically positive attitude toward the task, their level of task's interest would not be affected by an automatically activated extrinsic motivation. We expected this interaction because of all the variables considered, we perceive task's interest as the most closely tied to the affective component associated with the task and thus to a positive stable attitude.

Study 1

Study 1 was designed to examine our main hypothesis about the automatic activation of intrinsic and extrinsic motivation. In order to successfully automatically activate intrinsic and extrinsic motivation, these types of motivation were carefully operationalized according to their

different underlying characteristics as defined by Deci & Ryan (1985). This was done through the identification of words that captured these differences and that were reminiscent of intrinsic and extrinsic motives. Based on the procedure developed by Srull & Wyer (1979), we then used these words to either prime an intrinsic or an extrinsic motivation. As mentioned previously, in order to insure that participants would not be aware of the nature of the primes and their possible automatic effects (Bargh, 1992), we told participants that they would be involved in two unrelated experiments, one on sentence construction and the second on the completion of complex tasks. In fact, the first task was used as the priming task and the second task was used to assess the nonconscious effect of the automatically activated motivation on participants' motivation, behavior, and task's perceptions.

Our predictions were as follow. When compared to participants primed with an extrinsic motivation, participants primed with an intrinsic motivation should be more intrinsically motivated, perform better, report greater interest-enjoyment, and perceive more choice while working on the subsequent task. The means for participants in the neutral condition were expected to fall between the means of the other two groups. A behavioral measure of intrinsic motivation, which was used as a post-performance measure, was also included as a dependent variable. We expected that participants primed with an intrinsic motivation would tend to correctly identify more words during a free-choice period than participants primed with an extrinsic motivation.

Method

Participants

Participants were 72 students at the University of Ottawa. Twelve participants were removed from the experimental sample for various reasons. Six participants were removed because they did not follow the experimental instructions, and 6 more participants were removed because they expressed suspicion about the experiment, the primes, or they thought the two experiments could have been related in some way.

The final sample comprised 60 students, 20 in each experimental conditions. The sample was composed of 52 women and 8 men aged between 19 and 45 years old ($M = 24.3$). All of them

were students at the University of Ottawa, Canada. Fifty-three participants (90%) were full time students. These participants were recruited in second and third year psychology courses, and had been in university for an average of 3.2 years. All participants except one were Canadians. The majority of them (81%) were English speaking and the remaining participants were bilingual.

Priming of intrinsic and extrinsic motivation

An adapted version of the Scrambled Sentence Test (Srull & Wyer, 1979) was used as a first task to automatically activate either an intrinsic or an extrinsic motivation in participants. The task was composed of 15 items, each requiring participants to form a grammatically correct four-word sentence out of five words presented in a scrambled order. In agreement with Srull & Wyer (1979), for the intrinsic motivation condition, words related to intrinsic motivation were incorporated in 12 of the items (80% of them). The primes in the intrinsic motivation condition were: spontaneous, challenge, interested, involved, satisfied, volunteering, mastering, delighted, autonomous, absorbed, competent, and enjoying. An example of item for the intrinsic motivation condition is: "dizzy is feeling he competent". For the extrinsic motivation condition, words related to extrinsic motives were incorporated in 12 of the items (also 80% of them). The primes in the extrinsic motivation condition were: competitive, obligation, expected, evaluated, constrained, demanded, avoiding, restricted, forced, pressure, controlled, and proving. An example of item for the extrinsic motivation priming condition is: "has obligation he an armchair". In the neutral priming condition these primes were replaced by: still, apartment, carried, numbed, cold, close, moving, sending, near, early, hungry, and going. These primes were selected based on definitions of intrinsic and extrinsic motivation proposed of Deci & Ryan (1985). All the other words in each condition were neutral with respect to both types of motivation. These other words composing the sentences were chosen to allow the participants to construct two grammatically correct sentences, one including the priming word and the other not including the priming word. Moreover, the words composing the sentences were identical in the intrinsic and extrinsic motivation conditions except for the respective primes.

Experimental task

This task was composed of 3 conventional crossword puzzles taken from a crossword puzzles booklet sold in newspaper outlets. Each one of the 3 crossword puzzles was chosen in function of its neutral word content, i.e., that the description of the words and the words used in the puzzle were as neutral as possible with respect to the motivation studied. Pilot testing with 20 participants showed that these crossword puzzles were in fact judged neutral. The mean interest scores for the crossword puzzles, were 5.3, 6.0, and 6.3 on a scale ranging from (1) not at all interesting to (9) very interesting. The level of difficulty of the three crossword puzzles were also moderate with mean values ranging from 4.3 to 6.5 on a scale from (1) not at all difficult to (9) very difficult. Each puzzle was of average size and composed of approximately 60 words. All participants had to try to solve the same crossword puzzle for a period of 15 minutes. If they happened to finish the puzzle in the time given, they could try to solve another one. However, the puzzles were long enough so that participants could not solve more than two in 15 minutes.

Dependent measures

The State Motivation Scale. This scale is composed of 18 items that were originally designed to measure individuals' situational or state motivation for a specific course (Guay & Vallerand, 1997). These items were designed to represent the motivational constructs defined by Deci & Ryan in their Self-Determination Theory (1985). As suggested by Guay & Vallerand (1997), in the present study, the question asked to participants was modified so the scale could measure individuals' reasons for performing the experimental task. The original scale is composed of 6 subscales (3 items per subscales) which specifically measure individuals' level of motivation at the time they are doing the experimental task, in this case the cross-word puzzles. These subscales represent constructs that could be placed on a self-determination continuum¹. They are, from the more autonomous to the least autonomous: intrinsic motivation (IM e.g., Because it was really fun), extrinsic motivation by integrated regulation (INTEG e.g., Because experiencing new things is a part of who I am), extrinsic motivation by identified regulation (IDEN e.g., Because it was a sensible way to get meaningful experience), extrinsic motivation by introjected regulation (INTRO

e.g., Because I would have felt guilty if I didn't), extrinsic motivation by external regulation (ER e.g., Because I felt I had to), and amotivation (AMO e.g., I don't know: I had the impression I was wasting my time). The psychometric properties of this scale have been shown to be very adequate. Results of exploratory and confirmatory factor analyses, as well as construct validity with relevant antecedents and consequences consistently support the validity and the reliability of the scale (Guay & Vallerand, 1997; Vallerand, 1997).

For the purpose of the present study, only the prototype of self-determined motivation, i.e. intrinsic motivation was considered. Participants had to answer each item on a 7 point scale ranging from (1) does not correspond at all to (7) corresponds exactly. The intrinsic motivation subscale of The State Motivation Scale showed an acceptable level of internal consistency ($\alpha = .95$).

Measure of performance. During the experimental session, participants had to work on at least one cross-word puzzle for a period of 15 minutes. If participants were able to finish the puzzle, they could try to solve another puzzle in the time given. The amount of words participants were able to correctly identify in that period of time represented the performance measure on the cross-word puzzle.

Task's interest-enjoyment. Another measure included in the questionnaire assessed the individual's experience of interest-enjoyment with the experimental task (5 items; e.g., I found the task really interesting) (Pelletier & Vallerand, 1996). This measure was included in the questionnaire because results of previous research indicated the existence of relations between intrinsic motivation, interest-enjoyment and choice ratings (Harackiewicz, 1979; Ryan, Koestner, & Deci, 1991; Ryan et al., 1983). Participants had to answer each one of these items on a 9 point scale ranging from (1) does not agree at all to (9) agree completely. A composite score of this scale showed a high level of internal consistency ($\alpha = .90$).

Perception of choice. A measure of participants' perception of choice while working on the experimental task was also administered to participants (4 items; e.g., I felt that what I did in this task was really what I wanted to do) (Pelletier & Vallerand, 1996). Participants had to answer the

items on a 9 point scale ranging from (1) not at all to (9) extremely. This scale showed an acceptable level of internal consistency ($\alpha = .65$).

Post-performance measure. Following the period of 15 minutes during which participants all worked on at least the first cross-word puzzle, they were left alone for a period of 6 minutes with at least one more cross-word puzzle that they could choose to complete. The number of words that the participant correctly identified during that 6 minute free-choice period was used to assess participants' post-performance on the task.

Test of awareness. In order to verify if participants were aware that the first experiment served as a priming procedure that could have automatically affected their motivation toward the cross-word puzzle, performance, and task's perceptions, participants were subjected to a funnel debriefing once they thought the experiment was over. Following the procedure in Chartrand & Bargh (1996) participants answered questions regarding (1) whether they had done the two experiments as two unrelated tasks, and (2) whether anything they had done on the first experiment had affected what they had done on the second experiment (item recoded when analyzed). These questions were answered on a 7 point scale ranging from (1) does not agree at all to (7) agree completely. Participants also answered questions about (1) the purpose of the two experiments, and (2) whether they thought that any of the words from the Scrambled Sentence Test seemed unusual or distinctive. In addition, following the actual debriefing, they were specifically asked whether, at the time of the experiment, they suspected that a motivation had been activated.

Procedure

The procedure used was based on previous studies on the automaticity of social psychological processes (see Bargh, Chen, & Burrows, 1996; Chartrand & Bargh, 1996). Participants were recruited in class. Interested participants were then called by the experimenter in order to schedule a session for the experiment. When contacted, participants were informed that they would be participating in two experiments, one for the experimenter and the other one for a colleague. Participants were told that the purpose of the first experiment was to examine some of the processes involved in a sentence construction task. The second experiment was presented as a

study on the processes involved in the completion of complex tasks. Participants were also told that these two experiments were done at the same time only because of time constraints. To make this more plausible during the actual experimental session, two different formats of written material were used and participants had to sign two separate consent forms.

During the experimental session, participants were tested one at a time. Upon arrival, participants were greeted by the experimenter who showed them into the experimental room. In each session, participants were randomly assigned to one of three conditions, with the only restriction that an equal number of participants be present in each experimental condition: The intrinsic motivation, the extrinsic motivation, or the neutral condition. After that participants were seated at a small desk, and were then informed that during the “first” experiment they would be working on the construction of English sentences. After obtaining the written consent of participants, a folder with one of the three versions of the Scrambled Sentence Test was given to participants and the grammatical task was introduced and explained to them. This procedure ensured that the experimenter was kept unaware of participants' priming condition. After the grammatical task was explained to them, participants were presented with an example of the Scramble Sentence Test and were asked to try to construct a sentence. Then the experimenter probed participants for any questions they might have at this point about the experiment and the task to be performed. Participants were then instructed to meet the experimenter outside the room, when they would be done. The experimenter then left the room while participants completed the task alone. The average time for the completion of the Scrambled Sentence Test was about 10 minutes.

After participants had completed the Scrambled Sentence Test, the experimenter thanked them for participating in the “first” experiment, and then told them that they were ready to begin the “second” experiment. The experimenter then took a folder of a different color than the one used in the first experiment. Participants were again asked to take place at the desk. Then participants were told that in the “second” experiment an experimenter's colleague wanted to examine the completion of complex tasks such as cross-word puzzles. After obtaining the written

consent of participants, the cross-word puzzle task was introduced and explained to them.

Participants were then left alone to work on the puzzle for a period of 15 minutes.

In the experimental instructions, an indefinite time period was given to participants in order to avoid putting pressure on them by imposing a strict time limit. However, after a period of exactly 15 minutes, the experimenter returned to the experimental room, holding a pager, and told participants that they could stop working on the puzzle. Then, participants were led to believe that the experimenter had just been paged and needed to make a phone call. The experimenter then left the room for a period of 6 minutes, bringing with her the crossword puzzle all participants were required to do, and when applicable, the additional puzzle participants had started during the 15 minutes. This was done in order to avoid any desire from participants to complete the unfinished puzzle during this free-choice period (Deci, 1971). Because of the length of the puzzles, there was always at least one puzzle remaining in the folder that participants could choose to work on while waiting alone in the room. The numbers of correct words participants identified during that period of time, represented the behavioral measure of intrinsic motivation. After 6 minutes, the experimenter returned to the room, excused herself again for the delay and then asked participants to complete a questionnaire assessing attitudes and motivation toward the crossword puzzle task.

After participants had completed the questionnaire, the experimenter told participants that she wanted to take some time to discuss the two experiments with them. The awareness test was then administered and participants were probed for any kind of suspicion about the priming manipulation and the relation between the two experiments (the scrambled sentence task and the cross-word puzzles task). Following this, participants were fully debriefed and thanked.

Results and Discussion

Preliminary analysis

The data were analyzed in order to verify if they were normally distributed. The values for skewness and kurtosis for each of the variable considered were all below 1 in absolute value, and were consequently judged to be normally distributed (Tabachnick & Fidell, 1996). In addition, the

postulate of homogeneity of variance was respected for each variable considered, as revealed by non-significant Levene's tests.

Test of awareness

Descriptive statistics performed on the measure of participants' level of awareness of the nature of the primes and the possible influence of these primes on their reactions to the second task revealed that participants were not aware of the connection between the two tasks. Participants indicated that what they did in the first experiment had not affected what they did in the second experiment ($M = 6.60$), and that they had performed the two experiments as two unrelated tasks ($M = 6.67$). In addition, when asked about the purpose of the two experiments, participants mentioned goals related to the cover story of the study. Furthermore, when asked about any words in the Scramble Sentence Task that seemed unusual or distinctive, participants could not remember any words that appeared to stand out. In addition, in the actual debriefing, after being told about the nature of the priming manipulation, no participant reported any suspicion about a motivation being automatically activated.

Effects of primed motivation

For the purpose of Study 1, we conducted a multivariate analyses of variance (MANOVA) to assess the effects of the automatically activated motivation on level of intrinsic motivation toward the task, task's performance, interest-enjoyment toward the task, and perception of choice while performing the task. The multivariate test of significance for all the variables considered was reliable, $F(2, 26) = 2.44$, $p < .05$. The univariate F-tests were then interpreted for each one of the variables considered.

Intrinsic motivation toward the task. As predicted, a significant main effect of priming condition was found, $F(2, 57) = 3.33$, $p < .05$. As seen in Table 1, post-hoc analyses using Student-Newman Keuls tests with significance levels of $p \leq .05$, revealed that participants for whom an intrinsic motivation had been automatically activated reported being significantly more intrinsically motivated toward the cross-word puzzles ($M = 6.10$) than participants for whom an extrinsic motivation had been automatically activated ($M = 4.70$). The mean for participants in the neutral

condition ($M = 5.92$) fell between the means for the other two conditions without being significantly different from them.

Insert Table 1 about here

Task's performance. The main effect of the priming manipulation for task performance was also found to be reliable, $F(2, 57) = 3.43$, $p < .05$ (see Table 1). Post-hoc analyses revealed that participants primed with an intrinsic motivation found significantly more words on the cross-word puzzles ($M = 47.25$) than participants primed with an extrinsic motivation ($M = 31.95$). Again, the mean for participants in the neutral condition ($M = 39.55$) fell between the means for the other two conditions without being significantly different from them.

Psychological correlates of intrinsic motivation. The main effect of the priming manipulation for interest-enjoyment toward the cross-word puzzles was significant, $F(2, 59) = 5.44$, $p < .01$ (see Table 1). Post-hoc analyses showed that within the main effect, participants in the intrinsic motivation condition perceived the cross-word puzzles as significantly more interesting ($M = 7.15$) than participants in the extrinsic motivation condition ($M = 5.96$). In addition, participants in the extrinsic motivation condition found the task significantly less interesting ($M = 5.96$) than participants in the neutral condition ($M = 7.20$).

Results for perceived choice with priming condition as the single factor, revealed a reliable main effect, $F(2, 59) = 4.40$, $p < .05$ (see Table 1). Post-hoc analyses showed that participants for whom an intrinsic motivation had been automatically activated perceived significantly greater choice in doing the cross-word puzzles ($M = 6.90$) than participants for whom an extrinsic motivation had been automatically activated ($M = 5.78$), or participants in the neutral condition ($M = 6.09$).

Post-performance measure. We compared the proportion of participants who returned and did not return on the cross-word puzzles between the intrinsic and extrinsic conditions, using a 2 (return, non-return) x 2 (intrinsic condition, extrinsic condition) chi-square analysis. Results showed that the proportion of participants who returned on the puzzles in the intrinsic motivation

condition (45%) was significantly higher than the proportion of participants who returned on the task in the extrinsic motivation condition (25%) ($\chi^2(1, 40) = 3.60, p = .05$).

Insert Table 2 about here

The ANOVA conducted on the mean number of words correctly identified in the free-choice period revealed no main effect of priming condition, $F(2, 59) = 1.87, p = .178$. However, inspection of the means clearly show a trend in the hypothesized direction. Participants in the intrinsic motivation condition who returned on the task, tended to find more words in the free-choice period ($M = 15.22$) than participants in the neutral ($M = 9.70$) or participants in the extrinsic motivation condition ($M = 7.80$). This trend was apparent although a small number of participants in each condition actually returned on the task (9, 9, and 5, respectively).

Taken together, the above findings suggest that intrinsic and extrinsic motivation can be automatically activated through temporary priming and then influence individuals' level of intrinsic motivation toward a subsequent task, task's performance, interest-enjoyment toward the task, perception of choice while working on the task, and the rate of return/non-return on the task. These results seem to suggest that intrinsic and extrinsic motivation can be directly and spontaneously activated by the mere presence of relevant environmental features in a general sample of individuals. The fact that intrinsic and extrinsic motivation can be automatically triggered by environmental stimuli in every individual, suggests the presence of a cognitive structure sensitive to stimuli relevant to these motivation.

The fact that participants did not report any connection between the two experimental tasks strongly suggest that participants were not aware of the nature of the primes or their possible effects. The effects of the primed motivation also appeared to be unintended, since participants did not express any suspicion about the cover story, the purpose of the two experiments, and the nature of the constructs being automatically activated. Furthermore, the level of intrinsic motivation toward a subsequent task was affected by the priming manipulation, suggesting that the manipulation was

successful in automatically activating an intrinsic and an extrinsic motivation. Consequently, we can argue that the effects obtained seemed to be attributable to nonconscious automatic processes.

The present findings, then, provide support for the applicability of automaticity research and the Auto-Motive Model to intrinsic and extrinsic motivation. If replicated, these findings would help shed some light on the processes involved in the impact of external events on individuals' level of self-determination (Deci & Ryan, 1985) and the associations between intrinsic motivation and related constructs. The activation and operation of these processes would be shown to be not exclusively consciously guided, but in part regulated by automatic processes.

Study 2

In Study 2 we attempted to replicate and extend the findings of Study 1. Although Study 1 provided encouraging support for the automaticity of intrinsic and extrinsic motivation, participants' experience with the experimental task used to evaluate the nonconscious effects of the automatically activated motivation (cross-word puzzles) was not assessed. It is very likely that level of experience with the task could influence participants' motivation, behavior, and perception of the task. Participants having experience with a certain task are probably more motivated and more interested in the task than participants with little experience with the task. If this is the case, the results obtained in Study 1 could be mainly applicable to non-experienced participants and not to experienced participants. Study 2 was thus designed as a 2 (level of experience with the task: high or low) X 3 (priming condition: intrinsic, extrinsic, or neutral) between subjects experiment in order to consider this possibility.

In the present study, we used the level of experience with the task as representing an individual difference related to people's attitude and interest toward the cross-word puzzles. Because we believe that the attitude of experienced participants would have been developed from repeated experience with the cross-word puzzles, we expected it to be akin to a chronically accessible attitude (see Higgins, 1997). We thus hypothesized that more than one punctual and temporary contrasting experience would be necessary to change one's level of interest toward the task. Consequently, we expected a significant interaction between Priming and Level of experience

for interest-enjoyment toward the task. That is, the level of interest toward the task of experienced participants would not be affected by the priming manipulation whereas it would be for non-experienced participants. We believed this would be the case since interest toward the task represents the manifestation of a positive attitude, and as such is closely tied to the affective component of the task.

Method

Participants

Participants were 106 students at the University of Ottawa. Ten participants were removed from the experimental sample for various reasons. Six participants were removed because they did not follow the experimental instructions, and 4 participants were removed because they expressed suspicion about the experiment, the primes, or they thought the two experiments could have been related in some way.

The final sample comprised 96 participants, 16 in each experimental conditions. The sample was composed of 70 women and 26 men aged between 18 and 55 years old ($M = 23.8$). All of them were students at the University of Ottawa, Canada, 85 of which (89%) studied full time. These participants were recruited in second and third year psychology courses, and had been in university for an average of 2.7 years. All participants except three were Canadians. The majority of them (81%) were English speaking and the remaining participants were bilingual.

Measures

All the measures used and described in the method section of Study 1 were again used in Study 2, plus one additional measure assessing participants' level of experience with cross-word puzzles. Participants had to respond to the question "How frequently do you generally try to solve cross-word puzzles" on a 7 point Likert scale ranging from (1) Never, through (4) Sometimes, to (7) Frequently.

Procedure

The same procedure described in Study 1 was again followed in Study 2. The major difference with Study 1 was that in Study 2 participants were classified either as being experienced

or non-experienced with cross-word puzzles. This classification was made on the basis of a question asked during the experiment. On the questionnaire administered following the free-choice period, participants had to report how often they tried to solve cross-word puzzles. Participants who indicated 3 or less (less than sometimes) were considered as having little experience with cross-word puzzles, whereas participants who indicated 4 or more (at least sometimes) were considered as being experienced with cross-word puzzles.

Results and Discussion

Preliminary analyses

The data were analyzed in order to verify if they were normally distributed. The values for skewness and kurtosis for each of the variable considered were all below 1 in absolute value, and were consequently judged to be normally distributed (Tabachnick & Fidell, 1996). In addition, the postulate of homogeneity of variance was respected for each variable considered, as revealed by non-significant Levene's tests.

Because participants' self-report of their own level of experience on an item included in the questionnaire was subsequently used to classify them in terms of their level of experience with cross-word puzzles, we recognize that too many participants scoring in the middle of the scale could attenuate the effects. However, the distribution of participants' reported experience with cross-word puzzles revealed that most individuals scored a 2 on this measure. Only 14 participants chose the middle of the scale (4) which is minimal in comparison to the total sample of participants. In any case, this situation would only attenuate the effects obtained and not invalidate them.

Test of awareness

Descriptive statistics performed on the measure of participants' level of awareness of the nature of the primes and the possible influence of these primes on their reactions to the second task revealed that participants were not aware of the connection between the two tasks. Participants indicated that what they did in the first experiment had not affected what they did in the second experiment ($M = 6.50$), and that they had performed the two experiments as two unrelated tasks (M

= 6.53). In addition, when asked about the purpose of the two experiments, participants mentioned goals related to the cover story of the study. Furthermore, when asked about any words in the Scramble Sentence Task that seemed unusual or distinctive, participants could not remember any words that seemed to stand out. In addition, in the actual debriefing, after being told about the nature of the priming manipulation, no participants expressed any suspicion about a motivation being automatically activated.

Effects of primed motivation and level of experience with the task

We conducted 2 (level of experience) X 3 (priming condition) analyses of variances (ANOVAs) to assess the effects of these variables on level of intrinsic motivation toward the task, task's performance, interest-enjoyment toward the task, perception of choice while performing the task and task's post-performance. The means for these variables are presented in Table 3.

Insert Table 3 about here

Intrinsic motivation toward the task. A significant main effect of priming condition was found, $F(2, 90) = 3.10, p < .05$. In addition, a significant main effect of level of experience was also found, $F(1,90) = 10.15, p < .01$ indicating that experienced participants reported being more intrinsically motivated toward the cross-word puzzle ($M = 6.85$) than non-experienced participants ($M = 5.67$). These results are consistent with the existence, for experienced participants, of a chronically accessible positive attitude toward cross-word puzzles, which would be automatically activated in the presence of relevant environmental inputs. The Level of experience X Priming interaction was nonsignificant, $F(1,90) = .94, p = .40$. Post-hoc analyses using Student-Newman Keuls tests with significance levels of $p \leq .05$, revealed that participants for whom an intrinsic motivation had been automatically activated reported being significantly more intrinsically motivated toward the cross-word puzzles ($M = 6.81$) than participants for whom an extrinsic motivation had been automatically activated ($M = 5.72$). The mean for participants in the neutral condition ($M = 6.21$) fell between the means for the other two conditions. Once again, these results indicate that it

was possible to automatically activate types of motivation and not simply some other mood related constructs.

Task's performance. We then conducted a 2 X 3 ANOVA on the mean performance of participants on the cross-word puzzles. There was a reliable main effect of the priming manipulation, $F(2, 90) = 4.25, p < .025$. A reliable main effect of level of experience was also found, $F(1,90) = 32.33, p < .01$ revealing that experienced participants performed significantly better ($M = 58.45$) than non-experienced participants ($M = 29.56$). The Level of experience X Priming interaction did not reach traditional level of significance, $F(1,90) = 2.06, p = .13$. Post-hoc analyses revealed that participants primed with an intrinsic motivation correctly identified significantly more words on the cross-word puzzles ($M = 54.47$) than participants in the neutral condition ($M = 38.97$), or participants primed with an extrinsic motivation ($M = 37.94$). Although the Level of experience X Priming interaction did not reach traditional level of significance, one-way analysis of variance conducted separately for experienced and non-experienced participants revealed that the priming manipulation significantly affected only the performance of experienced participants. Participants exposed to primes reflecting intrinsic motivation found significantly more words ($M = 75.94$) than experienced participants exposed to neutral primes ($M = 51.25$), or experienced participants exposed to primes reflecting extrinsic motivation ($M = 47.47$). These effects were not found for non-experienced participants. One possible explanation for this finding is that non-experienced participants probably don't possess the strategies and skills needed to improve their performance instantly, since they don't often work on their own on the task. However, our results seem to suggest that the automatically activated intrinsic motivation probably helped experienced participants to find new and creative strategies to solve the puzzles that lead them to better their performance. It thus appears that temporary primed stimuli will affect performance on a task, only when individuals already possess the necessary skills available.

Psychological correlates of intrinsic motivation. Results of the 2 X 3 ANOVA on the mean ratings of interest-enjoyment toward the cross-word puzzles revealed a significant main effect of priming condition, $F(2,90) = 5.00, p < .01$. Also, a reliable main effect of level of experience was

found, $F(1,90) = 22.50$, $p < .01$ indicating that experienced participants reported being significantly more interested in the cross-word puzzles ($M = 7.83$) than non-experienced participants ($M = 6.71$). Once again, these results support the existence, for experienced participants, of a chronically accessible positive attitude toward the puzzles. As predicted, the Level of experience X Priming interaction was also significant, $F(1,90) = 3.06$, $p = .05$. Post-hoc analyses showed that within the main effect, participants in the intrinsic motivation condition perceived the cross-word puzzles as significantly more interesting ($M = 7.74$) than participants in the extrinsic motivation condition ($M = 6.84$). The mean for participants in the neutral condition ($M = 7.19$) fell between the means for the other two conditions. Following the significant interaction, one-way ANOVAs conducted separately for experienced and non-experienced participants revealed that the priming manipulation only affected the level of interest of non-experienced participants. Non-experienced participants for whom an intrinsic motivation was automatically activated reported significantly greater interest toward the cross-word puzzles ($M = 7.56$) than non-experienced participants exposed to neutral primes ($M = 6.56$), or non-experienced participants for whom an extrinsic motivation was automatically activated ($M = 6.01$). These effects were not found for experienced participants. These results seem to suggest that the hypothesized chronically accessible positive attitude of experienced participants made them resistant to the automatically activated motivation.

Results for perceived choice revealed a reliable main effect of priming condition, $F(2,90) = 10.39$, $p < .01$. A significant main effect for level of experience was also found, $F(1,90) = 10.06$, $p < .01$ revealing that experienced participants reported greater perceived choice while working on the cross-word puzzles ($M = 7.32$) than non-experienced participants ($M = 6.58$). The Level of experience X Priming interaction was not reliable, $F(1,90) = .44$, $p = .65$. Within the main effect, post-hoc analyses showed that participants for whom an intrinsic motivation had been automatically activated perceived more choice while working on the cross-word puzzles ($M = 7.69$) than participants in the neutral condition ($M = 6.68$), or participants for whom an extrinsic motivation had been automatically activated ($M = 6.46$).

Post-performance measure. We first compared the proportion of participants who returned and did not return on the cross-word puzzles between the intrinsic and extrinsic conditions using a 2 (return, non-return) x 2 (intrinsic condition, extrinsic condition) chi-square statistic. Results showed that the proportion of participants who returned on the puzzles in the intrinsic motivation condition (38%) was significantly greater than the proportion of participants who returned on the task in the extrinsic motivation condition (31%) ($\chi^2(1, 64) = 6.25, p < .05$) (see Table 4a). We then compared the proportion of experienced participants who returned on the cross-word puzzles to the proportion of non-experienced participants who returned on the task using a 2 (return, non-return) x 2 (high experience, low experience) chi-square statistic. Results showed that the proportion of experienced participants who returned on the puzzles (66%) was significantly higher than the proportion of non-experienced participants who returned on the task (50%) ($\chi^2(1, 96) = 7.04, p < .01$) (see Table 4b).

The 2 X 3 ANOVA conducted on the mean number of words correctly identified in the free-choice period revealed no main effect of priming condition, $F(2,90) = .72, p = .50$ (see Table 5). However, a reliable main effect for level of experience was found, $F(1,90) = 6.62, p < .025$. Experienced participants who returned on the task found significantly more words during the free-choice period ($M = 14.05$) than non-experienced participants ($M = 7.44$).

Insert Tables 4a, 4b, and 5 about here

Taken together, the findings of Study 2 replicated the findings of Study 1, further supporting the automaticity of intrinsic and extrinsic motivation. Again, our results showed that relevant environmental features directly and spontaneously activated intrinsic and extrinsic motivation. The automatically activated motivation subsequently influenced the level of intrinsic motivation toward a second unrelated task, task's performance, interest-enjoyment toward the task, perceived choice while working on the task, and the rate of return/non-return on the task. Once again, the fact that the level of intrinsic motivation toward a subsequent task was significantly

affected by the priming manipulation, further supports the hypothesis that the priming manipulation automatically activated an intrinsic or an extrinsic motivation. Also, as in Study 1, participants did not report any connection between the two experimental tasks or express any suspicion about the cover story, the purpose of the two experiments, or the nature of the constructs being activated. This further suggests that the activation of the motivation and the subsequent effects observed took place without individuals' conscious awareness or guidance. Consequently, we are confident that the effects obtained were due to automatic processes.

The findings of Study 2 also extended the results of Study 1. The level of experience with the task was found to affect intrinsic motivation toward the task, task's performance, interest-enjoyment toward the task, and perceive choice in a way similar to the priming manipulation. However, we found that the priming manipulation did not affect the level of interest toward the task of experienced participants. We believe that this interaction was observed probably because experienced participants acquired through repeated experience with the task, a stable positive attitude toward cross-word puzzles. This stable attitude appears to have made experienced individuals less susceptible to factors favoring a change in the level of interest toward the task. It thus seems plausible that more than one punctual contrasting experience would be necessary to change the well-developed attitude of experienced participants.

General discussion

According to the Auto-Motive Model (Bargh, 1990), goals and motivation that are repeatedly chosen in particular situations, would over time become active automatically in the presence of relevant environmental features, and then operate without any conscious choice or intention. It follows that we should be able to automatically activate goals or motivation by temporary priming constructs relevant to the motivation to be activated, thus reproducing the activation of goals by environmental features. The propositions of this model have already been tested with some goals or motivation (see Bargh, 1997 for a review). The purpose of the present two studies was to extend the Auto-Motive Model to other types of motivation, namely intrinsic and extrinsic motivation (Deci & Ryan, 1985).

In two studies, the activation of intrinsic and extrinsic motivation in one situation affected the level of intrinsic motivation toward a subsequent task, task's performance, level of interest-enjoyment toward the task, and perceived choice while working on the task. Individuals for which an intrinsic motivation was activated in the first task became more intrinsically motivated, performed better, reported more interest-enjoyment, and greater perception of choice while working on a second unrelated task, than individuals for which an extrinsic motivation was initially activated. In addition, post-performance on the task was found to be marginally affected by the automatic activation of motivation (Study 1). Even though the effect for performance during the free-choice period did not reach traditional levels of significance, the pattern of the means was nonetheless in the expected direction. Furthermore, the proportion of participants who chose to return on the task during the free-choice period was also influenced by the priming manipulation (Study 1 and Study 2), and by participants' level of experience with the task (Study 2). Participants exposed to the intrinsic primes chose to return on the task at a significantly higher rate than participants exposed to extrinsic primes. In addition, a greater proportion of experienced participants than non-experienced participants chose to return on the cross-word puzzles. It is important to emphasize that all these effects were obtained while participants were not aware of the motivation being activated in the initial task, and the relation between the two tasks performed. Consequently, it is possible to attribute the effects obtained to automatic processes that operated outside individuals' conscious awareness and without any need for conscious guidance or intention (Bargh, 1992).

In Study 2, we extended the results of Study 1 by considering the level of experience as possibly underlying a chronically accessible attitude (see Bargh et al., 1992; Higgins, 1989, 1997; Higgins et al., 1982) toward cross-word puzzles. We believed that once told they would work on the cross-word puzzles, experienced participants' attitude would determine their motivation, behavior, and perceptions of the cross-word puzzles. Our results showed that experienced participants were in fact more intrinsically motivated toward the cross-word puzzles, performed better on the task, found the task more interesting, and perceived they had more choice while doing the cross-word puzzles, than non-experienced participants. Although a main effect for level of

experience was found, the effect of the priming condition was also generally significant across levels of task's experience. Globally, these results suggest that the effects of participants' level of experience with the task and priming condition were mostly additive and that every individuals, even those with a high level of experience with a certain task could be, in general, susceptible to the influence of automatically activated motivation. Thus, it would seem that every individual possesses a mental structure capable of subconscious processing of stimuli relevant to intrinsic and extrinsic motivation. The only significant interaction between level of experience and priming condition was found for level of interest-enjoyment toward the cross-word puzzles. We believe this was the case since interest toward a task represent the manifestation of a positive attitude, and is closely tied to the affective component of the task. This finding seems to be consistent with the possibility that the attitude of experienced participants toward cross-word puzzles could have been a stable attitude developed from repeated experience with the task and akin to a chronically accessible attitude (see Higgins, 1997). In addition, one interesting finding of Study 2 related to participants' level of experience, was that the priming manipulation tended to affect only the performance of experienced participants. It thus appears that for a temporary primed motivation to affect performance on a task, individuals need to already have developed the necessary abilities and possess the necessary skills to perform the task.

In sum, our results suggest that the motivation automatically activated in a certain context affected individuals' motivation, behavior, and perception toward a subsequent task. However, one could ask whether the effects obtained in Study 1 and Study 2 were really due to automatically activated motivation, or if they simply resulted from an alteration of participants' mood state. Although conceivable, we believe that this is not the case. The fact that individuals' level of intrinsic motivation toward a subsequent unrelated task was affected, in addition to task's perception and behavior, suggest that a motivation was initially activated. Moreover, the effects obtained through automatic activation parallel very closely the results of previous studies on the consequences of self-determined motivation (see Vallerand, 1997 for a review). For example, self-determined students have been found to demonstrate more in depth conceptual understanding (Deci, Vallerand, Pelletier,

& Ryan, 1991), to perform better on academic tasks (Deci & al., 1982), and to persist longer in school (Vallerand & Bissonnette, 1992; Vallerand et al., 1997). Similarly, individuals who are self-determined toward the environment have been found to do more of a variety of environmentally-conscious actions (Green-Demers, Pelletier, & Ménard, 1997; Séguin, Pelletier, & Hunsley, 1998, in press). In addition, intrinsic and extrinsic motives for behaving have been shown to be associated with constructs such as interest-enjoyment and perception of choice, which are manifest of one's underlying level of self-determination toward an activity (Enzle & Ross, 1978; Harackiewicz, 1979; Ryan, Mims, & Koestner, 1983; Ryan, Koestner, & Deci, 1991).

Circumstances under which automatic processing can occur

Although the results of Study 1 and Study 2 suggest that intrinsic and extrinsic motivation can be directly triggered by environmental features, outside individuals awareness, these motivations should develop and operate automatically only when a specific set of circumstances are present. In other circumstances, conscious processes should guide people's behavior. As suggested by Bargh, like driving, automatic processes are, in the beginning consciously guided processes. For example, first time drivers need to consciously monitor every aspect of driving, from turning the wheel, changing lane, or passing another car. Over time as one become experienced, all these frequently and consistently performed components of driving become automatically guided and subsumed under the act of driving. One does not need to think so much about how to drive to work in order to successfully get to work. According to the Auto-Motive Model (Bargh, 1990), goals and motivation can function the same way. A goal enacted for the first time will be consciously guided and chosen. If this goal is frequently enacted in the same manner in similar contexts, it will become automatically associated in one's mind with features of the particular situation and automatically activated and guided by the mere presence of these situational features. Automatic processes are developed in order to adapt to situations where a consistent pattern of behavior has been manifested, thus allowing the resources that would be needed to consciously guide these actions to be used for other novel behaviors requiring conscious guidance (Atkinson & Shiffrin, 1968; Bargh & Barndollar, 1996).

In the present studies, it is very likely that the intrinsic and extrinsic motivation that were primed were already available in participants' cognitive structure (see Higgins, 1997). In fact, it is unlikely that you can instill in somebody a motivation that one does not already have at some level, and thus make somebody do something for which one has no motive base (Cartwright, 1959). In the present studies, the effects of the primed motivation were short lived, and it is very unlikely that participants primed with an intrinsic motivation suddenly became more interested in academia for example, if this was something they did not previously like.

Implications for Self-Determination Theory and directions for future research

This conception of automatically activated intrinsic and extrinsic motivation, can seem, at first, difficult to integrate with Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991). How can the existence of a basic need to master one's environment, to become self-determined, and the initiator of one's actions and behaviors be reconciled with the idea that environmental features can directly activate intrinsic and extrinsic motives for behaving? How can individuals be autonomous in their actions and at the same time be susceptible to the direct control of their behavior and perceptions by environmental features? Although, according to Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991), innate psychological needs for competence and autonomy underlie and contribute to individuals' intrinsic motivation, it is also believed that external events can undermine or foster individuals' feeling of self-determination. More importantly, an unconscious account of this process does not appear inconsistent with the Self-Determination Theory. It is reasonable to think that individuals cannot continuously remain aware of everything that could influence their perceptions and behaviors. For example, it is quite conceivable that individuals might be aware of a controlling context or feel pressured in certain situations, although they might not necessarily be conscious of the particular mechanisms operating or the undermining effect on their level of intrinsic motivation. Similarly, individuals exposed to an autonomy supportive context could consciously attend to relevant information and then choose to interact in accordance with other individuals without necessarily being aware of how this can affect their level of self-determination.

However, a nonconscious account of these motivational processes by which external events affect individuals' level of self-determination had not yet been empirically examined.

We believe that the present findings can help shed some light on the processes involved in motivational change and maintenance. Instead of being all the time consciously aware of the source and the process of motivational change, individuals would, in some circumstances, be automatically influenced by environmental features without being aware of the source of this influence. Consequently they would spontaneously attribute their subsequent motivation, behavior, and attitudes to proximal and plausible causes to which they are aware, either to themselves or to the situation. The resilience of intrinsically motivated children to controlling external factors found in the Boggiano and colleagues studies (Boggiano & Katz, 1991; Boggiano, et al., 1988), could represent an example of automatic processes. In the Boggiano and colleagues experiments, intrinsically motivated children exposed to a controlling context were found to remain intrinsically motivated toward a certain task. Based on the findings of the present studies, we propose that intrinsically motivated children would be those with a chronically accessible intrinsic motivation toward school, that would have been developed over time from repeated experience with autonomy supportive academic contexts. Once chronically accessible, this motivation toward school would be automatically activated in the mere presence of relevant academic situations, without children's conscious guidance or involvement. Since automatic processes have the characteristic to be less effortful than controlled processes, an automatically activated intrinsic motivation would contribute, without expending a great amount of cognitive resources, to maintain children's level of self-determination toward school in stressful contexts, such as a controlling academic context. As suggested by Atkinson & Shiffrin (1968) and Bargh & Barndollar (1996), the process of motivational maintenance would thus be more efficient when regulated by automatic processes.

Consequently, an important question that remains for further research is the extent to which an automatic motivation in individuals could make them resistant to the influence of contextual factors that could change their initial level of motivation. The results of Study 2 provides us with indirect evidence of the possible resilience of individuals with chronically accessible attitudes.

Experienced participants in Study 2 were able to resist to some extent the influence of the automatically activated extrinsic motivation and remain highly interested in the subsequent task, probably because they had developed a positive and stable attitude toward the task. Similarly, individuals with a chronically accessible motivation should also be able to resist the influence of contextual cues that could affect their motivation and perceptions of a certain activity. For example, future research could examine to what extent the motivation of individuals with an automatic intrinsic motivation would be affected by the provision of a reward for doing a particular activity, or by a controlling context in general. Along the same lines, it would also be useful to investigate how individuals with a chronically accessible motivation spontaneously approach a new activity, and to identify the contextual stimuli to which they automatically attend to in order to maintain their initial level of motivation.

Another important question for future studies is the extent to which automatic processes can be controlled. One fundamental characteristic of automatic processes is that they require less cognitive resources than conscious processes to operate. Consequently, automatic processes become activated when individuals are not aware of the possible influence of a certain context, when motivation to exert control over the contextual influence is low, or when individuals do not have enough attentional capacity to engage in a control effort (Bargh, 1989; Bargh & Chartrand, 1996; Wegner, 1994). Further research could examine how making individuals aware of possible unwanted contextual influences, could contribute to override the automatic activation of a motivation and lead individuals to consciously regulate their perceptions and behavior.

In sum, the present studies represent a first demonstration of the automaticity of intrinsic and extrinsic motivation, and thus the limits of these effects remain to be established. However, an important theoretical implication can be derived from the present findings. Motivations to act including intrinsic and extrinsic motivation appear to be like any other social psychological phenomena, such as impression formation or stereotypes. They can be automatically activated by the presence of relevant social situations, in the absence of conscious involvement or intervention.

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Author Note

This paper was prepared while the first author was supported by a doctoral scholarship from the Social Sciences and Humanities Research Council of Canada (SSHRC), and the second author was supported by a grant from the Social Sciences and Humanities Research Council of Canada (SSHRC).

Correspondence concerning this article should be addressed to Chantal Séguin-Levesque, University of Ottawa, School of Psychology, 145 Jean-Jacques Lussier, Ottawa, Ontario, K1N 6N5.

Footnotes

¹Extrinsic motivation by introjected regulation refers to behaviors that are performed because of internal constraints, such as guilt or shame. Extrinsic motivation by identified regulation refers to behaviors that have been internalized to the point of being valued by the individual who performs them, while extrinsic motivation by integrated regulation refers to behaviors that have become part of an individual's self-concept. In addition to intrinsic and extrinsic motivation, amotivation is another form of motivation which represents behaviors that are performed without a sense of purpose for doing the activity.

Table 1

Mean ratings for intrinsic motivation, task's performance, interest-enjoyment, and perceived choice as a function of priming condition in Study 1

	Priming condition		
	Intrinsic motivation condition	Neutral condition	Extrinsic motivation condition
Intrinsic motivation	6.10 _a	5.92 _{ab}	4.70 _b
Performance	47.25 _a	39.55 _{ab}	31.95 _b
Interest-enjoyment	7.15 _a	7.20 _a	5.96 _b
Perceived choice	6.90 _a	6.09 _b	5.78 _b

Note. The means for performance represent the number of words correctly identified. Means in the same row with different subscripts are different at the $p < .05$ level by the Student-Newman Keuls test.

Table 2

Number of participants who returned and did not return on the task in Study 1 in function of intrinsic and extrinsic motivation conditions

	Participants who returned	Participants who did not return	<u>N</u>
For intrinsic motivation condition	9	11	20
For extrinsic motivation condition	5	15	20

Table 3

Mean ratings for intrinsic motivation, task's performance, interest-enjoyment, and perceived choice as a function of priming condition and level of experience in Study 2

	Priming condition					
	Intrinsic motivation condition		Neutral condition		Extrinsic motivation condition	
	low experience	high experience	low experience	high experience	low experience	high experience
Intrinsic motivation	6.58	7.04	5.46	6.96	4.95	6.53
Performance	33.00	75.94	26.69	51.20	29.00	47.47
Interest-enjoyment	7.56	7.91	6.56	7.83	6.01	7.73
Perceived choice	7.47	7.91	6.26	7.09	6.00	6.95

Note. Means for performance represent the number of words correctly identified.

Table 4a

Number of participants who returned and did not return on the task in Study 2 in function of intrinsic and extrinsic motivation conditions

	Participants who returned	Participants who did not return	<u>N</u>
For intrinsic motivation condition	12	20	32
For extrinsic motivation condition	10	22	32

Table 4b

Number of participants who returned and did not return on the task in Study 2 in function of level of experience with the task

	Participants who returned	Participants who did not return	<u>N</u>
For experienced participants	19	29	48
For non-experienced participants	16	32	48

Table 5

Mean ratings for performance on the cross-word puzzles in the free-choice period in Study 2

Level of experience with the task	Priming condition		
	Intrinsic motivation condition	Neutral condition	Extrinsic motivation condition
low	8.20	8.12	4.33
high	17.29	11.40	12.71

Note. The means represent the number of words correctly identified.

Automaticity of motivational orientations: The interplay of chronically accessible
and temporary primed intrinsic and extrinsic motivation

Chantal Séguin-Levesque & Luc G. Pelletier

University of Ottawa

June 22, 1999
Chantal Séguin-Levesque
School of Psychology
University of Ottawa
145 Jean-Jacques Lussier
K1L 6K2
e-mail: s642101@aix1.uottawa.ca

Abstract

Two studies were conducted in order to examine the interplay of chronically accessible and temporary primed intrinsic and extrinsic motivation. In Study 1, a measure designed to assess individuals' chronically accessible academic motivational orientations was developed. In Study 2, the hypothesis about the motivational resiliency of intrinsic and extrinsic chronics to nonconsciously primed motivation was specifically tested. Results showed that the level of motivation, perceptions, and behavior of individuals without a chronically accessible motivational orientation were affected by a temporary primed motivation. In contrast, intrinsic and extrinsic chronics spontaneously resisted the influence of a primed competing motivation. All these effects took place without individuals' conscious guidance or awareness. The susceptibility of nonchronics to the nonconsciously primed motivation in combination with the absence of susceptibility of chronics supported the existence of a motivational resilience regulated by automatic processes.

Automaticity of motivational orientations: The interplay of chronically accessible and temporary primed intrinsic and extrinsic motivation

Why do some people approach a novel activity with certain preconceived perceptions of the task to be done and expectations about their future enjoyment of the task? Why do some people remain highly motivated toward an activity in circumstances that would lead other people to abandon the activity? From a motivational perspective, one would respond that people possess a certain motivational orientation that leads them to repeatedly make choices consistent with their orientation and approach in certain ways even new situations. According to Self-Determination Theory (Deci & Ryan, 1985; 1987; 1991), intrinsic motivation energizes a wide variety of behaviors for which the consequence that is sought is the fulfillment of the innate psychological needs of competence and autonomy. Intrinsic motivation represents the prototype of self-determined reasons for behaving and the natural manifestation of one's innate tendency to discover novel things and to master the environment in the absence of external rewards or contingencies (Deci & Ryan, 1985; 1991). In contrast, extrinsic motivation refers to behaviors that are performed for instrumental reasons. These reasons can range from the attainment of a desired outcome, to the avoidance of negative feelings, or to the achievement of a valued goal. In sum, although extrinsically motivated behaviors can be performed for a variety of reasons, they are dependent on the presence of external incentives to be maintained. Individuals who are extrinsically motivated derive pleasure and satisfaction in the attainment of a certain outcome and not in the process of accomplishing something or learning new skills.

According to Self-Determination Theory, intrinsic motivation should be naturally maintained in contexts that are perceived as autonomy supportive. For example positive competence feedback has been found to foster individuals' intrinsic motivation (Boggiano & Barrett, 1985; Harackiewicz, Manderlink, & Sansone, 1992; Swann & Pittman, 1977; Zucherman, Porac, Lathin, Smith, & Deci, 1978). In contrast, intrinsic motivation has been found to be impaired in contexts that were perceived as controlling (Amabile, DeJong, & Lepper; Benware & Deci, 1984; Deci, 1971; Harackiewicz, Manderlink, & Sansone, 1984; Lepper, Greene, & Nisbett, 1973). These

same controlling contexts were found to enhance individuals' level of extrinsic motivation.

Consequently, the nature of the interpersonal situations to which individuals are consistently exposed should foster in them a particular motivational orientation. This motivational orientation should subsequently be consciously adopted in various contexts. For example, parents who would be consistently autonomy supportive in relation to school work should foster, in their children, an intrinsic motivational orientation toward school, which should subsequently be willfully adopted in relevant situations. Conversely, children whose parents are consistently controlling toward academia should develop an extrinsic motivational orientation toward school which would then be adopted in relevant situations.

The question of how people maintain a certain level of motivation in circumstances where one feels pressured to behave have been somewhat more of a challenge for Self-Determination Theory (Deci & Ryan, 1985; 1987; 1991). Despite the fact that numerous studies have repeatedly found that external constraints can undermine individuals' intrinsic motivation (Deci, 1971; Deci & Ryan, 1985, 1987, for reviews; Harackiewicz, 1979; Lepper et al., 1973; Ross, 1975; Ryan, Mims, & Koestner, 1983; Vallerand, 1997 for a review), some studies did not find this undermining effect of intrinsic motivation in controlling contexts. For example, Boggiano, Main & Katz (1988) found that intrinsically motivated children exposed to controlling cues, such as words like "must" or "should", did not manifest significant decreases in their mastery strivings. Along the same lines, Boggiano & Katz (1991) found that students with an intrinsic motivational orientation who were given failure feedback following their performance on a spatial ability task, did not show motivational impairment on a subsequent task. In fact, these children manifested an increased perseverance to solve more puzzles. To explain these findings, Boggiano & colleagues (Boggiano, et al., 1988; Boggiano & Katz, 1991) proposed that children with an intrinsic motivational orientation had consciously used various strategies that helped them selectively maintain their attention on the most interesting aspects of the task. These chosen strategies, subsequently allowed them to resist the influence of a controlling context. However, we propose that because a certain degree of conscious effort and monitoring of one's environment and behavior would have to be

continuously exerted for individuals to remain intrinsically motivated, these strategies would likely be difficult to maintain especially under pressuring conditions. Nonetheless, it is precisely in these demanding conditions that resistance to controlling cues have been observed in intrinsically motivated children.

In response to these questions and Boggiano and colleagues' findings (Boggiano, et al., 1988; Boggiano & Katz, 1991), a cognitive perspective could offer a somewhat different answer. The motivational resistance to external events found in situations commonly associated with motivational change, could be accounted for, in part, by automatic processes that would regulate individuals' motivational orientation. By automatic, it is meant that either the initiation of these processes, their operation, or both would occur outside individuals' conscious guidance or choice.

In recent years, a lot of research has been conducted on the automaticity of various social psychological processes. Automatic processes that were once thought to be irrational behavioral responses are now more widely conceived as routinized forms of conscious processing that evolved from long term experience (Bargh, 1990, 1996, 1997; Bargh & Barndollar, 1996; Bargh, Lombardi, & Higgins, 1988; Higgins, 1989, 1996; Higgins, Bargh, & Lombardi, 1985). According to Bargh's (1990) Auto-Motive Model, spontaneously made categorizations, interpretations, or evaluations are those that were at first consciously regulated but that gradually became chronically accessible, through frequent associations with the same set of environmental features. Once a construct, such as a trait or an attitude has become chronically accessible, it can be automatically activated by the mere presence of relevant environmental stimuli and then operate, without the need of conscious guidance or intervention (see Bargh, 1996, 1997, for reviews, Bargh, Chaiken, Gollwitzer, & Pratto, 1992; Bargh, Chaiken, Raymond, & Hymes, 1996; Bargh, Litt, Pratto, & Spielman, 1989; Chaiken & Bargh, 1993; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). This transfer from conscious to nonconscious sources of regulation is thus thought to be highly adaptive by contributing to free up cognitive resources needed to learn or novel tasks (Atkinson & Shiffrin, 1968; Bargh, 1989, 1996, 1997; Searle, 1992; Shiffrin & Dumais, 1981).

However, traits or attitudes are not the only constructs that could be in part regulated by automatic processes. According to the Auto-Motive Model (Bargh, 1990), goals and motivations could also be regulated by nonconscious automatic processes. In fact, goals and motivations are thought to be like any other constructs, such as stereotypes, schema, and attitudes, in that they can be represented in memory. Consequently, it is reasonable to propose that given the same conditions that lead to the development of automaticity in other constructs, goals and motivations could also become automatically activated by relevant environmental stimuli. Results of recent studies supported these hypotheses (Chaiken, Giner-Sorolla, & Chen, 1996; Cialdini, 1994). Researchers were able to identify individuals with chronically accessible impression-management and consistency goals that were activated nonconsciously in the presence of relevant triggering stimuli in the environment. These chronically accessible motivations then automatically influenced individuals' perceptions of another unrelated task.

The automatic processes hypothesized to underlie chronically accessible traits, attitudes or motivational orientations, have been successfully reproduced through temporary nonconscious activation or priming. In one particular study (Bargh, Bond, Lombardi, & Tota, 1986), the same effects were obtained whether through chronic or temporary use of a construct, thus demonstrating that the same functional mechanism underlie chronic and temporary forms of construct accessibility. Typically, during a short period of time, a particular construct is made temporarily more accessible to be spontaneously used by individuals to perceive subsequent information (see Bargh, 1997, for a review; Bargh, Gollwitzer, & Barndollar, 1996; Bargh, Gollwitzer, Lee-Chai, & Barndollar, 1997; Bargh & Pietromonaco, 1982; Chartrand & Bargh, 1996; Higgins, Rholes, & Jones, 1977; Moskowitz & Roman, 1992; Newman & Uleman, 1989; Uleman, Newman, & Moskowitz, 1996; Srull & Wyer, 1979). In one of these studies (Chartrand & Bargh, 1996), the scrambled sentence procedure (Srull & Wyer, 1979), was used to automatically activate either an impression goal with words such as "opinion, personality, and evaluate", or a memorization goal with words such as "absorb, retain, and remember". These nonconsciously primed goals subsequently affected individuals' attitudes and perceptions of another task.

Thus, goals and motivation, like any other constructs, appear to be present in individuals' cognitive structure, and if consistently associated with the same set of environmental features, they will become automatically activated by the mere presence of relevant contextual stimuli. Although not proposed by Deci & Ryan (1985, 1987, 1991), the existence of automatic motivational processes is quite consistent with Self-Determination Theory. Over time, given repeated exposure to autonomy supportive contexts, individuals would come to experience greater intrinsic motivation and associate this motivation with the particular situation. It is conceivable that individuals could subsequently allow their intrinsic motivational orientation to be activated in the presence of relevant situations without necessarily be aware of the underlying processes at work. Recently, Séguin-Levesque & Pelletier (1999) were able to demonstrate for the first time, that intrinsic and extrinsic motivational orientations (Deci & Ryan, 1985; 1987; 1991) could in fact be in part regulated by nonconscious automatic processes. In two studies, these authors were able to automatically activate either an intrinsic or an extrinsic motivational orientation with the use of prime words relevant to these types of motivations (Deci & Ryan, 1985, 1987, 1991). Once again, based on the procedure proposed by Srull & Wyer (1979), participants were primed with words related to either an intrinsic motivational orientation or an extrinsic motivational orientation. Results showed that when subsequently engaged in an unrelated task, participants primed with an intrinsic motivation were more intrinsically motivated to work on the task, performed better and perceived the task more positively than participants primed with an extrinsic motivation. Since it was possible to temporary prime these types of motivation, this suggest that these motivation could be developed in chronic form in some individuals and be regulated by automatic processes. Previous studies on the automaticity of various social psychological processes (Bargh, 1990) and results of our own study (Séguin-Levesque & Pelletier, 1999) indirectly support the possible automatic mechanism underlying the motivational resistance observed in situations commonly associated with motivational change. The way in which motivational orientations made more accessible from dispositional and situational sources influence one another remains to be empirically examined.

However, empirical evidences already exist on the interaction of chronic and temporary sources of accessibility for various trait-related constructs.

Interplay of chronic and temporary forms of construct accessibility

In order to address the issue of motivational resilience, it is crucial to ask how dispositional and situational sources of construct accessibility might influence one another when these two sources of accessibility are opposite in nature, but both relevant for the interpretation of a given situation. In the first study examining the interaction between chronic and temporary forms of construct accessibility, Higgins and colleagues (1985) presented participants with positive traits (e.g., adventurous) or negative traits (e.g., reckless). For half of the participants, the positive traits appeared more frequently, thus reproducing a chronically accessible construct, and a negative trait was presented last, thus most recently primed. For the other participants, the negative traits were presented more frequently but a positive trait was primed most recently. After a delay of either 15s or 120s, participants were asked to give their impression of a target based on a description of the target's behavior relevant either to adventurousness or recklessness (e.g., He has risked injury, and even death, a number of times). Results showed that after a delay of 15s, participants' impression was more in line with the most recently primed but less accessible construct. However, after a delay of 120s, the most frequently primed traits were more likely to be nonconsciously used and thus had the greatest impact on participants' impression. After a while, participants' attitude was found to be more in line with the most chronically accessible constructs.

Bargh and colleagues (1988) examined the interaction between dispositional and situational influences by contrasting participants' chronically accessible personality related constructs with temporary primed competing but relevant constructs. Consequently, participants chronically possessing the trait outgoing were temporary primed with words related to the trait inconsiderate and participants chronically possessing the trait inconsiderate were temporary primed with words related to the trait outgoing. Again, results showed that after a delay of 180s, participants' impression of an ambiguous target's behavior was more in line with their chronically accessible personality construct than with the temporary primed construct. Results of these studies show that

when two opposite constructs are both relevant to the interpretation of the same situation, it is the most accessible construct that will, in time, be more likely to be spontaneously used and automatically influence individuals' attitudes and judgments.

The present studies

Taken together, the above findings suggest that chronic individual differences in construct accessibility could help people spontaneously counteract the effect of competing situational influences. Although research has showed that this phenomena occurs for personality trait constructs only after a delay of at least 120s (Bargh et al., 1988; Higgins et al., 1985), in natural setting, these "long" delays between events are usually experienced. Drawing from these conclusions, we can hypothesize that a chronically accessible intrinsic or extrinsic motivational orientation could lead people to automatically resist the influence of various contextual stimuli relevant to extrinsic or intrinsic motivation, respectively. As long as participants are not aware of the nature of the primed stimuli and their possible influence, the process can be labeled automatic (Bargh, 1992). By mean of this automatic process, individuals would consequently be able to spontaneously maintain their initial level of motivation even in situations commonly associated with motivational change. This account would provide another possible explanation for the findings of Boggiano and colleagues (Boggiano et al., 1988; Boggiano & Katz, 1991).

In this article, we report two studies designed to test the hypothesized motivational resilience of chronics to temporary primed competing motivation. In Study 1, a measure designed to assess individuals' chronically accessible intrinsic and extrinsic motivational orientation toward academic studies was developed. This adapted measure of the free-response measure of accessible constructs (Higgins, King, & Mavin, 1982) enabled us to classify participants into three distinct groups: intrinsic chronics, extrinsic chronics, and nonchronics. Study 2 was designed as a 3 (chronic motivational orientation: intrinsic, extrinsic, or nonchronic) X 3 (type of priming: intrinsic, extrinsic, or neutral) completely randomized between subjects experiment. Using the free-response measure of chronically accessible academic motivational orientation developed in Study 1, participants classified as intrinsic chronics, extrinsic chronics and nonchronics were then randomly assigned to

one of the three priming conditions. The procedure followed was based on the one used in previous studies on the automaticity of various social psychological phenomena (see Chartrand & Bargh, 1996; Séguin-Levesque & Pelletier, 1999; Srull & Wyer, 1979). Based on previous research on the automaticity of goals and motivations (see Bargh, 1996, 1997 for reviews), we expected the academic motivational orientation of chronics to be automatically activated in the mere presence of relevant environmental academic stimuli. Because these chronic motivational orientations developed over time would be more stable than a temporary priming, we expected chronics to automatically resist the influence of a competing nonconsciously activated motivation. In Study 2, the motivation, perceptions, and behavior of nonchronics (those without a chronically accessible intrinsic or extrinsic motivational orientation) should be affected by the priming manipulation. In sharp contrast, we specifically expected that individuals with a chronically accessible intrinsic or extrinsic motivational orientation would not show this motivational susceptibility to the temporary priming manipulation. Regardless of the type of temporary priming they will be exposed to, the level of motivation and the behavior of intrinsic and extrinsic chronics will not be significantly affected. The spontaneous susceptibility of the nonchronics in combination with the absence of susceptibility of intrinsic and extrinsic chronics will support the hypothesized motivational resilience of chronics and the underlying automatic process.

Study 1: Development, coding, and validation of the free-response measure of chronically accessible academic motivational orientations

The purpose of Study 1 was to develop and validate a free-response measure designed to assess individuals' chronically accessible motivational orientation toward university studies. Based on the work of Bruner (1957a, 1957b) and Higgins (1989, 1996; Higgins et al., 1982), chronically accessible constructs were operationalized as constructs which are most easily and quickly encoded and retrieved in terms of a given category when information relevant to the construct are presented. For example, in response to a question on the reasons why one attends university, individuals who would first mention intrinsic motives, such as for the satisfaction and pleasure of learning would be identified as chronically possessing this motivational orientation. Another goal of Study 1 was to

assess the construct validity of the free-response measure of chronically accessible motivational orientations. Specifically, we wanted to see how chronically accessible motivational orientations would be related to relevant motivational constructs.

Some hypotheses were formulated concerning the construct validity of the free-response measure of chronically accessible motivational orientations. As mentioned previously, chronically accessible constructs are automatically activated in the mere presence of relevant input in the environment without the need for conscious guidance or involvement (Bargh, 1996, 1997). Consequently, we expected that our free-response measure of chronically accessible academic motivation, would only be moderately correlated with self-report measures of academic motivation, which are more a reflection of individuals conscious motives for engaging in an activity. Among self-report measures of academic motivation, different associations with the free-response measure of chronic motivations were expected depending on the level of globality of the motivational constructs assessed. The highest correlation was expected with the type of motivation existing at a higher level of globality, thus with the motivational construct presenting the greatest hypothesized level of stability (Vallerand, 1997). Specifically, we hypothesized that our free-response measure of chronically accessible academic motivation would be more related to contextual academic motivation than to situational academic motivation.

Method

Participants

Participants were 190 first-year students recruited in introductory psychology courses at the University of Ottawa, Canada. The sample was composed of 50 men and 140 women. Participants' age ranged from 17 to 52, with a mean age of 20.5. Almost all of the participants (98%) were full time students. The majority of participants (95%) were Canadians and English speaking (86%) with the remaining participants being bilingual (14%). An additional 30 participants completed only the free-response measure of chronically accessible academic motivation twice to assess the test-retest reliability of the measure.

Measures

Free-response measure of chronically accessible academic motivational orientations. We used an adapted version of Higgins and colleagues (1982) free-response measure of accessible constructs to identify individuals' chronically accessible motivational orientation toward university studies. Participants were asked to "take a few minutes to list up to 10 reasons they had for attending university in general". Participants were given a maximum of 3 minutes to come up with a list of reasons. Participants were also told that they were not required to list 10 reasons, just a few were necessary. According to Higgins et al. (1982), it is unnecessary to require participants to give a full set of reasons because accessible constructs are defined in terms of their output primacy. Once this part of the questionnaire was completed, participants were instructed to go on to the other questions and not come back on this free-response measure even if other reasons later came to mind. This was done to ensure that the items listed in the other measures assessing different types of academic motivations were not used by participants to complete the free-response measure of chronically accessible academic motivational orientations.

The Academic Motivation Scale. This scale is composed of 32 items designed to represent the motivational constructs identified by Deci & Ryan (1985, 1987, 1991). The AMS is composed of 8 subscales (4 items each) that measures an individual's global level of motivation toward university (Vallerand, Pelletier, Blais, & Brière, 1992, 1993). These constructs are, from the highest to the lowest level of self-determination: three types of intrinsic motivation, i.e., intrinsic motivation to experience stimulation (IMS: Because I experience pleasure and satisfaction while learning new things), intrinsic motivation to know (IMK: For the pleasure that I experience in knowing more about subjects which appeal to me), intrinsic motivation toward accomplishments (IMA: For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments), extrinsic motivation by integrated regulation (INTEG: Because university experience is very meaningful to me), extrinsic motivation by identified regulation (IDEN: Because it is one of the ways I have chosen to take responsibility for my future career), extrinsic motivation by introjected regulation (INTRO: To prove to myself that I am adept in academic endeavors), extrinsic

motivation by external regulation (ER: Because I have to attend university to complete my degree), and amotivation (AMO: I don't know, I can't understand what I am doing in university).

Participants had to answer each item on 7 point scale from (1) does not corresponds at all to (7) corresponds exactly. For the purpose of this study, a Self-Determination Index (SDI) which is the combined score of each of the eight subscales, was computed in the following way:

$((3 \times \text{IM}) + (2 \times \text{INTEG}) + (\text{IDEN}) - (\text{INTRO}) - (2 \times \text{ER}) - (3 \times \text{AMO}))$ (see Blais, Sabourin, Boucher, & Vallerand, 1990; Green-Demers, Pelletier, & Ménard, 1997; Vallerand, 1997).

The AMS possesses acceptable levels of reliability, validity, and internal consistency (from .69 to .91) (Vallerand et al., 1992, 1993). Results of both exploratory and confirmatory factor analysis support the eight-factor structure of this scale. In addition, correlation between the subscales and various related constructs support the continuum of self-determination proposed by Deci & Ryan (1985).

The State Academic Motivation Scale. This scale developed by Guay & Vallerand (1997), is composed of 18 items designed to measure individuals' specific level of academic motivation toward a course in particular. The scale is composed of 6 subscales (3 items each) which specifically measure individuals' level of intrinsic motivation (IM e.g., Because I really enjoyed it), extrinsic motivation by integrated regulation (INTEG e.g., Because experiencing new things is a part of who I am), extrinsic motivation by identified regulation (IDEN e.g., Because it was a sensible way to get meaningful experience), extrinsic motivation by introjected regulation (INTRO e.g., Because I would have felt guilty if I didn't), extrinsic motivation by external regulation (ER e.g., Because I felt I had to), and amotivation (AMO e.g., I don't know: I had the impression I was wasting my time). Participants had to answer each item on a 7 point scale ranging from (1) does not correspond at all to (7) corresponds exactly. For the purpose of the present study a Self-Determination Index (SDI) was also computed in the following way:

$(3 \times \text{IM}) + (2 \times \text{INTEG}) + (\text{IDEN}) - (\text{INTRO}) - (2 \times \text{ER}) - (3 \times \text{AMO})$ (see Blais et al., 1990; Green-Demers et al., 1997; Vallerand, 1997, for more information on the SDI).

The State Motivation Scale possesses acceptable levels of reliability, validity, and internal consistency (from .75 to .93). Results of confirmatory factor analysis support the structure of the scale. In addition, correlation between the subscales and various related constructs support the continuum of self-determination proposed by Deci & Ryan (1985).

Perceptions of the course. This scale was constructed for the purpose of the present study. It is composed of 7 items designed to measure individuals' interest for the course in which the questionnaire was completed at the time of completion (e.g., Today, to what extent do you feel that this course is interesting). Participants had to answer each item on 9 point scale from (1) not at all to (9) extremely. Thus, a high score (maximum score = 9) indicates that participants have a positive perception of the course on that specific day, whereas a low score (minimum = 1) indicates that participants have a negative perception of the course on that specific day ($\alpha = .84$).

Procedure

Participants completed all measures in class. The questionnaire took approximately 20 minutes to complete. Participants were informed that the purpose of the study was to understand the reasons that students have for attending university. Students were also told that participation was completely voluntary and that their data would remain completely confidential.

Coding of the free-response measure of chronically accessible academic motivation.

According to Higgins et al. (1982), the first few answers coming to an individual's mind in response to a specific question are considered representative of the individual's most accessible constructs in reference to the question's domain. Consequently, when coding the free-response measures of accessible academic motivational orientations, only participants' first two answers were considered. When one of the first two motives given by participants could not be coded precisely, due to lack of information in the description of the motive that was needed to code it, the next available motive given was coded instead. Two independent judges coded all the participants responses following a precise coding process. This process can be broken down into three separate steps.

As a first step, the first two motives given for attending university were coded according to their underlying level of self-determination as defined by Deci & Ryan (1985, 1987, 1991). A

given motive was coded as self-determined when an explicit sense of choice was present in the reason for attending university. In contrast, a given motive was coded as non self-determined when a sense of pressure or obligation was conveyed by the reason for attending university. An example of a self-determined motive for attending university would be: "to obtain a good education" whereas an example of a non-self-determined motive for attending university would be: "because I have to get a job that pays well".

As a second step, the first two motives given for attending university were again coded this time according to the intrinsic/extrinsic dimension as defined by Deci & Ryan (1985, 1987, 1991). A motive was coded as intrinsic when the reason given for attending university was clearly related to the pleasure, interest, or satisfaction felt while learning. In contrast, a motive was coded as extrinsic when the reason given for attending university was clearly a mean to an end. For example, the reasons previously given in order to illustrate self-determined and non self-determined motives would both have been classified as extrinsic motives. In fact, even if "obtaining a good education" is clearly a chosen motive, the individuals still attends university in order to attain the outcome of being educated and not solely by interest for university studies. An example of an intrinsic motive for attending university would be: "because I enjoy learning new and interesting things". Because an intrinsic motive is related to a sense of satisfaction or pleasure while doing an activity, by definition, it is also a chosen motive. In sum, at the end of these first two steps, each motive for attending university was either coded as self-determined intrinsic, self-determined extrinsic, or non self-determined extrinsic.

In a third step, depending on the coding of the motives and the order in which they were mentioned, a score designed to measure participants' degree of chronicity toward university studies was attributed to each participant based on a continuum of motivational chronicity. The scores reflecting individuals' underlying level of motivational chronicity can range from (1) extremely chronically extrinsically motivated to (7) extremely chronically intrinsically motivated. In the middle of this continuum of motivational chronicity we find individuals who are neither chronically intrinsically motivated nor chronically extrinsically motivated. These individuals are attending

University primarily for self-determined extrinsic motives, i.e., because they perceive university studies as important and valuable. This continuum and its associated coding are described in the following paragraphs.

Participants were identified as chronically extrinsically motivated when at least one of the first two motives was coded as non self-determined extrinsic, and the other motive was not coded as self-determined intrinsic. However, when the first two motives given by participants were coded as non self-determined extrinsic, this represented the highest degree of chronically accessible extrinsic motivation and a score of 1 was attributed. If the first motive given by participants was coded as non self-determined extrinsic and the second motive given was coded as self-determined extrinsic, this was identified as a milder form of a chronic extrinsic motivational orientation and participants were given a score of 2. If the first motive given by participants was coded as self-determined extrinsic and the second motive was coded as non self-determined extrinsic, participants were still classified as chronically extrinsically motivated but to a lesser degree and given a score of 3.

Conversely, when at least one of the first two motives was coded as self-determined intrinsic, and the other motive was not coded as non self-determined extrinsic, participants were identified as chronically intrinsically motivated. When the first two motives given by participants were coded as a self-determined intrinsic, this represented the highest degree of chronically accessible intrinsic motivation and a score of 7 was attributed. If the first motive given by participants was coded as a self-determined intrinsic and the second motive given was coded as self-determined extrinsic, participants were also classified as chronically intrinsically motivated but were given a score of 6. If the first motive given by participants was coded as a self-determined extrinsic and the second motive was coded as a self-determined intrinsic, participants were still classified as chronically intrinsically motivated but to a lesser degree and they were given a score of 5.

If the first two motives given by participants were coded as self-determined extrinsic, participants were considered as neither chronically intrinsically motivated nor chronically extrinsically motivated. In sum, these participants were judged to attend university because it represented a goal they valued, but not because they derived pleasure and satisfaction from it, or

because they felt pressured to do it (Deci & Ryan, 1985). They were consequently attributed a score of 4, which represents the middle of the scale.

In some cases, one of the first two motives given by participants was coded as self-determined intrinsic and the other one was coded as non self-determined extrinsic. In these instances, participants' most accessible motives were contradictory because they comprised the two motivational orientations emphasized in the present study, one motive being chosen by interest and the other one being pressured. Thus these participants were labeled as ambiguous with regard to their motivational orientation and were removed from the sample.

Results and Discussion

Preliminary analyses

Participants generated a total of 380 motives to be coded (2 motives for each of the 190 participants). A total of 5% of the motives (only 17 of them) could not be coded due to lack of information in the description of the motive. As mentioned previously, in these cases, the next available motive given by participants was coded instead. Interjudge reliability was assessed with a Pearson's correlation and found to be very satisfactory ($r = .94$). The few discrepancies between the coding of the two judges were resolved through discussions.

Then, 34 participants were removed from the experimental sample because they were classified as ambiguous with regard to their motivational orientation. That is, one of the motive they gave was coded as self-determined intrinsic and the other motive was coded as non self-determined extrinsic. This left a total of 156 participants (111 women, and 45 men).

Distribution of scores

Participants' scores on the free-response measure of chronically accessible academic motivational orientations, were then examined and interpreted according to their underlying degree of chronicity toward university studies. Out of the 156 participants, 120 participants were labeled as chronically extrinsically motivated toward university studies. Specifically, 43 participants were attributed a score of 1, 12 participants were attributed as score of 2, and 65 participants were attributed a score of 3.

Fourteen participants were attributed a score of 4 which represent the middle of the possible range of scores. These participants were categorized as neither chronically intrinsically motivated nor chronically extrinsically motivated toward university studies. The motives they gave for attending university studies were both related to learning, education, or university as a valued goal they wanted to attain.

Out of the 156 participants, 22 were labeled as chronically intrinsically motivated toward university studies. More specifically, 13 participants were attributed a score of 5, five participants were given a score of 6, and only four participants were given a score of 7.

The fact that the majority of participants were identified as chronically extrinsically motivated is not surprising. It is largely assumed that many university students attend University in order to get a job in the future that will enable them to make more money then they would have only with a college degree, or attend university because their parents are pressuring them to get a higher education. Few students should indicate that they attend university simply for the pleasure of learning and the satisfaction derived from knowing more.

Associations between the measure of chronic motivation and other motivational constructs

As hypothesized, the association between participants' level of chronicity toward university studies and the SDI for the Academic Motivation Scale ($r = .30, p < .01$) was larger than between participants' chronicity level and the SDI for the State Academic Motivation Scale ($r = .18, p < .05$). These results suggest that participants' level of chronicity toward academia and a global level of academic motivation were more related than participants' level of chronicity and a specific level of academic motivation. We argue that this was the case since the first two constructs measure a general level of academic motivation. Furthermore, the size of the correlation between the free-response measure of chronically accessible academic motivational orientations and participants' global level of academic motivation was only moderate. These results indicate that although a free-response measure of accessible academic motives is certainly relevant to participants' general academic motivation as measured with a Likert type scale, these two motivational constructs seem to

be very different. Participants' general level of self-reported academic motivation does not necessarily reflect their most chronically accessible academic motives.

In addition, participants' scores on the free-response measure of chronically accessible academic motivational orientations were not significantly related to participants' positive perceptions of the course ($r = .12$, n.s.). This suggests that the motives given by participants on the free-response measure of chronically accessible academic motivational orientations were probably not influenced by participants' perceptions of the course at the time they completed the questionnaire.

Test-retest reliability

Thirty participants were asked to come to the laboratory to complete a second time the free-response measure of chronically accessible academic motivational orientations. This second measure was taken about 2 months after the initial measure. The test-retest reliability of the free-response measure of chronically accessible academic motivational orientations was found to be adequate with a Cronbach alpha of .78.

Taken together, these results seem to suggest, as expected, that the measure of chronically accessible academic motivational orientations is more similar to a global measure of academic motivation than to a specific measure of academic motivation. At the same time, these findings seem to show that a chronically accessible academic motivational orientation is different than what is measured by a Likert type scale in a questionnaire designed to evaluate individuals' global level of academic motivation. In sum, the free-response measure of chronically accessible academic motivational orientations appears to be an adequate way to assess individuals' chronically accessible academic motives.

Study 2

The purpose of Study 2 was to test if individuals with a chronically accessible intrinsic or extrinsic motivational orientation toward academia would be resilient to the effect of primed competing motivation. We were expecting that differences in individuals motivational orientations would act nonconsciously and automatically as a barrier against competing temporary primed motivational influences and thus would affect individuals' motivation, perceptions, and behavior. When a conflict exist between two automatically activated motivational orientations, one through chronic use and the other one through temporary means, the one most frequently activated in the past should most likely be spontaneously used to perceive and interpret a situation (Bargh et al., 1988; Higgins et al., 1985).

The test of the motivational resilience of intrinsic and extrinsic chronics proposed was the following. We specifically hypothesized that the effect of the priming manipulation would only be found for nonchronics. As already mentioned, intrinsic and extrinsic chronics were expected to be automatically resilient and thus not affected by a nonconsciously activated motivation. Since specific predictions were made about which group of participants should be influenced by the temporary priming manipulation, planned comparisons within each group of participants were performed.

Specifically, nonchronics primed with an intrinsic motivation were expected to be more intrinsically motivated, report greater interest-enjoyment, perceive more choice, and spend more time working on the task than nonchronics primed with an extrinsic motivation. The means for nonchronics exposed to neutral primes were expected to fall between the means of the other two groups. These results would reproduce previous findings obtained with a different task (i.e., cross-word puzzles; Séguin-Levesque & Pelletier, 1999). In conjunction, we hypothesized that these effects would not be found for intrinsic and extrinsic chronics, thus demonstrating their resilience to change generally brought about by contextual stimuli. When compared with intrinsic chronics primed with an intrinsic motivation, intrinsic chronics primed with an extrinsic motivation should not experience the task in a significantly different manner: They should remain as intrinsically

motivated, interested, persistent, and positive toward the task. Similarly, extrinsic chronics nonconsciously primed with an intrinsic motivation should not be significantly different than extrinsic chronics nonconsciously primed with an extrinsic motivation on all the variables considered.

As a way to further validate the newly developed free-response measure of chronically accessible academic motivational orientations, we expected that when compared with extrinsic chronics, intrinsic chronics would spontaneously be more intrinsically motivated toward a subsequent task, would find the task more interesting, would perceive more choice while doing the task, and would spend more time working on their own on the task. The means for nonchronics were expected to fall in the middle of these two extremes. In order to automatically activate individuals' chronic motivational orientation toward academic studies, this subsequent task was introduced as an academic task. Finally, because we wanted to test for the automaticity of the motivational orientations and the hypothesized motivational resilience, participants remained unaware of the nature of the experiment and the fact that they were recruited based on their motivational characteristics.

Method

Participants

Participants were selected based on their answers to the free-response measure of chronically accessible academic motivation. This measure was administered a few weeks prior to the actual experiment as part of another unrelated study. The recruitment process was based on previous studies on the assessment of the effects of chronically accessible constructs (Bargh, Bond et al., 1986). A total of 686 students at the University of Ottawa, Canada, completed the free-response measure of chronically accessible academic motivation. Following the coding procedure outlined in Study 1, these participants were then classified either as possessing (1) a chronically accessible intrinsic academic motivational orientation, (2) a chronically accessible extrinsic academic motivational orientation, or (3) no chronically accessible academic motivational orientation. Of these possible participants, 102 (about 15%) individuals had to be removed from the sample

because they were ambiguous with respect to their academic motivational orientation. This percentage of ambiguous participants was very similar to what was found in Study 1. Of the remaining 584 potential participants 121 individuals accepted to participate in the laboratory experiment. The remaining potential participants either could not be contacted, refused to participate in the experiment, or did not show up at their scheduled appointment.

Of the 121 participants, 13 of them were removed from the experimental sample for various reasons. Seven participants were removed because they did not follow the experimental instructions, and 6 more participants were removed because they expressed suspicion either about the true purpose of the experiment, the nature of the primes, or the connection between the tasks. A total of 36 intrinsic chronics, 36 extrinsic chronics, and 36 nonchronics comprised the final sample. This sample was composed of 70 women and 38 men aged between 18 and 50 years old ($M = 21.95$). Participants were recruited in first, second, and third year social sciences courses, and had been in university for an average of 2.15 years. Almost all participants were Canadians (98%). The majority of them (85%) were English speaking and the remaining participants were bilingual (15%).

Priming of intrinsic and extrinsic motivation

An adapted version of the Scrambled Sentence Test (Srull & Wyer, 1979) was used as a first task to automatically activate either an intrinsic or an extrinsic motivational orientation in participants. The task was composed of 15 items, each requiring participants to form a grammatically correct four-word sentence out of five words presented in a scrambled order. In agreement with Srull & Wyer (1979), for the intrinsic motivational orientation condition, words related to intrinsic motivation were incorporated in 12 of the items (80% of them). The primes in the intrinsic motivational orientation condition were: spontaneous, challenge, interested, involved, satisfied, volunteering, mastering, delighted, autonomous, absorbed, competent, and enjoying. An example of item for the intrinsic motivational orientation condition is: “dizzy is feeling he competent”. For the extrinsic motivational orientation condition, words related to extrinsic motives were incorporated in 12 of the items (also 80% of them). The primes in the extrinsic motivational

orientation condition were: competitive, obligation, expected, evaluated, constrained, demanded, avoiding, restricted, forced, pressure, controlled, and proving. An example of item for the extrinsic motivation priming condition is: "has obligation he an armchair". In the neutral priming condition these primes were replaced by: still, apartment, carried, numbed, cold, close, moving, sending, near, early, hungry, and going. These primes were selected based on definitions of intrinsic and extrinsic motivation proposed of Deci & Ryan (1985, 1987, 1991). All the other words in each condition were neutral with respect to both types of motivational orientations. These other words composing the sentences were chosen to allow the participants to construct two grammatically correct sentences, one including the priming word and the other not including the priming word. Moreover, the words composing the sentences were identical in the intrinsic and extrinsic motivational orientation conditions except for the respective primes.

Experimental task

This task was a spatial relations puzzle composed of 7 three-dimensional pieces called SOMA (see Deci, 1971). This puzzle was commercially sold in the 80's but is not in circulation anymore, thus limiting the possibility of participants having experience with the task. With these 7 pieces, 60 different three-dimensional figures can be formed. During the experimental session, all participants tried to solve the same 4 figures for a period of 15 minutes. The number of figures participants had to work on during the period of 15 minutes was determined based on a recent study using the SOMA puzzles as an experimental task (Pelletier & Vallerand, 1996). If participants were able to solve all the figures in the time allowed, there were additional figures placed in a folder that participants could try to solve.

Dependent measures

The State Motivation Scale. This scale is composed of 18 items who were originally designed to measure individuals' situational or state motivation for a specific course (Guay & Vallerand, 1997). These items were designed to represent the motivational constructs defined by Deci & Ryan in their Self-Determination Theory (1985). As suggested by Guay & Vallerand (1997), in the present study, the question asked to participants was modified so the scale could

measure individuals' reasons for performing the experimental task. The original scale is composed of 6 subscales (3 items per subscales) which specifically measure individuals' level of motivation at the time they are doing the experimental task, in this case the cross-word puzzles. For the purpose of the present study, only the prototype of self-determined motivation, i.e. intrinsic motivation was considered. Participants had to answer each item on a 7 point scale ranging from (1) does not correspond at all to (7) corresponds exactly. The intrinsic motivation subscale of The State Motivation Scale showed an acceptable level of internal consistency ($\alpha = .95$).

Task's interest-enjoyment. Another measure included in the questionnaire assessed the individual's experience of interest-enjoyment with the experimental task (5 items; e.g., I found the task really interesting) (Pelletier & Vallerand, 1996). This measure was included in the questionnaire because results of previous research indicated the existence of relations between intrinsic motivation, interest-enjoyment and choice ratings (Harackiewicz, 1979; Ryan, Koestner, & Deci, 1991; Ryan et al., 1983). Participants had to answer each one of these items on a 9 point scale ranging from (1) does not agree at all to (9) agree completely. A composite score of this scale showed a high level of internal consistency ($\alpha = .90$).

Positive emotions. A measure of participants' positive emotions while working on the experimental task was also administered to participants (4 items; e.g., The feelings I had during the task were generally positive) (Pelletier & Vallerand, 1996). Participants had to answer the items on a 9 point scale ranging from (1) does not agree at all to (9) agree completely. This scale showed an acceptable level of internal consistency ($\alpha = .87$).

Behavioral measure of intrinsic motivation. Following the period of 15 minutes during which participants all worked on at least 4 SOMA puzzles, they were left alone for a period of 6 minutes with more SOMA puzzles. The amount of time participants spent working on the figures during that 6 minute free-choice period was used as a behavioral indicator of participants' level of intrinsic motivation (Pelletier & Vallerand, 1996).

Test of awareness. In order to verify if participants were aware of the true purpose of the experiment and the nature of the priming procedure, participants were subjected to a funnel

debriefing once they thought the experiment was over. Following the procedure in Chartrand & Bargh (1996) participants answered questions regarding (1) whether they had done the two experiments as two unrelated tasks, and (2) whether anything they had done on the first experiment had affected what they had done on the second experiment (item recoded when analyzed). These questions were answered on a 7 point scale ranging from (1) does not agree at all to (7) agree completely. Participants also answered questions about (1) the purpose of the two experiments, and (2) whether they thought that any of the words from the Scrambled Sentence Test seemed unusual or distinctive. In addition, following the actual debriefing, they were specifically asked whether, at the time of the experiment, they suspected that a motivational orientation had been activated. Finally, they were asked whether they thought they had been selected based on their answers to the free-response measure of chronically accessible academic motivational orientations.

Procedure

Coding of the academic motives given on the free-response measure of chronically accessible motivation was done in the manner described in Study 1. Following this codification process, potential participants were classified either as intrinsic chronics, extrinsic chronics, or non-chronics. The procedure we then followed for the actual experiment was based on previous studies on the automaticity of social psychological processes and is outlined below (see Bargh, Chen, & Burrows, 1996; Chartrand & Bargh, 1996; Séguin-Levesque & Pelletier, 1999).

Potential participants were contacted by telephone. At that time, they were informed that they would be participating in two experiments, one for the experimenter and the other one for a colleague. Participants were told that the purpose of the first experiment was to examine some of the processes involved in a sentence construction task. The second experiment was presented as a study on the processes involved in the completion of academic task such as spatial ability tasks. Participants were also told that these two experiments were done at the same time only because of time constraints. To make this more plausible during the actual experimental session, two different formats of written material were used and participants had to sign two separate consent forms.

During the experimental session, participants were tested one at a time. Upon arrival, participants were greeted by the experimenter who showed them into the experimental room. In each session, participants were randomly assigned to one of three conditions, with the only restriction that an equal number of participants be present in each experimental condition: The intrinsic motivational orientation, the extrinsic motivational orientation, or the neutral condition. Participants were seated at a small desk, and were informed that during the “first” experiment they would be working on the construction of English sentences. After obtaining the written consent of participants, a folder with one of the three versions of the Scrambled Sentence Test was given to participants and the grammatical task was introduced and explained to them. This procedure ensured that the experimenter was kept unaware of participants' priming condition. After the grammatical task was explained to them, participants were presented with an example of the Scramble Sentence Test and were asked to try to construct a sentence. Then the experimenter probed participants for any questions they might have at this point about the experiment and the task to be performed. Participants were then instructed to meet the experimenter outside the room, when they would be done. The experimenter then left the room while participants completed the task alone. The average time for the completion of the Scrambled Sentence Test was about 10 minutes.

After participants had completed the Scrambled Sentence Test, the experimenter thanked them for participating in the “first” experiment, and then told them that they were ready to begin the “second” experiment. The experimenter then took a folder of a different color than the one used in the first experiment. Participants were again asked to take place at the desk. Then participants were told that in the “second” experiment an experimenter’s colleague wanted to examine the completion of academic tasks such as spatial ability tasks. The spatial ability task was purposefully associated with academic tasks, so that the chronically accessible academic motivation of participants could be automatically activated by the presence of this contextual cue. Once automatically activated, the chronically accessible academic motivational orientation of participants would then influence their motivation, perception, and behavior on the SOMA task. In research on

chronically accessible constructs, the establishment of this link between the experimental task to perform and individuals' chronically accessible construct has been shown to be essential (Bargh, 1992; Bargh et al., 1986). After obtaining the written consent of participants, the spatial ability task was introduced and explained to them. Participants were then left alone to work on the puzzle for a period of 15 minutes.

In the experimental instructions, an indefinite time period was given to participants in order to avoid putting pressure on them by imposing a strict time limit. However, after a period of exactly 15 minutes, the experimenter returned to the experimental room, holding a pager, and told participants that they could stop working on the task. Then, participants were led to believe that the experimenter had just been paged and needed to make a phone call. The experimenter then proceeded to solve the figure participants were working on before leaving the room for a period of 6 minutes. This was done in order to avoid any desire from participants to complete the unfinished figure during this free-choice period (Deci, 1971). There was always more figures remaining in the folder that participants could choose to work on while waiting alone in the room. The amount of time participants spent working on the task during that period of time, represented the behavioral measure of intrinsic motivation. After 6 minutes, the experimenter returned to the room, excused herself again for the delay and then asked participants to complete a questionnaire assessing attitudes and motivation toward the spatial ability task.

After participants had completed the questionnaire, the experimenter told participants that she wanted to take some time to discuss the two experiments with them. The awareness test was then administered and participants were probed for any kind of suspicion about the priming manipulation and the relation between the two experiments (the scrambled sentence task and the spatial ability task). Following this, participants were fully debriefed and thanked.

Results and Discussion

Preliminary analyses

The data were analyzed in order to verify that they were normally distributed. The values for skewness and kurtosis for each of the variable considered were all below 1 in absolute value,

and were consequently judged to be normally distributed (Tabachnik & Fidell, 1996). In addition, the postulate of homogeneity of variance was generally respected for the variables considered, as revealed by non-significant Levene's tests.

The coding of the academic motives given by participants was again found to be adequate with an interjudge reliability of .92. Given the high level of agreement in the coding, the discrepancies were resolved by classifying the participants according to the ratings of the first author.

Test of awareness

Descriptive statistics performed on the measure of participants' level of awareness of the nature of the primes and the possible influence of these primes on their reactions to the second task revealed that participants were not aware of the connection between the two tasks. Participants indicated that what they did in the first experiment had not affected what they did in the second experiment ($M = 6.29$), and that they had performed the two experiments as two unrelated tasks ($M = 6.24$). Also, when asked about the purpose of the two experiments, participants mentioned goals related to the cover story of the study, and no one suspected that they had been recruited for the experiment based on their individual motivational characteristics. In addition, when asked about any words in the Scramble Sentence Task that seemed unusual or distinctive, participants could not remember any words that seemed to stand out. Furthermore, in the actual debriefing, after being told the true purpose of the experiment and the nature of the primes, no participant expressed any suspicion about a motivational orientation being automatically activated.

Effects of chronically accessible academic motivational orientations

One-way analyses of variance (ANOVAs) were conducted to assess the effect of chronically accessible academic motivational orientations on level of intrinsic motivation, interest-enjoyment toward the task, positive emotions, and persistence of the task.

Intrinsic motivation. As expected, there was a reliable effect of chronicity across levels of priming, $F(2, 107) = 3.00, p < .05$. Intrinsic chronics reported being more intrinsically motivated

toward the task ($\underline{M} = 6.06$) than extrinsic chronics ($\underline{M} = 4.95$). The mean for nonchronics fell between these two extremes ($\underline{M} = 5.35$) but was not significantly different from the other two.

Interest-enjoyment. The ANOVA on level of interest-enjoyment toward the task revealed a significant effect of chronicity, $F(2, 107) = 5.62, p < .01$. Again, intrinsic chronics found the task more interesting ($\underline{M} = 7.19$) than extrinsic chronics ($\underline{M} = 5.87$). The mean for nonchronics fell between these two poles ($\underline{M} = 6.45$) but was not found to be significantly different from the two other means.

Positive emotions. We also found a reliable effect of chronicity for level of positive emotions experienced during the task, $F(2, 107) = 2.93, p < .05$. Once more, the pattern of the means were in the expected direction. Intrinsic chronics reported greater positive emotions ($\underline{M} = 6.82$) than extrinsic chronics ($\underline{M} = 5.82$). Once again, the mean for nonchronics fell in the middle of these two poles ($\underline{M} = 6.17$) without being significantly different from the other means.

Free-choice period. The ANOVA conducted on the amount of time participants spent working on the task during the free-choice period revealed a reliable effect of chronicity, $F(2, 107) = 5.29, p < .01$. Examination of the means revealed that intrinsic chronics spent significantly more time on the task ($\underline{M} = 280s$) during the free-choice period than extrinsic chronics ($\underline{M} = 124s$). The mean for nonchronics fell between these two extremes ($\underline{M} = 210s$).

Effects of primed motivation

Recall that we specifically expected that only nonchronics would be susceptible to the influence of an automatically activated motivational orientations. Planned comparisons were thus performed for nonchronics, intrinsic chronics and extrinsic chronics separately.

Effects for nonchronics. As shown in Table 1, nonchronics primed with an intrinsic motivation reported being significantly more intrinsically motivated toward the SOMA puzzles ($\underline{M} = 6.25$) than nonchronics primed with an extrinsic motivation ($\underline{M} = 4.42$) ($t(22) = -2.43, p < .05$). This suggest that motivational orientations were automatically activated by the priming manipulation and not some related mood state. Nonchronics nonconsciously primed with an intrinsic motivational orientation also perceived the SOMA task as more interesting ($\underline{M} = 7.18$) ($t(22) = -$

2.69, $p < .01$), and tended to report more positive emotions ($M = 6.67$) while working on the task ($t(22) = -1.49$, $p = .15$), than nonchronics primed with an extrinsic motivational orientation ($M_s = 5.33$ and 5.50 , respectively). Furthermore, nonchronics exposed to intrinsic primes were found to spend significantly more time on the task during the free-choice period ($M = 284.64$) than nonchronics exposed to extrinsic primes ($M = 133.92$) ($t(22) = -2.49$, $p < .05$). As expected, for every variable considered, the means for nonchronics exposed to neutral primes always fell in the middle of the values for the other two conditions. These results replicate previous findings on the automaticity of intrinsic and extrinsic motivational orientations (Séguin-Levesque & Pelletier, 1999). In sum, as predicted, nonchronics' motivation toward the task, task's perceptions, and behavior, were nonconsciously affected by the automatically activated motivations. Furthermore, the means for nonchronics on every variables considered followed the predicted pattern of results.

Insert Table 1 about here

Effects for chronics. Intrinsic chronics primed with an extrinsic motivational orientation did not reliably differ from intrinsic chronics primed with an intrinsic motivational orientation on either their level of intrinsic motivation ($t(22) = .34$, $p = .73$), interest toward the task ($t(22) = -.02$, $p = .98$), positive emotions experienced ($t(22) = .27$, $p = .79$), or persistence on the task ($t(22) = -.49$, $p = .63$) (see Table 1).

Similarly, compared with extrinsic chronics primed with an extrinsic motivational orientation, extrinsic chronics primed with an intrinsic motivational orientation did not report being significantly more intrinsically motivated ($t(22) = -.69$, $p = .50$), or interested toward the task ($t(22) = -.28$, $p = .78$); also, they were not found to experience more positive emotions ($t(22) = -.23$, $p = .82$), or show more persistence to work on the task ($t(22) = .27$, $p = .80$). Furthermore, the means for intrinsic and extrinsic chronics exposed to the three type of primes did not follow the predictable pattern found in our previous study on the automaticity of intrinsic and extrinsic motivational orientations (Séguin-Levesque & Pelletier, 1999) and for nonchronics in the present

study. In sum, as predicted, and in sharp contrast with the findings for nonchronics just reported, planned comparisons showed that intrinsic and extrinsic chronics were not significantly affected by the automatically activated motivational orientations. The three types of primes did not have the same effect on intrinsic and extrinsic chronics that they had on nonchronics

Taken together, the results of Study 2 first show that the measure of chronically accessible academic motivational orientations successfully tapped into a motivational orientation regulated in part by automatic processes. Upon mere presentation of the academic task (SOMA), individuals' chronically accessible academic motivational orientation was spontaneously activated and subsequently influenced perceptions and behavior on the task. In addition, these effects were reproduced by the nonconsciously primed motivation for nonchronics. This suggests that the same processes underlie chronic and temporary forms of motivational construct accessibility and that chronically accessible intrinsic and extrinsic motivational orientations are in part regulated by automatic processes (see Bargh et al., 1986; Bargh et al., 1988; Bargh & Barndollar, 1996). Furthermore, the susceptibility of nonchronics to the automatically activated intrinsic and extrinsic motivation, in combination with the absence of susceptibility of chronics to the same motivational primes, supported the hypothesized automatic resilience of intrinsic and extrinsic chronics to external events.

General discussion

Based on the Auto-Motive Model (Bargh, 1990), and research on automatic social psychological processes (see Bargh, 1997 for a review), we investigated the existence of a nonconscious process allowing individuals to spontaneously resist the influence of contextual stimuli susceptible to affect their level of intrinsic or extrinsic motivation.

Results of Study 1 demonstrated that intrinsic and extrinsic motivational orientations can be found in chronic form in some individuals. As expected, chronic academic motivational orientations were found to be moderately associated with relevant self-report measures of academic motivation. Furthermore, chronic academic motivational orientations were found to be more strongly associated with contextual than situational academic motivation, thus with the motivation presenting a higher

level of globality. These findings suggest that a measure of chronically accessible motivational orientations is conceptually closer to a global measure of academic motivation. These results also seem to suggest that although self-report measures of academic motivation are relevant to chronic individual differences in academic motivational orientations, these two constructs tap in different motivational dimensions. It appears possible that while self-report measures are designed to represent individuals' conscious motives for behaving, chronic individual differences would represent motivational constructs that are regulated by more automatic processes.

Results of Study 2 showed that individuals identified as possessing a chronically accessible intrinsic or extrinsic motivational orientation were nonconsciously resilient to the effects of temporary primed competing motivation. Most importantly, this resilience to automatically activated motivation was not found for individuals identified as not possessing a chronically accessible motivational orientation. The subsequent motivation, perceptions, and behavior of this latter group of individuals were susceptible to the influence of the priming manipulation.

Specifically, nonchronics nonconsciously primed with an intrinsic motivation were found to be more intrinsically motivated, more interested, to experience greater positive emotions, and to persist longer on the puzzles than nonchronics primed with an extrinsic motivation. These results for nonchronics are consistent with our own previous findings on the automaticity of intrinsic and extrinsic motivation (Séguin-Levesque & Pelletier, 1999). Consequently, our results once more support the effectiveness of the priming manipulation and support even further the automaticity of intrinsic and extrinsic motivation. As expected, these effects of the temporary primed motivation were not found either for intrinsic chronics or extrinsic chronics. Intrinsic chronics exposed to extrinsic primes were not found to be less motivated, interested, to experience fewer positive emotions, or to spend less time on the task than intrinsic chronics exposed to intrinsic primes. Similarly, extrinsic chronics exposed to intrinsic primes were not found to be more motivated, more interested, to experience greater positive emotions, or to spend more time on the task than extrinsic chronics exposed to extrinsic primes.

Because we found an effect of the priming manipulation on the motivation, perceptions, and behavior of nonchronics, in combination with an absence of effect on these variables for chronics, we can argue for the motivational resilience of chronics to the effects of the temporary primed motivation. Furthermore, this susceptibility to the priming manipulation observed for nonchronics in combination with the absence of susceptibility of chronics was obtained without individuals' conscious involvement or guidance. Intrinsic and extrinsic chronics resisted the effects of the competing primed motivation without being aware that a certain motivation had been activated. In addition, participants reported being not aware of the relation between the two experimental tasks, or the fact they had been recruited based on their individual motivational characteristics. Consequently, it seems that the motivational resilience exhibited by intrinsic and extrinsic chronics to primed competing motivation was in part regulated by nonconscious automatic processes (Bargh, 1992; Bargh et al., 1988; Chartrand & Bargh, 1996; Higgins et al., 1985).

In addition, the results of Study 2 further validated the measure of chronicity developed in Study 1. In Study 2, we found that intrinsic chronics were more intrinsically motivated and interested toward a task, experienced greater positive emotions, and spent more time on the task than extrinsic chronics. Individuals without a chronically accessible academic motivational orientation were consistently found to score between chronics on every variable considered. Again, since participants did not report any awareness of having been recruited based on their motivational characteristics, this suggests that the effects obtained were due to automatic processes. Once presented with an academic task to work on, individuals' chronically accessible academic motivational orientation was spontaneously activated and subsequently influenced their motivation, perceptions, and behavior without the need of conscious intention or monitoring. An important finding of Study 2, is the fact that the effects of the chronically accessible motivational orientations and the temporary primed motivation for nonchronics were very similar. This seems to suggest that chronically accessible motivational orientations are developed over time from frequent prior construct activation (Bargh, 1990, 1996, 1997; Bargh et al., 1986).

Implications for research on human motivation

The implications of the present findings for Self-Determination Theory specifically, and for human motivation in general are far reaching. These results provide us with some understanding of the mechanisms possibly regulating the development of intrinsic and extrinsic motivational orientations. The effects of the chronically accessible motivational orientations and the temporary primed motivation on task's motivation, perceptions, and behavior paralleled each other. This is consistent with the assumption that chronic motivational orientations are developed through repeated experience (Bargh, 1997; Bargh et al., 1986). Since temporarily, a primed motivation reproduced for nonchronics the effects of a chronic motivational orientation, we can assume that if situations fostering this type of motivation were to be repeatedly experienced, a chronically accessible motivational orientation would develop in association with relevant situations. It appears that like an habitual response, motivational orientations can become associated with environmental features and then gradually subsumed under nonconscious processes.

Deci & Ryan (1985, 1987, 1991) proposed that individuals are inherently inclined to become more self-determined and numerous empirical studies have showed that when exposed to autonomy supportive environments this natural tendency will be fostered (see Vallerand, 1997 for a review). Individuals involved in interesting activities performed in autonomy supportive contexts, should develop an intrinsic motivational orientation that would influence how they perceive and choose to behave in various situations. Individuals who acquire an intrinsic motivational orientation in association with various contexts should be motivated to maintain their attention on the most interesting aspects of the task. Consequently, these individuals could remain highly motivated in various situations, although they would be most certainly faced from time to time with uninteresting duties to perform, restrictive environments, or controlling employers. Although, the process by which motivational orientations are developed could be at first consciously regulated, in time, with consistent experiences, the way people act and approach new situations would become nonconsciously regulated and then guide perceptions and behavior. The crucial advantage of an automatic process over a conscious process is that it demands much less cognitive attention and

consequently enables the individual's cognitive system to free up resources to monitor other novel activities (Atkinson & Shiffrin, 1968; Bargh & Barndollar, 1996).

Precisely because automatic processes are effortless and thus very efficient, the findings of Study 2 suggest that the automatic motivational resilience of chronics would become operative and guide perceptions and behavior especially when individuals are cognitively busy or unable to consciously process information. Our findings suggest that this automatic motivational resilience to competing primed motivation makes people resistant to contextual influences that would otherwise contribute to change their initial level of motivation, without the need for conscious guidance. Thus, our results suggest a possible alternative explanation as to why the motivational orientation of some people could be so difficult to change (see for example Boggiano et al., 1988; Boggiano & Katz, 1991).

We found that once a motivation becomes chronically accessible and is automatically activated by relevant environmental features, it predominantly guides and influences people's perceptions and actions without the person having to consciously monitor this process. Although not examined in the present research, we would also expect this motivational orientation to automatically direct individuals' attention on the autonomy supportive aspects of a situation, although the situation may also be comprised of some controlling features. Most importantly, since the person is not conscious of this automatic process operating, it would become very difficult for the individual to alter or stop this motivational process from running to completion and affect perceptions and behavior. Consequently, we can suppose that through the course of a week or a year, an individual with a chronically accessible motivational orientation could maintain his own level of motivation constant, although some daily fluctuations in one's level of motivation would be observed. For example, it appears possible that children's level of intrinsic motivation in the Boggiano and colleagues studies (Boggiano et al., 1988; Boggiano & Katz, 1991) was not affected by controlling teaching environments because some of them already possessed a chronically accessible intrinsic academic motivational orientation. This chronic motivational orientation once activated by an academic context could have made them nonconsciously resistant to the effect of a

controlling teacher. The children's chronic disposition could have spontaneously counteracted the effects of competing situational cues, and resulted in the maintenance of the children's initial level of motivation toward school.

Although plausible based on the evidences of the present study, the motivational resilience of individuals with an automatically activated motivation to controlling or autonomy supportive behaviors has not been directly examined. However, the fact that intrinsic and extrinsic chronics have been found to be resilient to the effect of primed competing motivation is consistent with the existence of a motivational resilience to interpersonal contexts. Nonetheless, further studies should directly examine the extent to which individuals with an automatically activated motivation would be able to nonconsciously resist the influence of controlling or autonomy supportive contexts in which at least two people are interacting. First, it would be important to examine how individuals with an automatically activated motivation perceive and interpret autonomy supportive and controlling behaviors. Then, the contextual stimuli that they nonconsciously predominantly attend to, and the kind of information they spontaneously overlook in order to maintain their initial level of motivation in controlling or autonomy supportive contexts should be investigated.

The self-regulation of motivation

To date, most of the empirical research supporting Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991) has examined the impact of situational factors, such as an autonomy supportive or a controlling context, on individuals' level of self-determination (see Vallerand, 1997 for a review). It seems that less research have been conducted on how individuals maintain their own level of motivation, motivate themselves in new contexts, or perceive and approach various situations. The results of the present studies demonstrated that a chronic motivational disposition automatically counteracted the effects of a competing primed motivation. In agreement with the Auto-Motive Model, chronic motivational dispositions could serve to help people maintain their own level of motivation without exerting much cognitive effort (Atkinson & Shiffrin, 1968; Bargh & Barndollar, 1996). Although it is well documented that individuals who are intrinsically motivated experience more of a variety of positive consequences (Deci & Ryan, 1985, 1987, 1991;

see Vallerand, 1997 for a review), individuals with a chronically accessible intrinsic motivational orientation might very well possess an additional advantage over individuals without this motivational orientation. By being chronically intrinsically motivated, these individuals might have reached the necessary level of automaticity enabling them to maintain their motivation effortlessly. Intrinsic chronics would have the capacity to remain highly motivated without consciously having to monitor their thoughts, perceptions, and behavior. It seems possible that these individuals could spontaneously approach new situations that bare a resemblance to old situations with a positive focus, they could nonconsciously attend to autonomy supportive environmental cues, and they could automatically resist the influence of controlling contexts. The individual's cognitive system would have integrated behavioral regularities under an unconscious process that would maintain effortlessly a motivational orientation consistently chosen in the past.

The present studies also showed that individuals can become chronically extrinsically motivated and that this motivational orientation can also be automatically activated and then predominantly determine individuals' motivation, perceptions, and behavior. In that specific case, an adaptive automatic motivational process would nonconsciously contribute to maintain that form of motivation. In the mere presence of relevant situations, an extrinsic motivational orientation would be automatically activated which would in turn spontaneously counteract the influence of contextual stimuli related to intrinsic motivation. As mentioned previously, this automatic process, once in motion, would be difficult to reverse since people cannot exert control over the operation of a process they are not aware.

Thus, another important and challenging question that remain to be addressed in future studies is the way by which a chronically accessible motivational orientation could be changed or overridden. This is especially important since some forms of motivational orientations found in chronic form could interfere with individuals' ability to fully integrate positive influences. For example, individuals who are extrinsically motivated toward school could report being not motivated, or interested in what they do, and although they could express the desire to become more motivated toward academia, they might face an unforeseen obstacle. For students with a chronically

accessible extrinsic motivational orientation, school settings would automatically activate their motivational orientation which would influence how they perceive and behave in school. We can suppose that even when taught by an autonomy supportive teacher, their automatically activated chronic disposition would possibly counteract this positive influence. In the end, these students could still find school un motivating. To override an automatically regulated motivation or to replace it with a more self-determined one, it would seem necessary to bring under conscious attention the nature of the motivation that can be activated and it's possible consequences (Bargh, 1989, 1997; Bargh & Barndollar, 1996). Because a new response would have to be implemented to replace the old automatic process, it would be very effortful at first to consciously monitor one's thoughts and actions in a different direction. However, as this new response is frequently and consistently chosen in similar situations, for example in academic setting, it would require less and less conscious monitoring to regulate the newly chosen motivation. This process would certainly be complicated by the presence of environmental features still automatically activating the existing motivational orientation. Individuals would need, especially in demanding situations, to continuously exert effort to stop themselves from using the automatically activated motivation they want to replace. Over time, we could think that this other motivational orientation would become automatically activated by relevant situations, and consequently spontaneously guide individuals' perceptions and behavior, thus fully replacing the old motivational orientation.

In sum, the present research demonstrated that individuals' chronic motivational differences automatically determine one's subsequent motivation, perceptions, and behavior. Furthermore, individuals' chronically accessible academic motivational orientations have been showed to make people resistant to the influence of competing but relevant situational cues that could change their initial level of motivation. This automatic resilience to motivational primes exhibited by intrinsic and extrinsic chronics suggest that the process by which these individuals maintain their level of motivation is in part automatically regulated. As more research gets done on automatic motivational resilience, we will learn more about the conditions under which this effect can occur and the

processes by which individuals spontaneously motivate themselves in new situations and maintain their level of motivation over time.

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Author Note

This paper was prepared while the first author was supported by a doctoral scholarship from the Social Sciences and Humanities Research Council of Canada (SSHRC), and the second author was supported by a grant from the Social Sciences and Humanities Research Council of Canada (SSHRC).

Correspondence concerning this article should be addressed to Chantal Séguin-Levesque, University of Ottawa, School of Psychology, 145 Jean-Jacques Lussier, Ottawa, Ontario, K1N 6N5.

Footnotes

¹Extrinsic motivation by introjected regulation refers to behaviors that are performed because of internal constraints, such as guilt or shame. Extrinsic motivation by identified regulation refers to behaviors that have been internalized to the point of being valued by the individual who performs them, while extrinsic motivation by integrated regulation refers to behaviors that have become part of an individual's self-concept. In addition to intrinsic and extrinsic motivation, amotivation is another form of motivation which represents behaviors that are performed without a sense of purpose for doing the activity.

Table 1

Mean ratings for intrinsic motivation, interest-enjoyment, positive emotions, and persistence as a function of chronicity level and priming condition

Priming	Chronicity level							
	Intrinsic chronics				Nonchronics			
	Intrinsic		Neutral		Intrinsic		Neutral	
	Intrinsic	Neutral	Neutral	Extrinsic	Intrinsic	Neutral	Neutral	Extrinsic
Intrinsic motivation	5.69	6.47	6.00	6.00	6.25	5.39	4.89	4.31
Interest-enjoyment	7.03	7.52	7.02	7.02	7.18	6.83	5.85	5.62
Positive emotions	6.72	6.86	6.89	6.89	6.67	6.33	5.61	5.42
Free-choice (sec.)	289.89	291.57	262.22	262.22	284.64	219.91	102.80	127.60

Note. The means for persistence represent the amount of time in seconds spent on the task during the free-choice period.

DISCUSSION AND CONCLUSION

Up until recently, automatic processes were considered to be the opposite of strategic controlled conscious processes (Bargh & Chartrand, 1999; Posner & Snyder, 1975; Shiffrin & Shneider, 1977). Automatic processes were viewed as errors of the mind and leading to irrational responses, whereas conscious processes were considered to be the reflection of individuals' conscious choice and effortful decision making process (Langer, 1978; Langer et al., 1978). However, as empirical evidences accumulated, it became increasingly clear that automatic processes served an adaptive function and that most social psychological processes possessed both conscious and nonconscious components (Bargh & Chartrand, 1999; Kahneman & Treisman, 1984; Logan & Cowan, 1984). In fact, many of everyday complex social cognitive processes have now been found to be at least in part automatically regulated (see Bargh, 1996, 1997; Bargh & Chartrand, 1999; Chartrand & Bargh, 1996, 1999; Chen & Bargh, 1999; Gollwitzer & Bargh, 1996). The field of psychology thus appears to be gradually moving away from a firm position concerning the nature of the processes underlying various psychological phenomena. A growing number of contemporary psychologists favor a perspective where psychological phenomena are thought to be determined jointly by processes set into motion by environmental stimuli and processes initiated by individual's conscious choice or will (see Bargh & Chartrand, 1999).

In the present thesis, the automaticity framework used to investigate various psychological processes, perceptual as well as motivational, was applied to a motivational domain not yet studied from this theoretical perspective. Four studies were conducted in order to investigate the existence and implications of automatic processes underlying intrinsic and extrinsic motivation (Deci & Ryan, 1985, 1987, 1991). First, it was found that intrinsic and extrinsic motivation were in part regulated by nonconscious automatic processes. In three separate studies, an intrinsic or an extrinsic motivation was activated outside individuals' awareness and subsequently influenced their level of motivation, perceptions, and behavior toward another task without the involvement of conscious intention or guidance. Second, the spontaneous effects of these nonconsciously activated motivation paralleled the effects obtained in previous studies through conscious regulation of these

motivation (Deci & Ryan, 1991; Vallerand, 1997, for a review). In agreement with those, results of the present studies showed that individuals nonconsciously primed with an intrinsic motivation became more motivated, interested, perceived more choice, and performed better on a subsequent task than individuals nonconsciously primed with an extrinsic motivation. These findings served to support our contention that a motivation was automatically activated in the series of experiments performed in the present thesis. It seems that whether intrinsic and extrinsic motivation are consciously or nonconsciously regulated, they tend to produce similar effects.

Third, results of two studies showed that intrinsic and extrinsic motivation existed in chronic form in some individuals. For these individuals, the construct that came easily to mind in reference to school, and that were thus most accessible, were associated with an intrinsic or an extrinsic motivation. These forms of motivation were nonconsciously activated by the mere presence of relevant input in the environment, in this case the reference to academia. Intrinsic chronics exposed to neutral primes, were more motivated, interested, perceived more choice, and spent more time on a subsequent task than extrinsic chronics exposed to neutral primes.

Fourth, evidence supporting the existence of a common process underlying temporary and chronic forms of construct accessibility reported in previous studies (see Bargh, 1996, 1997, for reviews) was also obtained with intrinsic and extrinsic motivational constructs. In the last study conducted, it was found that temporary primed intrinsic and extrinsic motivation reproduced the effects of these chronically accessible motivation. Whether the necessary level of activation of the motivational constructs had been reached through temporary means or chronic use, the same effects on task's motivation, perception, and behavior were observed. Finally, individuals with a chronically accessible intrinsic or extrinsic motivation were found to nonconsciously resist the influence of a temporary primed competing motivation. Whereas the perception and behavior of nonchronics were affected by the temporary primed motivation, the perceptions and behavior of intrinsic and extrinsic chronics were not.

Although research on various automatic processes had been conducted in the recent past, and similar conclusions had been reached, the studies comprised in the present thesis represented

the first evidences supporting the automaticity of intrinsic and extrinsic motivation. Beyond the empirical demonstration consistent with the existence of nonconscious processes underlying and regulating intrinsic and extrinsic motivation, the theoretical as well as practical implications of the present findings are potentially far reaching and certainly need to be further explored. The present thesis certainly does not address all the questions about the automatic activation and regulation of motivational constructs related to intrinsic and extrinsic motivation. Nonetheless, the present results represent an encouraging first attempt to study the nonconscious processes involved in the regulation of certain forms of motivation identified in Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991). The following discussion is thus a reflection on what the empirical evidences of the present thesis could mean for the study of motivation in general and Self-Determination Theory specifically. We also address some limitations of the present studies as well as identify some avenues for future research.

Volition and the unconscious

A major conclusion derived from the present findings is that individuals do not seem to be fully aware of every situational influences affecting their perceptions and motivation and guiding their behavior. People want to be in control of their fate and actions and strongly believe they play an agentic role in the determination of their life orientation (DeCharms, 1968, James, 1890, White, 1959). The fundamental premises of humanistic theories such as the Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991) are also based on this belief that people are responsible for their actions. The three basic needs posited by Self-Determination Theory, namely competence, autonomy, and relatedness, are an expression of the agentic nature of humans. However, results of previous studies and those of the present thesis seem to suggest that goals and motivation can be activated nonconsciously by features of the environment and then operate outside of awareness to spontaneously influence one's motivation, perceptions, and actions. As a consequence, several of our actions and perceptions would appear to be under the direct control of the environment.

Even if individuals are aware of and can report their preferences, perceptions, moods, state of mind, and reasons for behaving, most of the time they probably remain unaware of the

environmental stimuli affecting their motivation or the processes underlying these motivational changes. In fact, in the present studies, individuals reported being not aware of the nature of the primes presented in the initial task, and the relation between the initial task and a subsequent task. To test that hypothesis even further, it would be interesting to reproduce the classic experiment of Deci (1971) and examine the extent to which individuals are aware of the detrimental effects of the reward on their level of intrinsic motivation toward the task. We would hypothesize that individuals would not suspect the detrimental effect of the reward and because of the pervasive use of rewards to motivate people, might even think that the reward was beneficial and increased their interest toward the task and their performance. Furthermore, as individuals' level of intrinsic motivation would gradually decrease with the use of an external incentive, and as they would become aware of their diminished level of motivation, we would hypothesize that individuals would not attribute their resultant perceptions and behavior to the situational context (e.g., external incentive). In sum, what we can extrapolate from the findings of the present thesis is that individuals may not be as fully conscious about what shape them or as truly strategic in their life decisions as they would like to be. In general, individuals would seem to be quite susceptible to situational influences merely present in the environment. The results of the present thesis suggest that an intrinsic or an extrinsic motivational goal can be automatically activated by environmental features in the absence of individuals' conscious choice or intention.

The susceptibility of participants to intrinsic as well as extrinsic motivational primes is consistent with the hypothesis that individuals already have available in memory, a cognitive structure associated with intrinsic and extrinsic contextual stimuli (Higgins, 1996). Even individuals without a chronically accessible intrinsic or extrinsic motivational orientation were influenced by the temporary primed motivation, suggesting that the relevant cognitive structures were also available for these individuals. In fact, for a construct to become accessible and influence individuals' perceptions and behavior, it necessarily has to be available in memory. If a construct is not available, at least in a latent state, it cannot become accessible and be activated by relevant environmental stimuli (Higgins, 1996; Higgins & King, 1981). This suggests that when individuals

experience at least some events or stimuli relevant to intrinsic and extrinsic motivation, associations starts to form in one's mind enabling the development of a cognitive structure for intrinsic and extrinsic motivation. Because of the presence of intrinsic as well as extrinsic cues in the environment, both of these cognitive structures would thus be stored and become available for everybody, not only for individuals with a chronically accessible intrinsic or extrinsic motivational orientation. Once available, these cognitive structures for intrinsic and extrinsic motivation could subsequently be made more accessible either through temporary priming of relevant stimuli or chronic use of the motivational constructs. If this reasoning is correct, it would appear that individuals would not only be predisposed to become intrinsically motivated and develop a cognitive structure associated with that form of motivation, but could as easily be predisposed to become extrinsically motivated and develop a cognitive structure associated with extrinsic motivation.

It seems possible that in the present studies, the priming event worked to activate the stored knowledge about intrinsic or extrinsic motivation, which temporarily increased the accessibility of the relevant cognitive structure. In turn, this increased accessibility should have contributed to augment the probability that an intrinsic or an extrinsic motivation would be spontaneously used to interpret and perceive the subsequent task presented to participants. As long as individuals have a cognitive structure associated with that goal available, the goal can be made more accessible through temporary priming of relevant stimuli. As discussed by researchers in the field of automaticity (Bargh, 1990, 1996, 1997, Bargh & Chartrand, 1996), the temporary priming manipulation used in laboratory studies is meant to reproduce the effects of chronic individual differences in construct accessibility. Alternatively, one's cognitive structure associated with intrinsic or extrinsic motivation could be strengthened through frequent and consistent experience with some type of motivational stimuli over another in similar situations. The temporary priming represents one way to illustrate what most likely occurs the first few times a construct is experienced, whether perceptual or motivational, before it becomes chronically accessible. Over time, this particular goal would become chronically accessible and thus more likely to be activated by contextual stimuli and spontaneously used to interpret and perceive subsequent information.

In some circumstances, individuals will consciously identify a goal they want to attain or the reasons for working toward that goal. Consequently, individuals will choose to place themselves in situations that will maximize their goal attainment and will purposefully make the same choices in association with that goal frequently and repeatedly in relevant situations. However, individuals don't need to consciously choose a goal to attain for it to become regulated by nonconscious automatic processes. Individuals can become chronically intrinsically or extrinsically motivated without having made a conscious decision or identified a strategic course of action to develop a particular kind of motivational orientation. Again, the necessary and sufficient conditions for a goal or motivation to become chronically accessible and automatically activated by relevant stimuli are frequency and consistency of use of the goal or motivation in the same contexts. It does not matter if this consistency resulted from a conscious and strategic decision to attain a goal or act in a certain manner, or whether it simply resulted from a tendency to be exposed to certain stimuli which engendered similar reactions, perceptions, emotions, and behaviors each time (Bargh & Chartrand, 1999).

Limitations of the present studies

In the last two studies conducted, we used an adapted version of the free-response measure of accessible constructs (Higgins et al., 1982) to identify intrinsic and extrinsic chronics. Although the procedure used was repeatedly validated in previous studies on the effects of chronically accessible constructs (Bargh et al., 1986; Higgins, 1989, 1996) and we thus believe it to be an appropriate measure to identify chronics, it was found to be very costly in terms of human resources. When asked to indicate the reasons they had for attending University, the majority of students spontaneously first reported reasons associated with an extrinsic motivation. These reasons first mentioned were taken as representative of one's most accessible motivational constructs. As a result, using that procedure, more extrinsic chronics than intrinsic chronics were identified. Consequently, in order to obtain an adequate sample of intrinsic chronics to participate in the laboratory study, a very large number of potential participants had to complete the free-response measure of chronically accessible academic constructs. The difficulty experienced in

recruiting enough chronics to participate in the laboratory study was aggravated by the fact that only a fraction of potential participants actually completed the study.

One possible explanation for the abundance of extrinsic chronics identified could be the pervasive use of rewards, bonuses, and various sanctions to alter individuals' behaviors. In our society, there exists a general belief that rewards are beneficial for individuals' motivation. In addition, most people agree with the implementation of strict sanctions to control individuals' behavior and believe these to be useful. Although sometimes sanctions and penalties are undoubtedly necessary to prevent dangerous behaviors, previous research deriving from the Self-Determination Theory (Deci & Ryan, 1985, 1987, 1991) showed repeatedly that material incentives and sanctions contributed to decrease individuals' level of self-determined motivation (see Vallerand, 1997, for a review). The extensive use of rewards, penalties, and other controlling contexts in general to motivate individuals to act, would thus contribute to produce a majority of extrinsic chronics in a variety of contexts.

Even though the results of the present thesis are encouraging, they support the existence of automatic processes underlying intrinsic and extrinsic motivation in a controlled context, i.e., a laboratory setting. Although we can extrapolate from the present findings, we do not yet know how these processes would manifest themselves in a natural setting. In the future, it would be useful to conduct research on automatically activated motivation in the field, or at least try to reproduce more closely the conditions present in a natural environment. This kind of research would contribute to expand our knowledge about automatic processes regulating intrinsic and extrinsic motivation and the conditions under which these processes operate.

The usefulness of automatic processes

Results of past research on automatic processes and the findings of the present thesis suggest that automatic processes are pervasive and influence individuals' perceptions, judgments, emotions, motivation, and actions. Does that mean that our life is merely a succession of mindless responses and behavioral errors? Even researchers advocating the importance of the conscious self as a decision maker guiding one's behavior, experimentally demonstrated the limited nature of the

self-regulatory capacity (Baumeister, Bratslasky, Muraven, & Tice, 1998). In fact, Baumeister et al. (1998) concluded that consciousness could guide individuals' behavior only approximately 5% of the time. Although individuals seem to be unaware of the process underlying automatically activated goals or motivation, these automatic processes may serve an adaptive function (see Bargh & Chartrand, 1999; Chartrand & Bargh, 1999). For one thing, they are thought to reflect individuals' own past histories and life regularities. Automatic processes capture individuals' own consistent experiences and are thus based on repeated use of a construct in specific contexts and not on one-time-experience or spur-of-the-moment decisions. In other words, the system comes to recognize the regularities in one's life and eventually subsumes them under the control of the unconscious (Bargh & Barndollar, 1996; Bargh & Chartrand, 1999). In time, individuals no longer need to consciously make decisions about situations they always made the same way in the past. Once developed and regulated by nonconscious processes, chronically accessible constructs spontaneously guide perceptions and behavior in the direction consistently experienced without the need for conscious awareness or monitoring (Bargh & Chartrand, 1999).

Having a self-determined motivation automatically activated by environmental stimuli could prove highly useful, especially in situations where values and commitment to a goal, as well as the pleasure experienced while working toward the goal play an important role. For example, in the academic domain, previous research has shown the importance of values and commitment to a goal for persistence toward that goal and goal achievement (Vallerand, 1997; Vallerand, Pelletier, Blais, & Brière, 1992, 1993). We could extrapolate and hypothesize that individuals with a chronically accessible self-determined motivation could persist longer in school and experience other long term motivational consequences, without the need for conscious monitoring of these endorsed long term goals. Especially in the transition periods, such as between high school and college, possessing a chronically accessible self-determined motivation could nonconsciously help students continue working toward an academic goal. Because the requirements, the type of assignments, and the level of involvement needed to succeed in school change over the years, being committed to a long term goal can be crucial for students to remain motivated toward school on a daily basis. Having that

valued goal automatically activated by environmental features could potentially help students to persist in the identified direction and be successful in their academic endeavors. Consequently, these students could successfully work toward their long term academic goal without the need to continuously consciously monitor their daily progress or to consciously regulate their perceptions and behavior.

Another important implication of the present thesis is that individuals with a chronically accessible intrinsic or extrinsic motivation nonconsciously resisted the influence of a temporary primed competing motivation. In contrast, individuals without a chronically accessible motivation were found to be quite susceptible to the influence of intrinsic and extrinsic primes. The automatic resilience to temporary primes exhibited by intrinsic and extrinsic chronics led us to believe that previous findings accounted for in terms of conscious controlled processes could have been explained by nonconscious automatic processes. For example, in the studies conducted by Boggiano and colleagues (Boggiano & Katz, 1991; Boggiano et al., 1988) children taught by controlling teacher could have been able to remain intrinsically motivated because some of them could have possessed a chronically accessible intrinsic motivation toward school. For intrinsic chronics, their chronic motivational orientation toward school could have made them nonconsciously resistant to a controlling context, once automatically activated by the academic setting. Because intrinsic chronics would have resisted the influence of the controlling context, the expected effects of the interpersonal context on the remaining students would not have been significant.

What is needed to test that possibility, is a demonstration, within a social interaction context, that the perceptions and behavior of individuals with an automatically activated motivation do not change as a function of the interpersonal context, and that these effects occur without conscious choice or guidance. Thus, in future studies, it would be interesting to examine the extent to which individuals with an automatically activated intrinsic or extrinsic motivation can nonconsciously resist the impact of a controlling or an autonomy supportive interaction. In order to do that, individuals could be asked to participate in several mini-experiments presented as unrelated to one

another. First, as part of the initial experiment, individuals could be exposed to intrinsic, extrinsic, or neutral primes. Then, in a subsequent experiment presented as unrelated to the initial one, individuals could be asked to work on a task with a confederate who would either display controlling or autonomy supportive behaviors. We would hypothesize that individuals exposed to neutral primes would be influenced by the nature of the interpersonal context they would subsequently experience. Compared to individuals exposed to neutral primes who would subsequently interact with a controlling confederate, individuals who would subsequently interact with an autonomy supportive confederate, could perceive the task as more positively, spend more time on the task, and perceive their interaction partner as more motivated and interested. These findings would be consistent with previous results on the impact of the interpersonal context on individuals' perceptions and behavior (Harackiewicz, 1979; Ryan, 1982; Ryan et al., 1983; Vallerand, 1997 for a review). In contrast, we would hypothesize that individuals with an automatically activated intrinsic or extrinsic motivation would not be influenced by the nature of the interpersonal context. Individuals with an automatically activated intrinsic or extrinsic motivation would behave and perceive the task, as well as the confederate, similarly whether they would have been involved in a controlling or an autonomy supportive context.

Previous research has already shown that the nature of the interpersonal context influences one's perceptions and behavior (Deci & Ryan, 1985, 1987, 1991; Harackiewicz, 1979; Ryan, 1982, Ryan et al., 1983; Vallerand, 1997). However, we do not yet know by which processes these effects occur or whether individuals are aware of these changes taking place. Since it has been demonstrated that most of everyday social psychological processes, including the development of goals and motivation (see Bargh, 1997 for a review) are in part automatically regulated, it seems reasonable to believe that individuals would not be aware of the processes underlying motivational change within a social interaction. To examine whether these processes are to some extent nonconsciously regulated, a variation on the procedure used in the present studies could be utilized. Specifically, in an initial task, individuals could be taught how to solve a puzzle (e.g., SOMA) by a confederate acting as a controlling or an autonomy supportive teacher. This task would serve to

subtly prime a controlling or an autonomy supportive interpersonal context by integrating in the interaction script words such as should or choice, respectively. Then individuals could be asked to work alone on another task presented as unrelated to the initial task through which a certain interpersonal context would have been primed. As discussed previously, we would hypothesize that individuals would not be aware of the impact of the context on their subsequent level of motivation, perceptions, and behavior toward another unrelated task.

Another question that would need to be addressed in future studies concerns the boundaries of the automatic motivational process identified in the present thesis. What are the conditions under which intrinsic and extrinsic motivation and possibly other forms of motivation can automatically operate. An automatic process can either be unintentional, occur outside of awareness, be uncontrollable, very efficient, or be characterized by any two or more of these features (Bargh, 1989, 1994). Results of the present thesis demonstrate that intrinsic and extrinsic motivation can be activated and become operative without individuals' conscious intention. The automatic process underlying these forms of motivation thus seem to be unintentional. In addition, it was found in the present series of studies that individuals were not aware of the potential influence of the primes on their subsequent level of motivation, behavior, and perceptions toward a task. Consequently, the automatic process regulating intrinsic and extrinsic motivation also appears to be operating outside individuals' awareness. What remains to be examined in future studies is the extent to which the automatic process underlying intrinsic and extrinsic motivation, and possibly other forms of motivation (Deci & Ryan, 1985, 1987, 1991), is controllable and efficient.

Efficiency and controllability of automatic motivational processes

Previous research on automatic processes and the findings of the present thesis suggest that these processes are pervasive, underlying a variety of constructs, and influencing most people (see Bargh, 1997, for a review). Some of these automatic processes have been shown to be quite efficient, capable of operating without much attentional capacity. For example, the social judgments and impressions of individuals with a chronically accessible construct were found to be nonconsciously influenced by construct relevant traits or behaviors even under attentional overload

(Anderson, Spielman, & Bargh, 1992; Bargh & Thein, 1985; Bargh & Tota, 1988). Dispositional trait inference has also been shown to be somewhat efficient as well as unintentional. Specifically, a digit retention task did not interfere with spontaneous trait inferences, whereas a probe reaction-time task added to the digit retention task interfered with this automatic process (Lupfer et al., 1990; Uleman, Newman, & Winter, 1992; Winter et al., 1985).

Attentional capacity

In the present case, however, we do not know how much attentional capacity is required for a motivational automatic process to operate. Further research could examine whether the spontaneous effects obtained without a concurrent cognitive load would also be obtained when individuals' cognitive capacity is occupied. A few previously tested procedures could be used to attain this aim. For example, individuals could be asked to rehearse a multiple-digit number (see Bargh & Thein, 1985; Thompson, Roman, Moskowitz, Chaiken, & Bargh, 1994) while performing the Scramble Sentence Task through which the motivational primes would be presented. Alternatively, while being exposed to the primes, individuals could be asked to listen to a tape recording in which a string of digits and/or letters could be recited (see Martin, Seta, & Crelia, 1990). If the automatic process underlying intrinsic and extrinsic motivation is efficient, the cognitive load manipulations would not interfere with this automatic process and the effects obtained in the present thesis without the use of a cognitive load would be reproduced. The automatic process underlying intrinsic and extrinsic motivation would thus be shown to be efficient as well as occurring outside of awareness and without individuals' intention.

Because intrinsic and extrinsic motivation can be activated and then operate outside individuals' awareness and without individuals' intention to start the process, this process can likely become automated without individuals knowing it and then operate automatically without individuals conscious choice or guidance. Consequently, it is quite possible that an automatic process could be developed and strengthened without individuals ever having knowledge of its existence. Specifically for that reason, it would appear to be very difficult for individuals to control or change an automatically regulated process, because typically one does not know it is present or

operating. Although generally adaptive, it is possible to imagine instances where it would be useful to know how to change the way individuals spontaneously approach or work toward a certain situation or task.

Overriding an automatic process

In the present thesis, it was found that individuals with a chronically accessible extrinsic motivation toward University nonconsciously resisted the influence of intrinsic primes that would have enhanced their level of self-determined motivation toward an academic task. Results of many studies showed that individuals who attend school mainly for non self-determined extrinsic motives, such as to make money or get a prestigious job, perceive school as less satisfying and abandon their studies earlier than individuals who attend school for self-determined motives (Vallerand, 1997, for a review; Vallerand et al., 1992, 1993). In this particular case, knowing how a chronically accessible extrinsic motivation toward school could be changed or the automatic underlying process overridden could have important implications from an applied point of view.

Previous research on the boundaries of various automatic social psychological processes have identified conditions under which a priming stimulus will or will not affect individuals' subsequent perceptions and behavior in the direction of the primed construct (Lombardi et al., 1987; Martin, 1986; Moskowitz & Roman, 1992; Moskowitz & Skurnik, 1999; Strack, Schwarz, Bless, Kübler, Wänke, 1993; Thompson, et al., 1994). Results of these studies showed that assimilation will occur when individuals are not aware, at the time of judgment, of the potential influence of a primed construct on subsequent task's impressions, as is the case in studies on the effects of automatic processes (see also Bargh, 1997, 1999, for reviews). Conversely, contrast effects are most likely to occur when individuals suspect that a primed stimulus could potentially bias their impressions of another task. When individuals are aware of the previously presented primes, at the time of judgment, they may interpret the stimuli in a way alternative to the primed construct. According to the Set-Reset model (Martin, 1986; Martin et al., 1990), contrast effects are the result of individuals attempting to remove the impact of a potential source of bias by subtracting out the biasing influence from their judgments. Extrapolating from these findings, it seems that in order to

reverse or override an automatic motivational process, one would need to make individuals aware, at least to some extent, of the potential impact of the primed motivation on their subsequent perceptions. This could be accomplished in different ways which vary in individuals' degree of awareness of the impact of the primed construct on latter perceptions and behavior. In addition, future research should also try to determine the sufficient level of awareness of the influence of a primed construct that is necessary to neutralize or reverse an automatic motivational process.

For example, using the research paradigm employed in the studies of the present thesis, in which the Scramble Sentence task was used to prime a motivational construct, individuals' awareness of the primed construct could be raised by asking them to recall as many sentences as possible. This surprise free-recall could be done either right after the completion of the Scrambled Sentence task or right before asking individuals about their impressions of the second task performed, which would still be presented as unrelated to the initial task. Either way, the motivational construct would have already been nonconsciously activated and the free-recall of the primes would be used as a demonstration of how automatic processes can be reversed. This experimental procedure would have the advantage of keeping individuals unaware of the true nature of the primed construct and their potential influence while still contributing to heightened individuals' awareness of the priming stimulus. Making individuals aware through recall of the stimuli presented could be sufficient to spontaneously activate a correction process for the biasing influence. In that particular case, the correction process would also be automatically regulated, without individuals' conscious choice or guidance, since they would not be aware of the potentially biasing influence of the primes.

The correction of an automatic process

Previous research has already shown that correction processes can be initiated and operate without individuals reporting any influence of the primes on their subsequent impressions, even after being told of the nature of the primes and their impact. However, individuals will typically acknowledge that other people could have been influenced by the primes (Martin, 1986; Martin et al., 1990; Moskowitz & Roman, 1992; Moskowitz & Skurnik, 1999). These findings suggest that

individuals have available in memory, at least on some level, the knowledge that perceptions and behavior can be affected by contextual stimuli. In spite of that, individuals do not consciously process the impact of the primes on their own judgment, and do not report being aware or having initiated any correction process on their impressions and judgments.

Individuals' awareness of the primed construct and their influence could also be raised more directly by highlighting the potential biasing influence of the stimuli presented in the initial task. As part of the experimental instructions, participants could be warned about the possible impact of one task on the other, without specifically mentioning how they could affect one another. In addition, participants could also be asked to consciously make an effort to monitor their reactions to each task and try not to be influenced by the components of the task they previously worked on. In that case, individuals would be aware of the potential for bias from the initial task on their subsequent judgments, but they would not be aware of the manner in which this bias should manifest itself. To correct for the potential biasing influence, individuals would have to first evaluate in which direction and to what extent the priming stimuli could affect their impressions and behavior on the subsequent task. Not knowing exactly how much they should compensate for the biasing influence and correct their perceptions of the subsequent task, individuals' final impressions of the task could follow two patterns. The first possible scenario we could think of is that individuals could adjust their impressions of the task too conservatively, resulting in a neutralization of the effects of the automatically activated motivation. Alternatively, individuals could overly correct for the potential biasing influence of the priming stimuli on their impressions of the task, resulting in a reversal of the effects of the automatically activated motivation, or a contrast effect (Moskowitz & Skurnik, 1999).

Finally, the biasing influence of the priming stimuli could be brought to individuals' consciousness in a blatant way by revealing to participants the nature of the primes they would have been exposed to in the initial task and their known effect on subsequent judgments. In that case, the process that individuals would follow in order to adjust their impressions of the subsequent task to compensate for the biasing influence of the primes would be consciously guided. However, in an

attempt to remove all of the primes' perceived influence on their impressions and behavior, individuals could inadvertently overcompensate, thus removing part of their genuine reaction to the task. This strategic adjustment would thus result in a contract effect (Moskowitz & Skurnik, 1999) and not simply a neutralization effect.

Conclusion

In sum, the findings of the present thesis constitute the first empirical demonstration of the existence of an automatic process underlying intrinsic and extrinsic motivation. Although encouraging, these findings need to be replicated in various situations and with different tasks in order to establish the generalizability as well as the limits of this automatic process. Further research will certainly help to establish the boundaries of the automatic process underlying intrinsic and extrinsic motivation, as well as other forms of motivation. In addition, we will become more knowledgeable of the conditions under which the spontaneous effects resulting from the automatic activation of various forms of motivation are augmented or diminished.

This general discussion has been a reflection on the widespread implications of the findings of the present thesis. However, the reflection leading to this general discussion has certainly not ceased with the completion of this work. On the contrary, the process has just begun and the implications deriving from the present findings will most certainly generate new ideas, new problems to solve, and new avenues to explore as further research is conducted and as these words are written.

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APPENDIX A
INTRINSIC AND EXTRINSIC PRIMES USED IN STUDIES 1, 2, AND 4

INTRINSIC MOTIVATION CONDITION

PRIMES

- 1) is quiet spontaneous very she
- 2) has challenge he a chair
- 3) they speaking interested constantly were
- 4) feeling she involved something was
- 6) was satisfied he simple really
- 8) were again volunteering they talking
- 10) were it mastering they reading
- 11) often is delighted she here
- 12) is there absorbed he really
- 13) dizzy is feeling he competent
- 14) were nothing they autonomous feeling
- 15) he enjoying was himself hearing

OTHER SCRAMBLED SENTENCES

- 5) was done ready she almost
- 7) he by came today walked
- 9) invited yesterday them she called

EXTRINSIC MOTIVATION CONDITION

PRIMES

- 1) is quiet competitive very she
- 2) has obligation he an armchair
- 3) they speaking expected constantly were
- 4) feeling she evaluated something was
- 6) was constrained he simple really
- 8) were again demanded they talking
- 10) were it avoiding they reading
- 11) often is restricted she here
- 12) is there forced he really
- 13) dizzy is feeling he pressure
- 14) were nothing they controlled feeling
- 15) he proving was himself hearing

OTHER SCRAMBLED SENTENCES (same as in the intrinsic motivational orientation condition)

- 5) was done ready she almost
- 7) he by came today walked
- 9) invited yesterday them she called

NEUTRAL CONDITION

- 1) is quiet still very she
- 2) has apartment he an armchair
- 3) they speaking carried constantly were
- 4) feeling she numbed something was
- 5) was done ready she almost
- 6) was close he simple really
- 7) he by came today walked
- 8) were again moving they talking
- 9) invited yesterday them she called
- 10) were it sending they reading
- 11) often is near she here
- 12) is there early he really
- 13) dizzy is feeling he cold
- 14) were nothing they hungry feeling
- 15) he going was himself hearing

APPENDIX B
QUESTIONNAIRE USED IN STUDIES 1, 2, AND 4

THOUGHTS AND FEELINGS ABOUT THE CURRENT TASK

Below are statements which deal with thoughts and feelings you might have had during the 15 minutes when you were working on the puzzle/ spatial ability task. Using the scale below, please indicate to what extent you agree with the following statements.

	Does not agree at all			Agree moderately			Agree completely		
1. I was tense during the task.	1	2	3	4	5	6	7	8	9
2. I was generally distracted during the task.	1	2	3	4	5	6	7	8	9
3. I was generally happy during the task.	1	2	3	4	5	6	7	8	9
4. I was generally anxious during the task.	1	2	3	4	5	6	7	8	9
5. I was usually absorbed during the task.	1	2	3	4	5	6	7	8	9
6. I was generally relaxed during the task.	1	2	3	4	5	6	7	8	9
7. I experienced a lot of freedom while doing the task.	1	2	3	4	5	6	7	8	9
8. I felt there were too many constraints in this task.	1	2	3	4	5	6	7	8	9
9. I felt that what I did in this task was really what I wanted to do.	1	2	3	4	5	6	7	8	9
10. I was generally in a good mood during the task.	1	2	3	4	5	6	7	8	9
11. I felt that the things I worked on in the task were imposed on me rather than chosen by me.	1	2	3	4	5	6	7	8	9
12. During the task, I sometimes thought of something else.	1	2	3	4	5	6	7	8	9
13. The feelings I had during the task were generally positive.	1	2	3	4	5	6	7	8	9
14. I thought I knew just as much as anyone else in order to perform the task.	1	2	3	4	5	6	7	8	9
15. I felt able to accomplish the task.	1	2	3	4	5	6	7	8	9
16. I thought I was just as capable as anyone to accomplish what was required in the task.	1	2	3	4	5	6	7	8	9
17. I actually felt that I was more competent to perform the task than most people.	1	2	3	4	5	6	7	8	9

- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 18. I thought I could effectively do what was required in the task. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 19. I thought I knew enough to be competent in the task. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

WHAT DID YOU THINK OF THE CURRENT TASK?

During the experimental session, you spent 15 minutes working on a puzzle/ spatial ability task. When answering the following questions, please refer specifically to what you thought of the task when you were working on the puzzle/ spatial ability task (during the 15 minute time period). Using the scale below, please indicate to what extent you agree with the following statements.

- | | Does not agree at all | | | Agree moderately | | | | Agree completely | |
|--|-----------------------|---|---|------------------|---|---|---|------------------|---|
| 1. I found the task really interesting. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2. I really liked doing the task. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3. I thought the task was really boring. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4. I found the task monotonous. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 5. I really enjoyed working on the task. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

WHY DID YOU PERFORM THE CURRENT TASK?

During the experimental session, you spent 15 minutes working on a puzzle/ spatial ability task. When answering the following questions, please refer specifically to the reasons you had for working on the puzzle/ spatial ability task when you were working on the task (during the 15 minutes). Even if we realize that we specifically asked you to work on this task, try to go beyond this fact and please indicate to what extent you agree with the following reasons for working on the puzzle/ spatial ability task, at the time you were actually working on the task?

- | | Does not agree at all | | | Agree moderately | | | | Agree completely | |
|--|-----------------------|---|---|------------------|---|---|---|------------------|---|
| 1. Because I thought it was a good idea to do it. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2. Because I would have felt bad if I didn't. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 3. Because I'm a type of person who likes to help. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4. I don't know. I had the impression I was wasting my time. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

5. Because I'm a type of person who likes interesting challenges.	1	2	3	4	5	6	7	8	9
6. Because I felt I had to.	1	2	3	4	5	6	7	8	9
7. I'm not sure anymore. I thought that maybe I should have stopped.	1	2	3	4	5	6	7	8	9
8. Because I really enjoyed it.	1	2	3	4	5	6	7	8	9
9. Because it was a sensible way to do something meaningful.	1	2	3	4	5	6	7	8	9
10. Because I would have felt guilty if I didn't.	1	2	3	4	5	6	7	8	9
11. Because I wanted to help the experimenter.	1	2	3	4	5	6	7	8	9
12. Because I really liked it.	1	2	3	4	5	6	7	8	9
13. Because experiencing new things is part of who I am.	1	2	3	4	5	6	7	8	9
14. Because that's what I was supposed to do.	1	2	3	4	5	6	7	8	9
15. I don't know. I thought about whether I should have continued.	1	2	3	4	5	6	7	8	9
16. Because I would have felt awful about myself if I didn't.	1	2	3	4	5	6	7	8	9
17. Because it was really fun.	1	2	3	4	5	6	7	8	9
18. Because that's what I was told to do.	1	2	3	4	5	6	7	8	9

**** When the experimenter left you alone to go make a phone call, did you return on the puzzle/ spatial ability task? Did you try to solve more puzzles?**

Yes_____ No_____

**** If no, please go to the next page. If yes, please refer specifically to the reasons you had for returning on the puzzle/ spatial ability task, when you were alone. Using the scale below, please indicate to what extent you agree with the following reasons for solving more figures when you were alone.**

	Does not agree at all			Agree moderately			Agree completely		
1. Because it allowed me to develop skills that are important to me.	1	2	3	4	5	6	7	8	9
2. Because I would have felt bad if I didn't.	1	2	3	4	5	6	7	8	9

3. Because learning all I can about academic work is really essential for me.	1	2	3	4	5	6	7	8	9
4. I don't know. I had the impression I was wasting my time.	1	2	3	4	5	6	7	8	9
5. Because acquiring all kinds of knowledge is fundamental for me.	1	2	3	4	5	6	7	8	9
6. Because I felt I had to.	1	2	3	4	5	6	7	8	9
7. I'm not sure anymore. I thought that maybe I should have stopped.	1	2	3	4	5	6	7	8	9
8. Because I really enjoyed it.	1	2	3	4	5	6	7	8	9
9. Because it was a sensible way to get meaningful experience.	1	2	3	4	5	6	7	8	9
10. Because I would have felt guilty if I didn't.	1	2	3	4	5	6	7	8	9
11. Because it was a practical way to acquire new knowledge.	1	2	3	4	5	6	7	8	9
12. Because I really liked it.	1	2	3	4	5	6	7	8	9
13. Because experiencing new things is a part of who I am.	1	2	3	4	5	6	7	8	9
14. Because that's what I was supposed to do.	1	2	3	4	5	6	7	8	9
15. I don't know. I thought about whether I should have continued.	1	2	3	4	5	6	7	8	9
16. Because I would have felt awful about myself if I didn't.	1	2	3	4	5	6	7	8	9
17. Because it was really fun.	1	2	3	4	5	6	7	8	9
18. Because that's what I was told to do.	1	2	3	4	5	6	7	8	9

DEMOGRAPHIC INFORMATION

What is your age? _____

What is your gender? Male____ Female____

What is your mother tongue: French____ English____ Other____ Please specify_____

What is your citizenship? Canadian____ Other____ Please specify_____

What is your marital status? Single____ Married____ Common law____
 Divorced____ Separated____

Do you have children? Yes____ No____ if yes how many?____

With whom do you live? with your husband or wife____
 with your partner____
 with roommates____
 with your parents____
 by yourself____

Do you study full time? Yes____ No____

How many years have you been in university?____

What is your intended major?_____

Do you work full time? Yes____ No____

If you work full time, how many years have you been in the job market?_____

Please circle the category which best describes your income before taxes

less than \$12,000
\$12,000 to \$19,000
\$20,000 to \$39,999
\$40,000 to \$59,999
\$60,000 to \$79,000
\$80,000 to \$99,999
More than \$100,000

ABOUT YOUR PARTICIPATION IN GENERAL

We asked you to participate in two experiments in the same session because we wanted to save time. We would like you to answer these questions in order to have your comments on the two experiments.

ABOUT THE EXPERIMENTER

	Not at all			Moderately			Very much		
1. Did you feel comfortable with the experimenter?	1	2	3	4	5	6	7	8	9
2. Did you feel pressured by the experimenter?	1	2	3	4	5	6	7	8	9
3. How helpful was the experimenter?	1	2	3	4	5	6	7	8	9
4. How supportive was the experimenter?	1	2	3	4	5	6	7	8	9

Please indicate to what extent you agree with the following statements?

	Does not agree at all		Agree moderately			Agree completely	
1. What I did in the first experiment has affected what I did in the second experiment.	1	2	3	4	5	6	7
2. I did the two experiments as two unrelated tasks.	1	2	3	4	5	6	7

QUESTIONS REGARDING THE DIFFICULTY OF THE FIRST EXPERIMENT

Please indicate the extent to which you agree with the following statements concerning the first experiment.

	Does not agree at all		Agree moderately			Agree completely	
1. The sentence construction task was very easy	1	2	3	4	5	6	7
2. The sentence construction task was very complex	1	2	3	4	5	6	7

APPENDIX C
QUESTIONNAIRE USED IN STUDY 3

Please indicate your first name: _____

Please indicate your phone number: _____

Indicate the title of the course in which this questionnaire is completed: _____

ACADEMIC MOTIVES

There could be many reasons for going to the University. Please take a few minutes to list up to 10 reasons that you have for going to the University in general.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

WHY DO YOU STUDY?

When answering the following questions, please refer to the reasons you have for attending university generally. On a scale from 1 to 9, please indicate to what extent you agree with the following reasons for attending the university, in general?

	Does not agree at all			Agree moderately			Agree completely		
1. Because I experience pleasure and satisfaction while learning new things.	1	2	3	4	5	6	7	8	9
2. Because I need a degree to get a good job.	1	2	3	4	5	6	7	8	9

- | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|
| 3. To show to myself that I can succeed in university studies. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 4. Because it's one of the ways that I have chosen to acquire skills in an area which is important to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 5. Because the university provides me with a better understanding of the profession which will be mine. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 6. I wonder what I'm doing in university; actually, I find it boring. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 7. For the pleasure I experience while surpassing myself in my studies. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 8. For the intense feeling I experience when I am communicating my own ideas to others. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 9. Honestly I don't know, I truly have the impression of wasting my time in university. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10. Because going to university makes me feel important. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 11. Because it allows me to learn about subjects which are of utmost importance to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 12. Because university allows me to continue to learn about a lot of things that interest me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 13. Because I have to attend university in order to complete my degree. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 14. For the satisfaction I experience when I am in the process of achieving difficult academic activities. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 15. Because, in my opinion, it is a good way to develop skills which will be useful to me later. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 16. For the pleasure that I experience when I read interesting authors. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 17. I don't know, I can't understand what I am doing in university. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

- | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|
| 18. For the pleasure I experience when I discover new things never seen before. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 19. Because it is a prerequisite for getting the job I want. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 20. For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 21. For the pleasure that I experience when I feel completely absorbed by what certain authors have written. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 22. To show to myself that I am an intelligent person. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 23. For the pleasure that I experience in knowing more about subjects which appeal to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 24. Because university experience is very meaningful to me. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 25. Because university allows me to experience a personal satisfaction in my quest for excellence in my studies. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 26. Because it is one of the ways I have chosen to take responsibility for my future career. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 27. I once had good reasons for registering in university; however, now I wonder whether I should continue. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 28. Because it was the only way to be considered for the career I want. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 29. To prove to myself that I am adept in academic endeavors. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 30. Because attending university is a good way to prepare myself for my future career. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 31. Because attending university is what I really want to do for the time being. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 32. For the "high" feeling that I experience while reading on various interesting subjects. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

WHY DO YOU ATTEND THIS COURSE?

When answering the following questions, please refer specifically to the reasons you have for attending this course. Using the scale below, please indicate, to what extent you agree with the following reasons for attending this course?

	Does not agree at all			Agree moderately			Agree completely		
1. Because it allows me to develop skills that are important to me.	1	2	3	4	5	6	7	8	9
2. Because I would feel bad if I didn't.	1	2	3	4	5	6	7	8	9
3. Because learning all I can about academic work is really essential for me.	1	2	3	4	5	6	7	8	9
4. I don't know. I have the impression I'm wasting my time.	1	2	3	4	5	6	7	8	9
5. Because acquiring all kinds of knowledge is fundamental for me.	1	2	3	4	5	6	7	8	9
6. Because I feel I have to.	1	2	3	4	5	6	7	8	9
7. I'm not sure anymore. I think that maybe I should quit.	1	2	3	4	5	6	7	8	9
8. Because I really enjoy it.	1	2	3	4	5	6	7	8	9
9. Because it's a sensible way to get meaningful experience.	1	2	3	4	5	6	7	8	9
10. Because I would feel guilty if I didn't.	1	2	3	4	5	6	7	8	9
11. Because it's a practical way to acquire new knowledge.	1	2	3	4	5	6	7	8	9
12. Because I really like it.	1	2	3	4	5	6	7	8	9
13. Because experiencing new things is a part of who I am.	1	2	3	4	5	6	7	8	9
14. Because that's what I am supposed to do.	1	2	3	4	5	6	7	8	9
15. I don't know. I wonder if I should continue.	1	2	3	4	5	6	7	8	9
16. Because I would feel awful about myself if I didn't.	1	2	3	4	5	6	7	8	9
17. Because it's really fun.	1	2	3	4	5	6	7	8	9
18. Because that's what I was told to do.	1	2	3	4	5	6	7	8	9

Today, to what extent do you feel that this course is...

	Not at all			Moderately				Extremely	
	1	2	3	4	5	6	7	8	9
Interesting.	1	2	3	4	5	6	7	8	9
Challenging.	1	2	3	4	5	6	7	8	9
Difficult.	1	2	3	4	5	6	7	8	9
Boring.	1	2	3	4	5	6	7	8	9
Satisfying.	1	2	3	4	5	6	7	8	9
Absorbing.	1	2	3	4	5	6	7	8	9
Monotonous.	1	2	3	4	5	6	7	8	9
Tiring.	1	2	3	4	5	6	7	8	9

DEMOGRAPHIC INFORMATION

What is your age?_____

What is your gender? Male____ Female____

What is your mother tongue: French____ English____ Other____ Please specify_____

What is your citizenship? Canadian____ Other____ Please specify_____

What is your marital status? Single____ Married____ Common law____
Divorced____ Separated____

Do you have children? Yes____ No____ if yes how many?____

Where do you live? with your husband or wife____
with your partner____
with roommates____
with your parents____
alone or by yourself____

Do you study full time? Yes____ No____

How many years have you been in university?____

What is your intended major?_____

Is this course compulsory in your program? Yes___ No___

Do you work full time? Yes___ No___

If you work full time, how many years have you been in the job market?_____

Please circle the category which best describes your income before taxes

less than \$12,000
\$12,000 to \$19,000
\$20,000 to \$39,999
\$40,000 to \$59,999
\$60,000 to \$79,000
\$80,000 to \$99,999
More than \$100,000

APPENDIX D
SOMA FIGURES USED IN STUDY 4

Figure
1

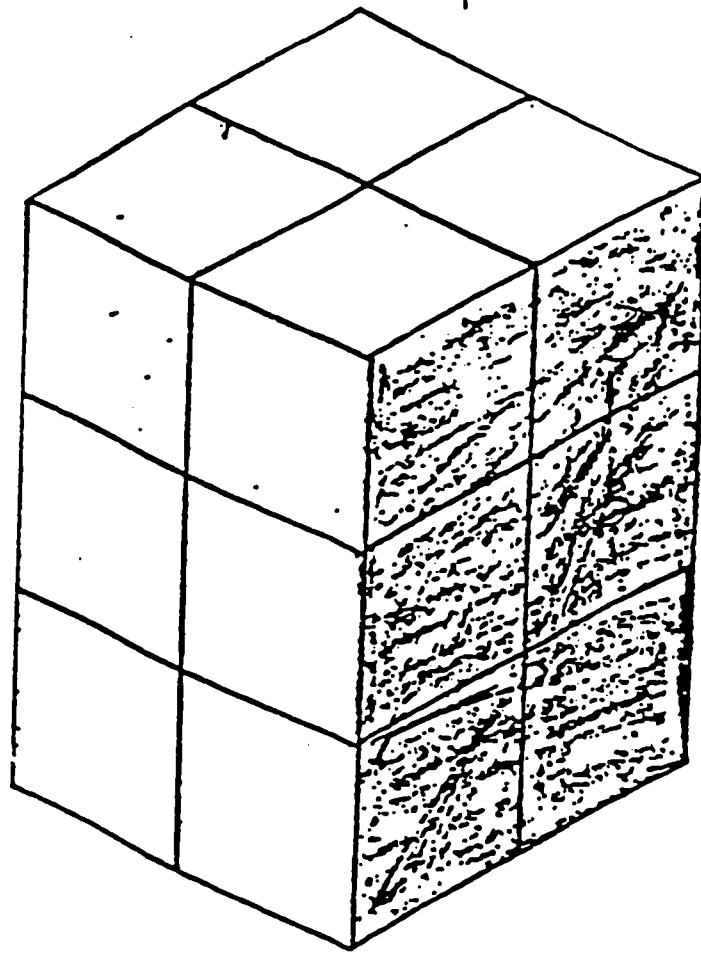


Figure no. 1

Figure
2

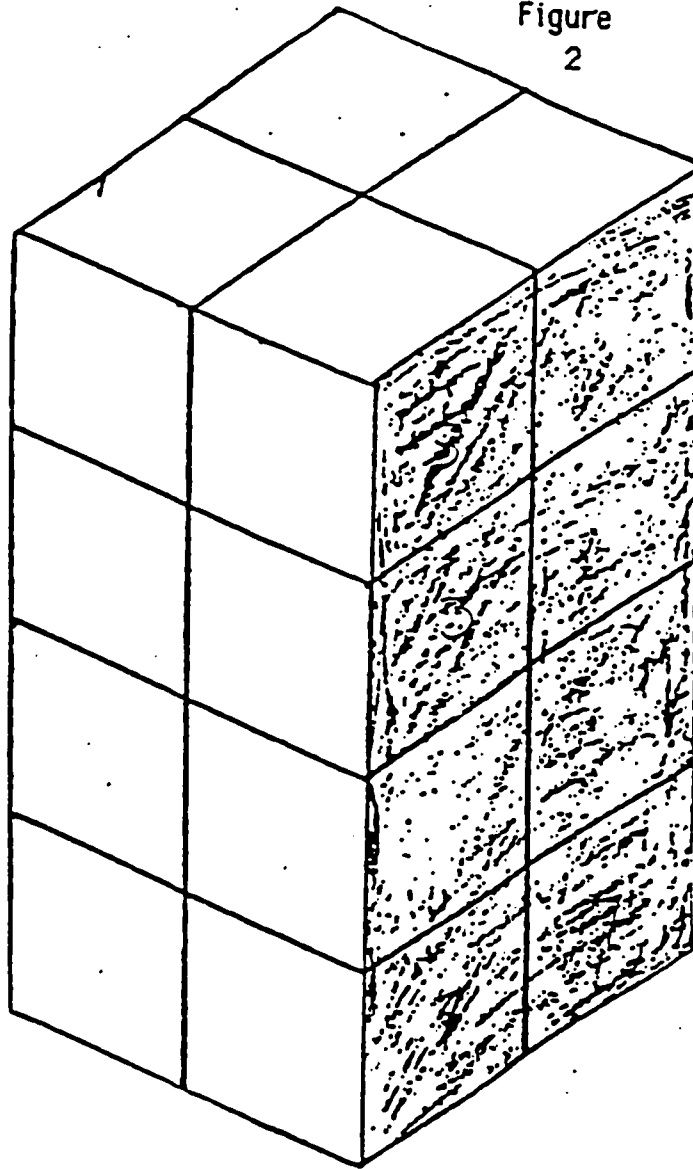


Figure no. 2

Figure
3

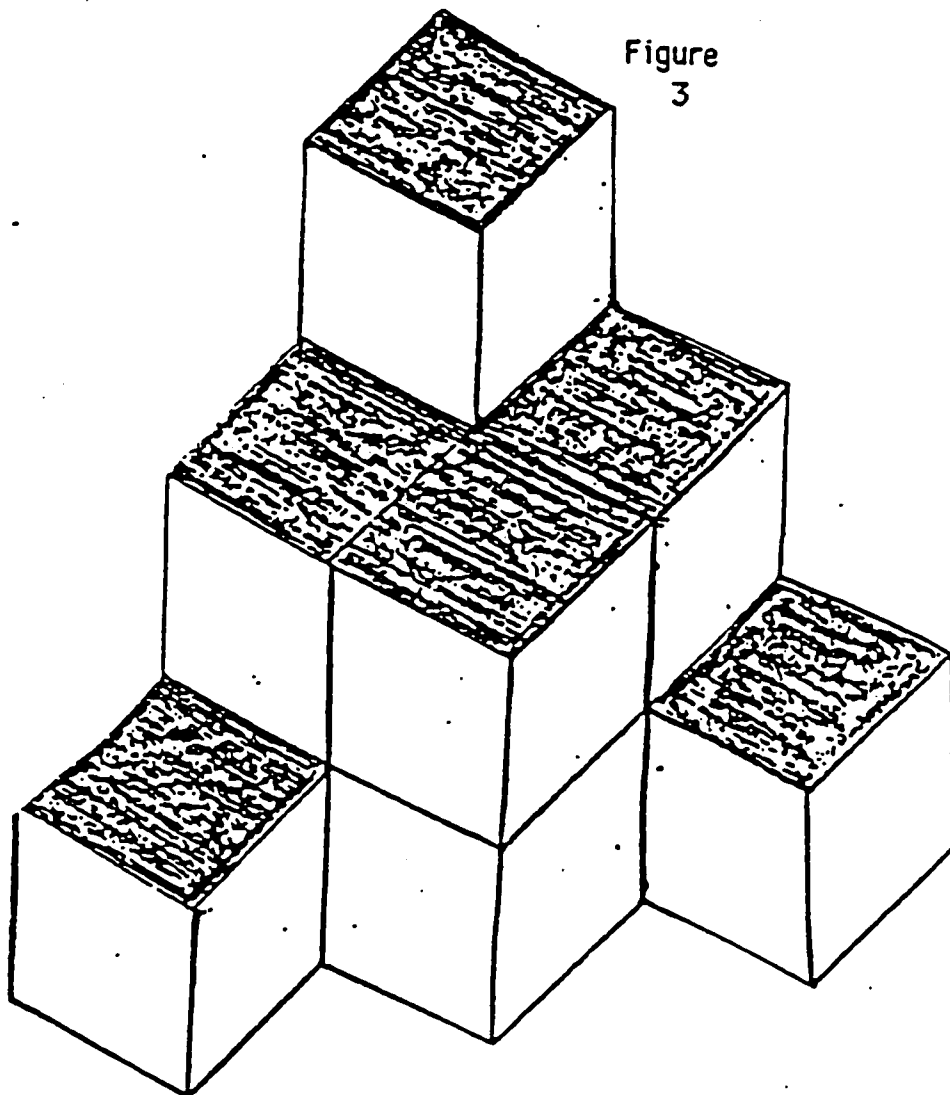


Figure no. 3

Figure
4

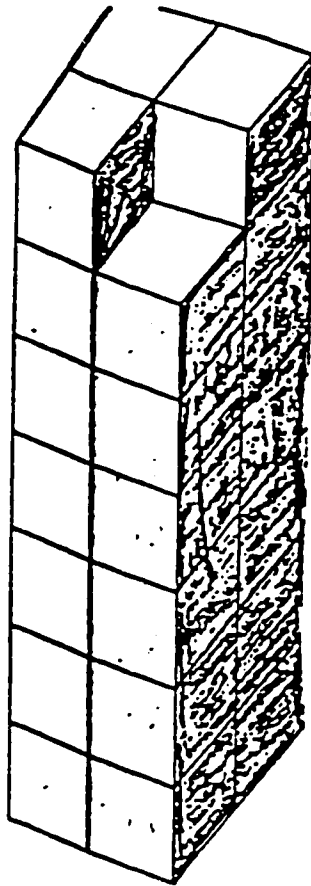


Figure no. 4

Figure
5

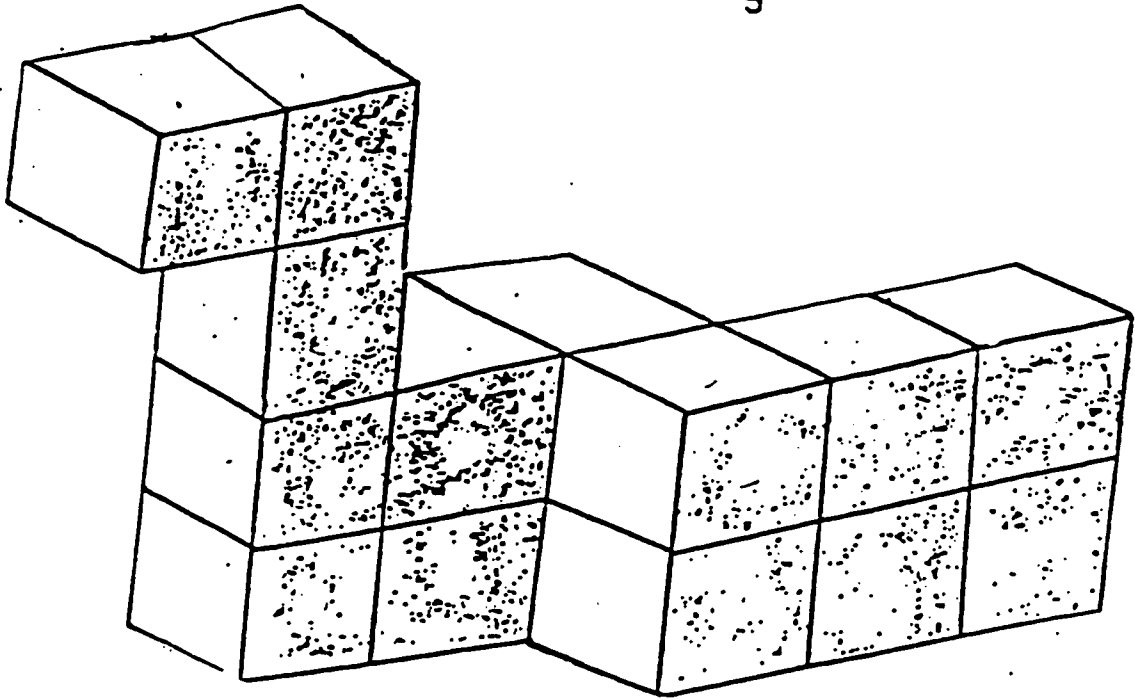


Figure
6.

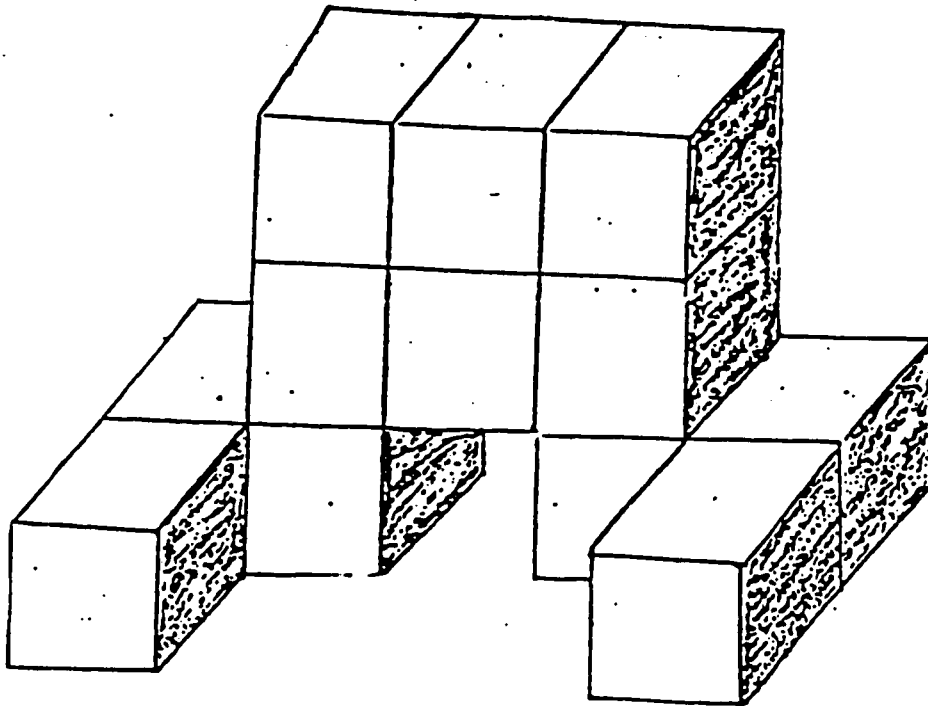


Figure
7

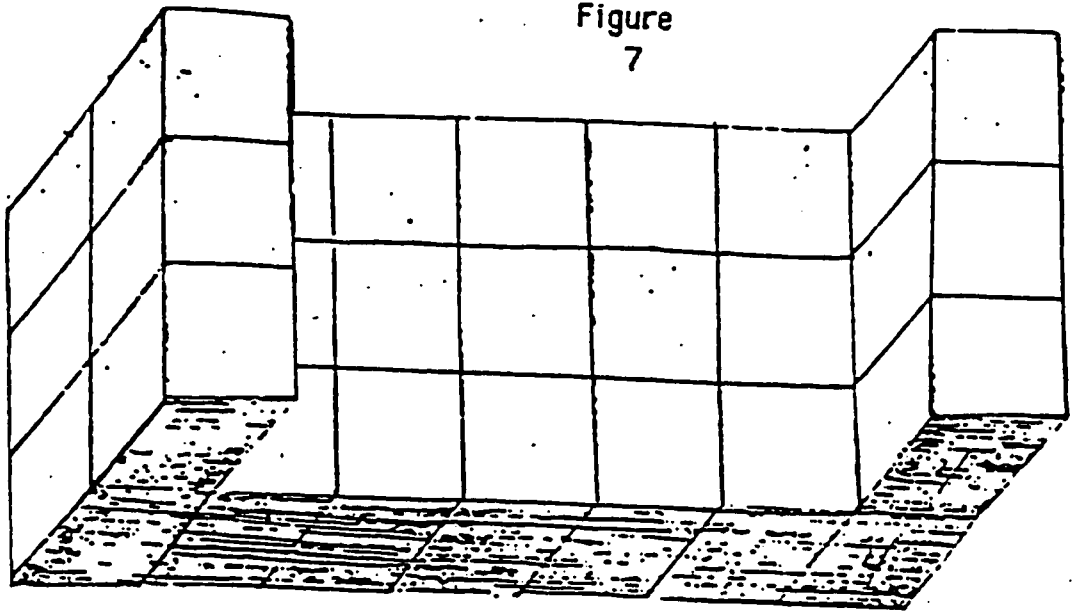


Figure no 7

FIGURE 8

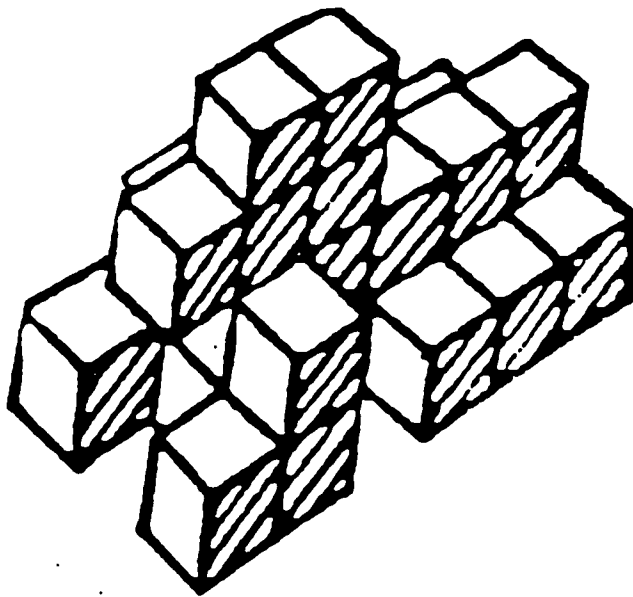


FIGURE 9

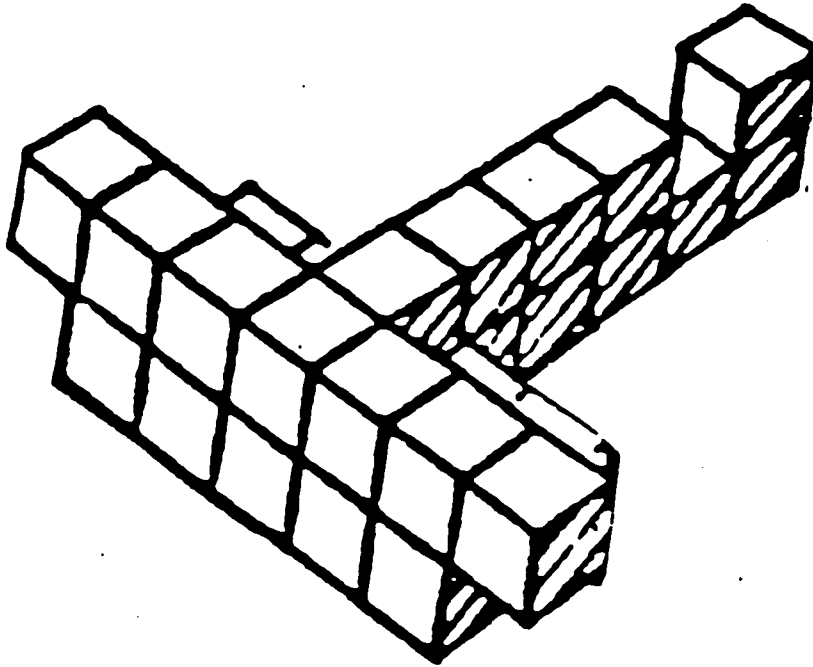


FIGURE 10

