THE ROLE OF PERSONALITY IN THE PRIMING OF AUTONOMY-SUPPORTIVE AND CONTROLLING OTHERS: EFFECTS ON INTRINSIC MOTIVATION.

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Abstract

Research on self-determination theory has established that the amount of autonomy support and control in a given situation can enhance or thwart intrinsic motivation. Meanwhile, research in social cognition has shown that people form schemas of significant others which can generalize to new situations. This thesis examines how external cues which activate nonconscious representations of autonomy-supportive and controlling significant others interact with individuals’ personality to influence intrinsic motivation on a novel task. Two studies with approximately two hundred participants were conducted to address this question. Participants were primed with either an autonomy-supportive or controlling significant other who they previously nominated as such on an online questionnaire, and engaged in a novel picture-search task. Self-report and behavioural measures of intrinsic motivation for the task were obtained. Participants’ causality orientations and attachment anxiety and avoidance were also assessed earlier in the semester. We found that in some instances causality orientations moderated the effect of the primes, as did anxious attachment.
Résumé

La théorie de l’autodétermination a révélé que le support de l’autonomie ainsi que le contrôle éprouvés dans une situation peuvent augmenter ou diminuer la motivation intrinsèque. La recherche en cognition sociale a démontré que les personnes forment des représentations mentales (schémas) d’autres qui peuvent généraliser à des nouvelles situations. Cette thèse examine la manière dont l’activation des représentations des personnes qui supportent ou contrecarrent l’autonomie interagit avec la personnalité pour influencer la motivation intrinsèque dans une nouvelle tâche. Les participants ont fourni des noms de personnes qui supportent et contrecarrent leur autonomie, puis quelques semaines après ont été amorcés avec une représentation d’une de ces personnes. Les participants étaient ensuite engagés dans un casse-tête d’objets caches, où leur motivation intrinsèque pour la tâche était mesurée. Les orientations générales à la causalité et les niveaux d’attachement anxieux et évitant ont également été évalués plus tôt dans le semestre. Nous avons trouvé que dans certains cas, les orientations à la causalité et l’attachement anxieux ont modéré l’effet de l’amorçage sur la motivation.
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INTRODUCTION

In recent years, research has shown that autonomous motivation (reflecting volition and self-endorsement) is conducive to a variety of positive outcomes such as creativity (Koestner, Ryan, Bernieri & Holt, 1984), persistence at school (Vallerand, Fortier & Guay, 1997), and more positive psychotherapy outcomes (Zuroff, Koestner, Moskowitz, McBride, Bagby & Marshall, 2007). Significant others can be an important source of autonomous motivation, and can be instrumental in developing and maintaining this motivation in a given context. Through perspective taking, empathy, and the provision of choice, autonomy-supportive others can foster autonomous motivation for contexts of which they are a part (Deci & Ryan, 2000). For example, an autonomy-supportive soccer coach can imbue youngsters with a love and motivation for the sport, while a controlling teacher can extinguish the desire to learn in even the most curious student.

Meanwhile, research in social cognition has shown that people have mental representations of significant others which can be nonconsciously activated by subtle cues in the environment to guide perceptions, emotions, and behaviour (e.g. Baldwin, Carrell, & Lopez, 1990). This thesis examines how such cues activate nonconscious representations of autonomy-supportive significant others, and how this interacts with individuals’ personality to influence motivation.

Self-determination theory and autonomous motivation

Self-determination theory (Deci & Ryan, 2000) is an organismic theory that posits that people are naturally curious, vital, and self-motivated, and as such are active agents in their lives and development. As people internalize and integrate social values and norms in their everyday lives, these norms can become fully integrated into the person’s
self-concept, or continue to be external to the self and influence the person only to the extent that there are reward and punishment contingencies associated with them. People’s reasons for their actions, or motivation, can thus be placed on a continuum, from a motivation that is autonomous, originating within the self, to one which is controlled and stems from outside pressure (see figure 1; Ryan & Deci, 2000; Deci & Ryan 2008).

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**Figure 1. The Self-Determination continuum showing types of motivation with their regulatory styles, loci of causality, and corresponding processes (reproduced from Deci & Ryan, 2008)**

The least self-determined form of motivation is considered to be a complete lack of motivation, also called amotivation (Deci & Ryan, 2000), which occurs when people do not have the intention to perform a certain behaviour. According to self-determination theory, this most often occurs when a person does not feel like they can attain the desired outcome, either because of a lack of self-efficacy or because the outcome is controlled by some external force and is not contingent on a behaviour. A student who feels like his/her teacher is unfair and will give them an F even if they try will not be motivated to study
for an exam. Amotivation represents an instance of non-regulation, and as such it is distinct from all other forms of motivation which involve some type of regulation of behaviour (Deci & Ryan, 1985b).

On the other end of the continuum is intrinsic motivation, which is characteristic of engagement in a behaviour for the behaviour’s own sake. Intrinsically motivating behaviours are interesting and pleasurable, and do not provide any external benefits other than the enjoyment inherent in the activity. Children who play and explore for the joy and fun of it are said to be behaving for intrinsic reasons. This is the most self-determined type of motivation as it is thought to stem from the innate propensity of all humans towards exploration, spontaneous interest and mastery.

Between amotivation and intrinsic motivation lies the motivation for most of the activities and behaviours in which people engage in their everyday lives. Activities such as doing the dishes, going to school or changing diapers are not inherently pleasurable, yet people still perform them willingly. These activities are necessary for some important outcome, and are termed extrinsically motivated – that is, they are not done for their own sake but because of the outcomes they help bring about. However, these activities can still be performed with various degrees of self-determination, dependent on the degree of the internalization of the value of that activity.

The least autonomous form of extrinsic motivation is external regulation, when one does something because of external contingencies. People behave in a certain way to produce a desirable outcome or to avoid an undesirable one. Rewards, punishments, and threats are necessary to produce the behaviour, and if these would cease so would the behaviour. A child who cleans his room because his parents threaten to punish him if he
fails to do so can be said to be externally regulated, and if the parents were out of town for a month, the room would most likely not get cleaned while they were away.

The next type of regulation is introjection, which occurs when individuals internalize the external regulations without integrating them into the self. For example, someone who stays in a relationship because she would feel guilty if she were to leave is doing so because of introjection. This type of motivation involves internal rewards and punishments, and is characterized by having one’s self-worth contingent on the behaviours, including contingent self-esteem, shame, or guilt. While no longer outside the individual, introjection is nevertheless not truly part of a person’s core self, and is thus a non-self-determined form of motivation.

In identified regulation, people internalize the importance and value of an activity or behaviour, and perform it volitionally because of this value. Someone who identifies with the importance of obtaining a good education will freely choose to pursue their education and to invest the time necessary to study and do their homework. This type of regulation is said to be autonomous because it stems from within the self, and behaviours which are identified are more likely to be maintained, with people exhibiting greater commitment and performance.

The most autonomous type of extrinsic motivation is integration, when the importance of a behaviour is internalized to such a degree that it is integrated with other aspects of the self. For example, an athlete who views practicing for her sport as a part of who she is could be said to have integrated the importance of practice.

Numerous studies have linked autonomous (self-determined) motivation to a variety of positive outcomes such as more creativity (Koestner et al., 1984), persistence at
school (Vallerand et al., 1997), healthier lifestyles and eating behaviour (Pelletier, Dion, Slovenic-D’Angelo, & Reid, 2004) and more positive psychotherapy outcomes (Zuroff et al., 2007). A central question of self-determination theory concerns the conditions which foster and sustain self-determined motivation. This is particularly prominent for intrinsic motivation, which is easily undermined by non-supportive environments and conditions. According to the theory, the most important ingredient in developing and maintaining intrinsic motivation or completely internalizing extrinsic motivation in a given context is the amount of psychological need satisfaction experienced in that context (Deci & Ryan, 2000).

Three psychological needs are considered to be essential: the needs for autonomy, competence, and relatedness (Deci & Ryan, 2000). The need for autonomy refers to the need to experience a sense of choice and personal endorsement of one’s activities and actions. Competence refers to feeling a sense of mastery of one’s environment and the ability to bring about desired outcomes. Finally, relatedness corresponds to feelings of closeness and connection with significant others. Many studies have linked the satisfaction of these three psychological needs with positive outcomes such as greater psychological well-being (e.g. Ryan, La Guardia, Solky-Butzel, Chirkov, & Kim, 2005), job performance (Baard, Deci, & Ryan, 2004), and even the experience of fewer physical symptoms such as having a runny nose (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000).

A large body of research spanning four decades has examined various situational factors that thwart these needs and undermine intrinsic motivation. Beginning in the 1970s, studies have shown that providing a monetary reward for performing an intrinsically motivating activity undermines the motivation for that activity (Deci, 1971,
by undermining the basic need for autonomy. When people are offered a reward for doing an interesting activity, they feel controlled by the reward and no longer feel like the origins of the behaviour, thwarting their need for autonomy. In a meta-analysis of over 100 studies, this was shown to be true not only for monetary rewards but also for symbolic rewards such as a certificate or a prize (Deci, Koesnter & Ryan, 1999). The same negative effect was found for competition (Deci et al, 1981). A pressure to compete and win reduces perceived self-determination as the activity is no longer performed for its own sake, but in order to win. Additionally, losing in a competitive context is especially detrimental to intrinsic motivation as perceived competence is also decreased (Reeve & Deci, 1996). Not surprisingly, threats, deadlines, and surveillance have also all been found to undermine intrinsic motivation (Deci & Cascio, 1972; Amabile, DeJong, & Lepper, 1976; Plant & Ryan, 1985).

While extrinsic motivators were found to thwart need satisfaction and reduce intrinsic motivation, conditions which resulted in need fulfillment led to increased intrinsic motivation. This includes positive non-controlling feedback, which increases perceived competence and thus increases intrinsic motivation (Ryan, Mims & Koestner, 1983). Similarly, the provision of choice has been found to increase autonomy and lead to greater intrinsic motivation (Zuckerman, Porac, Lathin, Smith, & Deci, 1978), as does the acknowledgment of feelings, and opportunities for self direction (Deci & Ryan, 2000).

In most of these studies, both self-report and behavioural measures have been used to assess intrinsic motivation. Particularly, the free-choice paradigm has often been employed to examine whether individuals will continue with a given task once they no
longer have to perform the task. In these studies, after the target task (often solving interesting puzzles or anagrams), participants are told that the study is over but that the experimenter needs to step out for a few minutes, either to score participant’s results (e.g. Ryan et al., 1983), make more photocopies of the last questionnaire (e.g.), or some other pretext. The participant is then told that he or she can either do some more puzzles, or read some magazines that are left in the room. While the experimenter is away from the room, the participant’s behaviour is recorded, and the amount of additional time that the participant spends on the puzzle (persistence on the task) is operationalized as the behavioural measure of intrinsic motivation.

*Interpersonal climates*

While many of the original studies on intrinsic motivation were experimental studies conducted in laboratory setting, field studies have also demonstrated the importance of the general motivational ambience of a situation. In particular, autonomy supportive interpersonal climates have been shown to lead to a multitude of positive outcomes in a variety of domains including school, work, home, relationships, sports, and in therapeutic settings, among others. Autonomy support involves an individual (who is often, but not always, in a position of authority) who relates to others “by taking their perspective, encouraging initiation, supporting a sense of choice, and being responsive to their thoughts, questions, and initiatives” (Deci & Ryan, 2008). Autonomy supportive others allow individuals to feel free to be who they are, express their opinions openly and follow their interests, fulfilling their basic psychological needs and leading to sustained intrinsic motivation and better integration of extrinsically motivating activities. On the other hand, controlling others often expect the individual to act in certain ways and show
conditional regard contingent on certain accomplishments of the individual, therefore diminishing one’s autonomy and competence (La Guardia, Ryan, Couchman & Deci, 2000).

The benefits of autonomy support have been shown in a number of important life domains. High school teachers who are autonomy supportive foster a greater sense of intrinsic motivation, curiosity, and desire for challenge in their students (Deci et al, 1981; Flink, Boggiano, & Barrett, 1990; Grolnick & Ryan, 1987). In college, students’ perceptions of a professor’s autonomy support was shown to lead to increases in students’ autonomy, competence, and interest in the course, as well as decreases in anxiety over the course of a semester and better course performance (Black & Deci, 2000). Similar results have been found in law school (Sheldon & Krieger, 2007) and in medical school (Williams & Deci, 1998; Williams, Saizow, Ross & Deci, 1997).

Similarly, parents who are autonomy-supportive and sensitive to their children’s needs are conducive to better adolescent adjustment and outcomes (Joussemet, Landry & Koestner, 2008), including better grades and higher performance on standardized tests (Grolnick & Ryan, 1989), higher levels of adjustment in school, in social competence, and in job-seeking behaviours (Soenens & Vansteenkiste, 2005), greater well-being (Chirkov & Ryan, 2001), relatively stronger intrinsic aspirations (for personal growth, meaningful relationships, and community contributions) than extrinsic ones (for wealth, fame, and image), and lower levels of deviant behaviours including alcohol and marijuana use and having sexual intercourse (Williams, Cox, Hedberg, and Deci, 2000). Parental psychological control produces opposite effects (Grolnick, 2003), with parental contingent regard (i.e. providing love and affection only when the child performs certain
behaviours, and withholding it when the child does not) shown to be related to introjected internalization, behavioural enactment, fluctuations in self-esteem, perceived parental disapproval, and resentment of parents (Assor, Roth & Deci, 2004).

Studies in the work domain found similar results, showing that managers who were autonomy supportive had employees that were more satisfied with their jobs (Deci, Connell & Ryan, 1989), were more engaged in their work and had higher performance ratings (Baard, Deci & Ryan, 2004), and experienced greater well-being (Baard et al, 2004; Lynch, Plant & Ryan, 2005). In therapeutic settings, perceiving one’s physician or healthcare provider as autonomy supportive was linked to more autonomous motivation for healthy behaviour and in turn on their actual behaviours and their health, including weight loss (Williams, Grow, Freedman, Ryan, and Deci 1996), smoking cessation (Williams, McGregor, Sharp, Levesque, et al.,2006), management of HIV/AIDS (Kennedy, Gogin, & Nollen, 2004) and diabetes (Williams, Rodin, Ryan, Grolnick, & Deci, 1998), and improved psychotherapy outcomes on depression (Zuroff et al, 2007).

While the above studies all looked at relationships with people in authority positions (parents, teachers, employers, coaches), autonomy support has also been shown to be important in peer relationships. Studies have linked psychological need fulfillment within relationships to better individual and relationship outcomes, including higher self-esteem, vitality, and positive effect as well as greater relationship satisfaction and commitment and more secure attachment (Patrick, Knee, Canevello & Lonsbary, 2007; La Guardia et al., 2000).

As the interpersonal climates could vary greatly between different domains, motivation is also thought to differ at contextual and situational levels (Vallerand, 1997;
Thus, a person could be have intrinsic motivation for sports, but be introjected towards their schoolwork, and identified with respect to her part-time job. Additionally, someone could be generally introjected towards school and only do his homework because he would feel guilty otherwise, but take one really interesting class in which he finds the material intrinsically motivating and for which he gladly spends hours immersed in a textbook. While it is expected that motivation for a familiar situation will be influenced by more general contextual motivation, little is known on how motivation can transfer to new contexts or situations (Ratelle, Baldwin & Vallerand, 2005).

Global Causality Orientations

In addition to domain-specific and contextual motivation that can change from one activity to another, individuals are thought to have a stable causality orientation which explains the perceived source of behaviour. This was originally conceptualized by DeCharms (1968) as a distinction between an internal locus of causality, in which a person experiences the self to be the ‘origin’ of action, and an external locus of causality, which involves feeling like a ‘pawn’ of social pressures and others’ desires. Deci and Ryan (1985a) renamed these orientations to autonomous and controlled to differentiate from Rotter’s internal and external locus of control (LOC; Rotter, 1966). While locus of control refers to the belief that outcomes are contingent on behaviour and thus under one’s control (for internal LOC; the opposite belief, that one does not control one’s outcomes, is termed external LOC; Rotter, 1966), locus of causality “refers to the perceived source of initiation and regulation of behaviour” (Deci & Ryan, 1985a). Thus, while one can believe that outcomes are contingent on behaviours (internal LOC), this does not distinguish whether these behaviours are initiated for autonomous or controlled
reasons. Locus of causality, however, can be autonomous (engaging in behaviours out of choice), controlled (engaging in behaviours because of external controls such as rewards or punishments, or because of internal introjects), or impersonal (experiencing behaviours as outside of one’s control). Locus of causality is thought to be a stable and enduring personality variable and as such it is expected to guide feelings and behaviours (Deci & Ryan, 1985a).

People who are *autonomy oriented* seek out opportunities and challenges, and see the potential for meaningful choice and action in their everyday lives. They are more likely to place themselves in situations which are conducive to greater autonomy by making choices which are in line with personal goals or interests. Such people are more often intrinsically motivated, and are less likely to be controlled by extrinsic rewards or introjects.

On the other hand, people who are *control oriented* seek out and interpret events as controlling. These people often do things because they ‘should’, and need rewards, monitoring and deadlines to motivate them. Their decisions tend to be based on extrinsic factors, such as the amount of money they will earn in a job, or the prestige they will achieve. Indeed, a controlling orientation has been shown to be strongly related to valuing financial success over success in other domains such as community, affiliation, and self-acceptance (Kasser & Ryan, 1993). Sometimes, the behaviour of those with a controlling orientation will also be characterized by defiance rather than compliance, as it is another reaction to the controls (Deci & Ryan, 1985a).

Finally, the *impersonal orientation* most closely parallels Rotters’ external dimension of locus of control. People with this orientation believe that their behaviour is
outside of their immediate control, and that it is caused by other people or by other factors such as luck or other agents. This is often a result of a perceived lack of competence, as these people see themselves unable to master their environment or take control of situations. They are thought to exhibit depression and anxiety when entering new situations, and prefer to follow precedents and do things the way they have been done before rather than trying something new which would have the potential of failure.

Numerous studies have examined the relationship of causality orientations to cognitions, behaviours, emotions, and other personality constructs. Studies have found the autonomous orientation to be positively related to self-esteem, ego-development, self-actualization, private self-consciousness, and openness to experience (Deci & Ryan, 1985a; Scherhorn & Grunert, 1988), while the controlled orientation has been linked to public self-consciousness, type-A coronary prone behavior pattern, anxiety, and shame. The impersonal orientation was found to be associated with a host of negative outcomes, including self-derogation, depression, social anxiety and low self-esteem (Deci & Ryan, 1985a). Additionally, the autonomy orientation has been linked to positive outcomes in various activities, including higher domain-specific relative autonomy (Williams & Deci, 1996; Black & Deci 2000; Lam & Gurland, 2008), greater psychological need satisfaction (Gagné, 2003), cognitive efficiency, perceived control and competence, and flow experience in school activities (Wong, 2000), and psychosocial engagement (Gagné, 2003). Compared to controlled individuals, autonomous individuals are more honest and open in interactions (Hodgins, Koestner, & Duncan, 1996), and exhibit behaviour which is more consistent with their attitudes and self-descriptions (Koestner, Bernieri & Zuckerman, 1992). They are also more likely to take responsibility for their actions.
(Hodgins & Liebeskind, 2003), and less likely to engage in self-serving bias (Knee & Zuckerman, 1996) and in self-presentation (i.e. impression management) tactics (Lewis & Neighbors, 2005). Overall, these findings suggest that more self-determined individuals have a more stable sense of self and use more adaptive coping strategies.

In addition to examining the general correlates of the three orientations, some studies have examined whether people with these orientation react differently to experimental situations. One especially interesting aspect of this is whether causality orientation or global motivation interacts with situational motivational elements. While self-determination theory argues that autonomy-supportive contexts are generally beneficent, it does concede that in certain situations more direction is necessary (e.g. in therapeutic interventions for highly non self-determined individuals; Deci & Ryan, 1985b). Additionally, by definition causality orientations concern the type of environments that people seek, with control-oriented individuals seeking controlled situations. The question then arises - do people who are control-oriented fare better in controlling situations? Limited research has been done on this topic, with contradictory results. One study (Kernis, 1982, as reported in Deci & Ryan, 1985) which placed participants in an informational (autonomy-supportive) or controlling condition and assessed their emotions found that participants high on the controlling orientation experienced more fear and less joy in the autonomy-supportive condition, but less fear and more joy in the controlling context. One other study which has examined such an interaction (Weinstein & Hodgins, 2009) found that after viewing a disturbing documentary on Hiroshima, control-oriented participants who where primed with an autonomous situational motivation fared better than those primed with a control
situational motivation, suggesting that autonomy-supportive situations are especially beneficial for control-oriented individuals. In our research, we sought to explore this dilemma by examining how participants’ global causality orientations interact with situations in which they find themselves.

In reviewing research conducted on causality orientations, it is also important to mention the different ways in which the Global Causality Orientation Scale (GCOS) has been used. As the scale yields 3 separate subscales that are only slightly related the literature is inconsistent on how these subscales have been used. Many studies examined the correlates of the subscales separately, sometimes ignoring the impersonal orientation (e.g. Weinstein & Hodgins, 2009), or only focusing on the autonomous orientation (e.g. Williams et al, 1996. ). A different approach has been taken by some researchers who categorize participants into one orientation style based on their standardized scores on the scales (e.g. Koestner, et al, 1992; Koestner & Zuckerman 1994; Weinstein & Hodgins, 2009). In this approach, individuals whose standardized autonomy subscale score is higher than the standardized controlled and impersonal subscale scores are classified as autonomy-oriented, while those whose control subscale score is higher than their autonomy and impersonal scores are classified as controlled and those whose impersonal scores are higher classified as impersonally oriented. Additionally, some studies focus on the autonomy versus controlled dimension and ignore the impersonal subscale, classifying participants into one of two categories (more autonomous than controlled, and more controlled than autonomous; e.g. Weinstein & Hodgins, 2009). This is the approach we have adapted for the present study.
Nonconscious activation of state motivation

Most studies in the self-determination literature focus on conscious processes, which is not surprising considering that the processes such as freedom and will involved in autonomous motivation seem to be antithetical to nonconscious activation. However, a closer look at the research on automaticity suggests that intrinsic motivation could be triggered like other goals and motivations. Specifically, automaticity research posits that when two constructs (including objects, settings, goals, people, feelings, etc.) are often linked together, their mental representations become linked and activating one construct automatically activates the other one (Bargh, 1984). Thus, if a person has often experienced intrinsic motivation in a classroom, thinking of a classroom setting should activate feelings of intrinsic motivation. Similarly, triggering the concept of intrinsic or extrinsic motivation directly should translate into cognitions and behaviours that parallel the triggered state.

One study (Levesque & Pelletier, 2003) used the scramble sentence task (Srull & Wyer, 1979) using words related to autonomy (e.g. choice, freedom, interest) or to control (e.g. pressure, obligated, forced) to prime either intrinsic or extrinsic motivation. Participants were then asked to solve some puzzles as part of a seemingly unrelated task. Participants primed with extrinsic motivation (i.e. who saw the control-related words) reported less interest for the puzzle task and spent less time on the task in a free-choice period, all without any realization that the tasks were related or that the first (priming) task contained motivational words. Similarly, other studies which have primed autonomous and controlled motivation have found that participants primed with
autonomy demonstrated less self-serving bias and less desire to escape the assigned task (Hodgins, Yacko, and Gottlieb, 2006), and that priming intrinsic self-regulation led to greater psychological well-being 10 days later (Burton, Lydon, D’Allessandro & Koestner, 2006).

The hypothesis that motivational processes can be transferred to new situations was further supported in a study by Ratelle and colleagues (2005). In their study, a neutral cue (an audio tone) was repeatedly paired with controlling feedback (e.g. “You did the puzzle as you should have, now you have to continue with the next one, as is expected of you”) on a ‘find the error’ task where they had to find the differences between pairs of images. In a subsequent different puzzle task, participants either heard the previously conditioned tone or a neutral tone as they progressed from one puzzle to the next. Those who heard the tone previously associated with controlling feedback reported less autonomous motivation for this puzzle task and were less likely to continue with the puzzles during a free-choice period.

While these studies have begun to explore the role of nonconscious processing, more research of this type is needed to fully understand the motivational implications. Particularly, as interpersonal climates and other individuals can exert a large influence over a person’s motivation, research is needed to examine whether these situations and the people associated with them can generalize to other contexts.

_Interpersonal schemas and priming significant others_

One way through which autonomy supportive or controlling significant others could play a part in how an individual approaches novel situations is through interpersonal schemas. Research has shown that people form cognitive mental
representations (schemas) of their important relationships based on their previous experiences within these relationships (Baldwin, 1992). Information about specific significant others, the relationship, and the self in relation to the other are stored in an associative memory network. When the schema is triggered, all of its elements, including cognitions, emotions and goals, become active through the process of spreading activation. This activation then allows these different components of the schema to be more readily available to other motivational and cognitive processes (Baldwin, 1992).

For example, an individual might have a schema for their relationship with their mother, which contains information about the mother as an accepting and positive person, of the self when with mother as good and worthy of love, and of the relationship as characterized by acceptance and love. If the memory of the mother is activated, that individual would experience the positive feelings he usually experiences around his mother, and feel confident about himself. Conversely, that person’s cognitive representation of his relationship with his father might be very different if the father is a controlling and judgemental person, in which case the schema might contain information about the self as unworthy and incompetent, and activating the concept of ‘father’ could lead to negative self-ratings and to less competent performance on a new task.

Research has shown that the activation of mental representations of significant others can have consequences for perceptions of self, others, and new situations (Baldwin et al., 1990; Glassman & Andersen, 1999; Baldwin & Holmes 1987), affect (Andersen, Reznik, & Manzella, 1996), motivation (Shah, 2003a, 2003b; ), and overt behaviors (Berk & Andersen, 2000; Fitzsimons & Bargh, 2003; Shah, 2003a). One study which examined how priming significant others affects judgements showed that participants
who read a passage about a permissive sexual encounter rated that passage as less enjoyable after being primed with older family members rather than peers (Baldwin & Holmes, 1987). Another study which examined self-perceptions showed that flashing the image of a scowling controlling department chair led graduate students in that department to evaluate themselves and their research more negatively, but had no effects on students at another university (Baldwin et al, 1990). In a second study, Baldwin & colleagues demonstrated that priming the image of a scowling pope led to more negative self-perceptions only for practicing Catholics, among whom the pope was a relevant figure. Thus, an important aspect of activating representations of others is that these representations must already be encoded as part of a network of associated memories. Flashing a picture of someone who a person has met only once will not have any effect because there are no enduring memories associated with this target (a potential exception could occur if the target was associated with an extremely vivid or significant life event).

Additionally, activating representations of significant others can also activate goal representations associated with the specific relational schema, automatically putting these goals into operation (Fitzsimons & Bargh, 2003; Shah, 2003a). This has been shown for interpersonal goals, with participants primed with a friend more likely to volunteer to help the experimenter than participants primed with a co-worker (Fitzsimons & Bargh, 2003). In that study, thinking about a friend activated the goal to be helpful to others more readily than did thinking about a co-worker, presumably because one is more likely to help friends than coworkers. In another set of studies, Shah (2003a) showed that activating representations of close others leads individuals to pursue the goals that these others hold for them and would most want them to pursue. Participants who were primed
with the names of a significant other who held a goal for them reported greater
commitment to the goal, and in the studies where the goal was related to performance on
a specific task (i.e. participants were primed with a close other who most wanted them to
have verbal fluency before completed a task related to verbal fluency), the prime led to
greater performance and persistence on the task. These effects were moderated by the
participant’s closeness with the significant other, the importance of the goal to that
significant other, and the number of other goals that other held for them, with primes of
significant others who held many goals less effective in activating the specific goal
related to the task.

Overall, this line of research has shown that using significant others who are
associated with certain concepts as cues produces the same effect as using these concepts
as cues directly. For example, priming participants with a significant other who held an
achievement goal for them led to correctly solving more puzzles (Shah, 2003a), a result
similar to the one typically found when the goal of achievement is primed directly
(Bargh, Gollwitzer, Lee-Chai, Barndollar & Trotschel, 2001). We expect that this could
also be the case for autonomy and control – that is, priming individuals with controlling
or autonomy supportive others should have the same effects as priming autonomy or
control directly, which has been shown to affect motivation and behaviour (Levesque &
Pelletier, 2003; Ratelle et al., 2005).

This proposition has been partially tested in a study of goals and controlling
others (Chartrand, Dalton & Fitzsimmons, 2007). In their study, participants indicated the
name of a person who most wants them to work hard and another person who most wants
them to have fun, and also indicated how much each of these persons tries to control the
participant’s life (i.e. how controlling they were). Participants who rated these others as most controlling (in the upper quartile) were then primed with one of the two target persons and completed some anagrams. Participants primed with a controlling other who most wanted them to work hard answered significantly fewer anagrams correctly than those who were primed with a controlling other who most wanted them to have fun, suggesting that participants nonconsciously reacted to the control by behaving in a manner opposite to what the target other would have desired. While this study suggests that controlling others can have a negative impact on behaviour, this has not been replicated, and no research has examined the potential impact of autonomy-supportive rather than of controlling others.

The present research

In the current studies we are interested in examining the effect of priming autonomy-supportive or controlling significant others on intrinsic motivation. As people’s schemas of significant others contain information related to autonomy support and control, we expected that priming a significant other would activate the relevant motivational interpersonal climate and similarly generalize to new situations. While other research (Chartrand et al., 2007) has shown that priming significant others who are controlling can lead to reactance on a task associated with the goals that these others have for the person, we were interested on how these primes would generalize to a new situation where no specific goal is pursued. We were also interested in motivation rather than performance, and in using an autonomy-supportive person in additional to a controlling significant other.
Additionally, we were interested in examining whether there are personality differences (i.e. of causality orientations) on how people react to such inductions. We expected that causality orientation will moderate the effect of the prime, but, as previous studies have found contradictory results, we were unsure of the direction of the moderation. Particularly, we were unsure whether people with a controlled orientation would benefit or suffer from autonomy support. To examine these questions, we conducted two studies with slightly different methodologies. In both studies, we hypothesized that

1) Priming participants with an autonomy supportive target person would lead to greater intrinsic motivation; and

2) The effect of the prime will be moderated by participants’ causality orientations.

STUDY 1

Method

Participants

Participants were students at McGill University recruited through university classified advertisements as well as through introductory psychology classes. One hundred students participated in return for course credit or were paid $15 for their participation. At debriefing, nine participants reported suspicion about either the prime or the free-choice period, and were removed from all analyses. Additionally, 6 participants were removed because they were outliers (more than 3 standard deviations away from the mean). We were left with 86 participants (81.4% female). These participants were between the ages of 17 and 33 with a mean age of 21.2 (SD = 3.64).
Procedure

Students who volunteered to participate were contacted by email. They were informed that they would take part in a two part study examining personality and attention to detail. Participants first completed an online questionnaire before their arrival to the lab. The participants gave their consent online. Participants completed measures assessing locus of causality and nominated significant others in their lives who fit specific descriptions. This was done in order to obtain names of autonomy-supportive and controlling persons to use as primes. Participants were asked to provide names corresponding to the following descriptions: “Name someone who is always interested in how you feel about things and who supports you in all your decisions and encourages you to do what you want to do and to pursue your dreams.” (autonomy-supportive); “someone who has high expectations of you, who strongly encourages you to do what they think would be in your best interest.” (controlling); and “someone with whom you like to go shopping – someone who has a good taste in clothes and fashion, and can give you advice on what to buy,” (neutral condition). Additionally, we asked participants to nominate “someone who you like to hang out with, a person with whom you can just relax and party with,” and “someone who tells you all their secrets, who confides in you and asks you for advice” as filler items. Participants completed a measure of need satisfaction and a measure of closeness for each nominated person.

Approximately two weeks later, participants came into the lab for a study of attention to detail. For the first part of the study, they were given written instructions to describe on a sheet of paper in as much detail as possible the appearance of one of the individuals who they nominated in the online questionnaire. The name of the target
person was randomly assigned by another experimenter in order to assure that the
experimenters were blind to the allotted condition. The visualisation lasted 5 minutes.

Participants were then introduced to a novel computer activity which involved looking at images in which the word “NINA” was hidden two or more times (Hirschfeld, 1998; see appendix A). Two undergraduate computer science students were hired to create a computerized version of this task for this study. Participants read instructions for the NINA task on the computer screen and were provided with an example. The computer program provided check marks when the participants clicked on the hidden NINA. Additionally, it controlled the amount of time each participant had per image so that after 30 seconds the program automatically moved on to the next image. Participants were told to find as many NINAs as possible, but did not know how many NINAs were hidden in each drawing. This task has previously been used in the motivational literature (e.g; Harackiewicz & Larson, 1986; Koestner, Zuckerman, & Koestner, 1987; Ryan, 1982) and participants tend to find it challenging and enjoyable (Ratelle et al., 2005). There were a total of 24 puzzles with an average of 3 hidden NINAs per image. The program kept track of the number of clicks the participants made during the task.¹

After 12 minutes, the experimenter told the participants that the task was over and participants completed the Intrinsic Motivational Inventory. The experimenter then told participants that she had forgotten to make copies of the last questionnaire and left the room to make photocopies. Participants were left alone for a period of 8 minutes and were told they could continue with the NINA puzzles if they wanted to or read some

¹ Four of the outliers who were removed were participants who had more than 1000 clicks (more than 1 click per second) during the task, and one who had more than 500 clicks during the free-choice period (more than 3 SD amove the mean).
magazines which were lying on a nearby table. The computer program kept track of the amount of time participants spent on the puzzles in the free-choice period. After 8 minutes, the experimenter came back into the room to debrief the participants.

*Measures*

*Locus of Causality.* Three motivational orientations (autonomy, controlled, and impersonal) were measured using the General Causality Orientations Scale (GCOS; Deci & Ryan, 1985; see appendix C). The GCOS consists of 12 vignettes and 36 items. Each vignette describes a common achievement or interpersonal orientation situation such as receiving a failing grade or interacting with strangers. For example, “Recently a position opened up at your place of work that could have meant a promotion for you. However, a person you work with was offered the job rather than you. In evaluating the situation, you’re likely to think: (a) You didn't really expect the job; you frequently get passed over; (b) The other person probably “did the right things” politically to get the job; (c) You would probably take a look at factors in your own performance that led you to be passed over.” The participant then rates the extent to which the three responses, an autonomy, a controlled, and an impersonal type, is typical for them, indicated on a 7-point Likert-type scale, ranging from 1 (*very unlikely*) to 7 (*very likely*). The subscale scores are generated by taking the mean of the participant’s 12 responses on items corresponding to each subscale. For this study, we were only interested in the autonomous and controlling orientation subscales. The reliability of the scales was adequate, $\alpha = .71$ for autonomous causality orientation and $\alpha = .74$ for controlling orientation. Following previous research (Koestner et al, 1992; Weinestein & Hodgins, 2009), we used the subscales to classify participants into one of two groups.
corresponding to an overall autonomy (Z-scored autonomy > Z-scored control) and a controlled (Z-scored control > Z-scored autonomy) orientation.

**Autonomy support of target.** We measured the autonomy support of each nominated target in the online questionnaire using the autonomy need satisfaction subscale of the Basic Need Satisfaction in Relationships questionnaire (La Guardia et al., 2000). The subscale contained 3 items: “When I am with XXXXXXX, I feel free to be who I am.” “When I am with XXXXXXX, I have a say in what happens, and I can voice my opinion” and “When I am with XXXXXXX, I feel controlled and pressured to be certain ways.”. Participants rated how true each item was for them using a scale from 1 (not at all true) to 7 (very true). The scale was reliable, $\alpha = .75$ for the target person.

**Closeness to target.** Participants rated their closeness to the nominated person using two items: “I feel close to XXXXXXX” and “XXXXXXX feels close to me” using a scale of 1(not at all true) to 7 (very true) (Shah, 2003a). These two items were highly correlated $r = .88, p < .001$.

**Intrinsic Motivation.** The Intrinsic Motivation Inventory (IMI; See appendix G) is used to assess participants’ subjective experience of intrinsic motivation on the NINA task (Ryan et al., 1983). The IMI assesses participants’ interest and enjoyment, perceived competence, felt pressure and tension (reversed), and perceived choice while performing a given activity. Examples of items include: “I would describe this task as very enjoyable” “After working at this task for awhile, I felt pretty competent” “I felt like I was doing what I wanted to do while I was working on the task”, and “I was anxious while doing the task” (reversed). Participants indicate, on a 7-point scale ranging from 1 (not true at all) to 7 (very true), the extent to which each item corresponded to their
reason for doing the NINA puzzles. Past research has shown that the IMI is a valid and reliable instrument (McAuley, Duncan, & Tammen, 1989). To compute a summary score of self-reported intrinsic motivation, we took an average of all the items after reversing the negatively-worded items. In the present study, the scale was reliable at $\alpha = .88$.

*Behavioural measure of intrinsic motivation.* Data was collected on the amount of time participants spent doing the puzzle during the free-choice period. The computer program kept track on the amount of time spent looking at each picture in the free-choice period (participants could move from image to image as they wished). One drawback of the program was that the time on the last image that the participant was on when the experimenter came back was continued. We thus included the number of images that the participants viewed and the number of NINAs found in the free-choice period as additional indicators of free-choice persistence. The behavioural measure of intrinsic motivation was computed by taking the mean of the standardized scores of these 3 measures, which were highly correlated ($r = .94-.97$).

*Results and Brief Discussion*

*Preliminary Analyses*

Table 1 presents the types of others who were nominated in each category. As can be seen, participants were most likely to nominate a friend as an autonomy supportive other, followed by their mother and a partner, with very few people naming fathers or other family members, and no one naming authority figures such as teachers or employers. Conversely, fathers were the most commonly nominated controlling other, followed by mothers and other family members (typically grandparents).
Table 1. *Percentage of participants who nominated each type of relationship for each target category.*

<table>
<thead>
<tr>
<th>Category</th>
<th>Autonomy</th>
<th>Controlling</th>
<th>Neutral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friend</td>
<td>41.5%</td>
<td>7.1%</td>
<td>68.6%</td>
</tr>
<tr>
<td>Partner</td>
<td>18.8%</td>
<td>1.2%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Mother</td>
<td>23.5%</td>
<td>27.1%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Father</td>
<td>5.9%</td>
<td>40.0%</td>
<td>0%</td>
</tr>
<tr>
<td>Sibling</td>
<td>9.4%</td>
<td>5.9%</td>
<td>17.4%</td>
</tr>
<tr>
<td>Other family member</td>
<td>1.2%</td>
<td>11.8%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Other authority figure</td>
<td>0%</td>
<td>7.1%</td>
<td>0%</td>
</tr>
</tbody>
</table>

To ensure that participants in the three experimental conditions were primed with significant others who differed on levels of autonomy support, we first examined the differences between conditions of the mean ratings of the level of autonomy-support for the target person that was primed. There were significant differences between the three conditions, \( F(2, 76) = 29.02, p < .001. \) Post-hoc analyses showed that while both the autonomy-supportive and neutral condition were significantly different from the controlling condition, the level of autonomy support provided by the target was not different in the autonomy-supportive and neutral conditions (\( p > .2 \)). Since the neutral condition would thus not work as a control, we decided to remove it from all future
analyses, leaving us with 57 participants. Participants in the neutral condition did not differ significantly from the other participants in age or gender, \( t(82) = -1.37 \) and \( t(83) = .36 \), for age and gender respectively, both \( p \)’s ns. Additionally, due to glitches in the computer program, we were unable to obtain behaviour data for 11 subjects. To prevent a further reduction of our sample than necessary, we included these participants in the self-report analyses \( (N = 57) \).

Table 2 presents the means, standard deviations and correlations of all study variables. Gender was related to causality orientation, with females more likely to be autonomy-oriented than males. Autonomy-support of the target was strongly correlated to closeness with target, but was unrelated to intrinsic motivation. As expected, the self-report and behavioural measure of intrinsic motivation were positively correlated.

Table 2. Means, standard deviations and correlations of Study 1 variables.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>20.81</td>
<td>3.43</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Gender</td>
<td>1.82</td>
<td>.38</td>
<td>-.07</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Autonomy of target</td>
<td>5.36</td>
<td>1.31</td>
<td>-.02</td>
<td>.12</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Closeness of target</td>
<td>5.75</td>
<td>1.10</td>
<td>-.04</td>
<td>-.02</td>
<td>.61**</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Causality orientation</td>
<td>.51</td>
<td>.50</td>
<td>-.02</td>
<td>-.45**</td>
<td>-.04</td>
<td>.07</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Self-report intrinsic motivation</td>
<td>5.11</td>
<td>.78</td>
<td>.32*</td>
<td>.14</td>
<td>-.04</td>
<td>-.06</td>
<td>-.19</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>7. Behavioural intrinsic motivation</td>
<td>.01</td>
<td>.99</td>
<td>.07</td>
<td>.10</td>
<td>-.12</td>
<td>-.18</td>
<td>-.12</td>
<td>.37**</td>
<td>--</td>
</tr>
</tbody>
</table>
We expected that the priming manipulation would affect intrinsic motivation, and that this effect would be moderated by participants’ locus of causality. We conducted 2-way ANOVAs (condition X causality orientations) on self-report and behavioural measures of intrinsic motivation. Table 3 shows the Means and F-tests for each analysis. There were no main effects of either condition or causality orientation on intrinsic motivation. A marginally significant interaction emerged for self-report motivation, $F(1, 53) = 3.76, p < .06$. Control-oriented participants primed with an autonomy-supportive close other reported less intrinsic motivation than all other groups. Figure 2 illustrates this interaction. These results remained essentially unchanged when we controlled for age, gender, and the closeness of the target person.

Figure 2. Condition by causality orientation interaction on intrinsic motivation.
Table 3. ANOVA results for intrinsic motivation: means and significance tests

<table>
<thead>
<tr>
<th>Condition</th>
<th>Self-report Intrinsic Motivation</th>
<th>Behavioural Intrinsic Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aut supportive</td>
<td>Controlling</td>
<td>Aut supportive</td>
</tr>
<tr>
<td>Aut GCO</td>
<td>5.30</td>
<td>.12</td>
</tr>
<tr>
<td>Cont GCO</td>
<td>4.68</td>
<td>-.27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Effects</th>
<th>Interactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition</td>
<td>F(1, 53) = 2.38</td>
<td>F(1, 53) = 3.76 †</td>
</tr>
<tr>
<td>GCO</td>
<td>F(1, 53) = 1.50</td>
<td>F(1, 42) = .48</td>
</tr>
<tr>
<td>Interaction</td>
<td>F(1, 53) = 3.76 †</td>
<td>F(1, 42) = .32</td>
</tr>
</tbody>
</table>

Note: Aut = autonomy, cont = control, GCO = global causality orientation.

† p < .10 * p < .05.

While the interaction for self-report motivation was marginal and the interaction for the behaviour indicator was not significant, an examination of the means did suggest some important mean differences between cells. To probe the differences, we split the file by motivational orientation and performed one-way ANOVAs for each group separately, focusing on the contrast between the autonomy supportive and controlling conditions. While there were no condition effects for participants with an autonomous orientation, those with a controlling orientation who were primed with an autonomy-supportive other reported significantly less intrinsic motivation (M = 4.68 vs. M = 5.37; t(27) = 2.80, p < .01). No differences were found for the behavioural measure of motivation.
Brief Discussion

In this study, we did not find any support for our first “main effect” hypothesis, and partial support for our second “interaction” hypothesis. Participants primed with an autonomy-supportive other were not different from those primed with a controlling other on either of our dependent measures. Locus of causality was a marginally significant moderator for self-reported intrinsic motivation, such that participants with a controlling orientation reported lower motivation when primed with an autonomy-supportive other.

Although we did find a marginal interaction effect for the self-reported measure of intrinsic motivation, no significant results emerged for the behavioural measure of intrinsic motivation on the puzzle task. One possible reason for the null findings is our small sample size. Although we began with 100 participants in this study, our analyses of self-reported intrinsic motivation were performed on only 57 participants, while analyses of behavioural motivation were done with only 46 participants. In the two-way ANOVA, this translates to less than 12 participants per condition - an inadequate N to detect anything except large effect sizes (Cohen, 1992). Nonetheless, the modest effect sizes that were obtained for the behavioural measure suggest that even with a sample size that matched our original goal, no statistically significant effects would have emerged.

Another limitation of the study was the nomination procedure. The questions that were asked to elicit an autonomy supportive and controlling other were chosen to elicit positive significant others in both cases, and may have been overly positive for the controlling other. Indeed, “Someone who has high expectations of you, who strongly encourages you to do what they think would be in your best interest” may not be always be someone who tries to control your behaviour. Additionally, the people who were
nominated for each of these categories were very different. For the autonomy supportive person, participants most often nominated friends, significant others and mothers, while mothers and fathers were most commonly nominated as controlling others. This presents a number of problems, as the primed figures in the two conditions most likely differed on other dimensions that just autonomy support. Firstly, autonomy-supportive others were mostly peers rather than authority figures, and so might not have been as relevant to motivation and motivational settings. In particular, peers could potentially be generally supportive without providing ‘autonomy-support’ per se. Moreover, in the case of parents, other constructs may have played a role, such as the goals the parents may have had for the children, or the relationship the individual has with their parents. In short, it appears that the two conditions were not equivalent in the type of figures they were priming, which could have impacted the results.

Study 2

A second study was conducted to address the limitations of the first study. We used a different nomination procedure, asking participants to nominate others in positions of authority who fit multiple characteristics of autonomy supportive or controlling figures. We also used a different neutral condition to act as a control. Instead of being asked to visualize and describe another person in their life, participants in the neutral condition were asked to describe the steps necessary to mail a letter. Additionally, as we experienced some problems with the automated NINA task in the first study, the target task was changed to another picture search task, where participants were asked to find objects in a series of photographs. This new task was constructed using e-prime software to more adequately measure the time spent in the free-choice period.
In addition to causality orientation this study also examines attachment, another enduring personality aspect that shapes interpersonal schemas and which we thought could influence the way that the primes activate feelings of autonomy or control. An important aspect of interpersonal schemas is that they are encoded based on subjective experiences, and that one’s perception of new interactions can be biased by prior experiences or expectations. Particularly, individuals who have a history of maladaptive relationships will tend to encode new relationships as fitting similar frameworks based on a generalized set of expectations for self and others (Mikulincer & Shaver, 2003). This has been extensively studied within the framework of attachment theory.

Attachment theory and maladaptive interpersonal schemas

Attachment theory began as an elaboration of the human attachment behavioural system, which developed to protect a person (particularly during infancy and childhood) from danger by ensuring that the person remains close to caring and supportive others who can protect and defend him or her (Bowlby, 1982). While it begins operating in infancy, the attachment system remains relevant in adulthood through the mental representations that individuals form of the typical interactions and responses they have previously experienced. If throughout one’s life significant others are responsive to proximity seeking attempts and provide comfort and care in times of distress, the individual will develop working models of others as available and responsive, and of the self as worthy and worth caring for. However, if bids for proximity are repeatedly rejected, the individual will develop maladaptive working models which can affect other future cognitions and behaviour (Mikulincer & Shaver 2003).
These maladaptive working models can be categorized on two dimensions, anxiety and avoidance (Brennan, Clark & Shaver, 1998). Anxious individuals worry that significant others will not be available in times of need, and are hypervigilant to signs of acceptance and rejection. They often blame themselves for others’ unavailability, viewing themselves as unworthy of love. In contrast, avoidant individuals respond to rejection by distancing themselves from significant others and relying on themselves. They are less attuned to other people, preferring to keep their independence and distrusting others.

Individuals whose early attachments are characterized by either anxiety or avoidance tend to encode all new relationships within a similar framework. Anxious people worry that others will reject them, and avoidant people are mistrustful of others, even when these others are objectively responsive to the person’s needs. While securely attached individuals (who have low levels of both attachment anxiety and avoidance) expect others to be supportive, anxious and avoidant individuals do not have such expectations (Mikulincer & Shaver, 2003). This distinction in the general perception of others as available and supporting could influence the interactions and mental schemas that individuals develop of autonomy-supportive and controlling others. Particularly, as avoidant and anxious individuals perceive others as unreliable or unavailable, these others cannot truly be represented as autonomy supportive even if the individuals can provide instances of such behaviour to nominate a person who has behaved that way with them. For insecure individuals, activating the mental representations of controlling or autonomy-supportive others could trigger the same set of maladaptive behaviours, thoughts and perceptions about the self and the self-in-relation to other without much
differentiation. In this study, we examine the role of insecure attachment in the nonconscious activation of interpersonal schemas, testing the hypothesis that attachment anxiety and avoidance can mediate the effects of the prime on motivation.

Method

Participants

Participants were McGill students recruited through university classified advertisements as well as through introductory psychology classes. One hundred and one students participated in return for course credit or were paid $15 for their participation. After removing participants who were suspicious during the experiment we were left with on 90 participants (67.8% female). Participants were between the ages of 17 and 28 with a mean age of 19.44 (SD = 1.59).

Procedure

Students who volunteered to participate were contacted by email. They were informed that they would take part in a two part study examining personality and attention to detail. Participants first completed an online questionnaire before their arrival to the lab. The participants gave their consent online and then completed measures assessing locus of causality and attachment anxiety and avoidance. They were then asked to nominate four different authority figures in their lives (e.g. teacher/professor, coach, employer, supervisor and others) who matched a given set of descriptions. This was done in order to obtain names of a controlling or autonomy-supportive authority figure for the second part of the experiment. For the controlling figure, participants were asked to

“think of someone in a position of authority (teacher/professor, coach, employer, supervisor, etc) who typically exhibits the following set of
characteristics: 1) has a strong focus on evaluation and performance, setting very high standards; 2) only accepts and acts well towards you when you are successful; 3) is often disappointed with you and voice that disapproval; 4) emphasizes doing things the “right” way; and 5) dictates what you should do and/or how you should behave.”

For the autonomy supportive figure, participants were asked to

“think of someone in a position of authority (teacher/professor, coach, employer, supervisor, etc) who typically exhibits the following set of characteristics: 1) understanding and accepting you as a person; 2) patient, even when you make mistakes; 3) believes and trusts in you; 4) encourages you to be yourself and pursue your own interests; and 5) supportive of your choices and decisions.

We also included two other nominations of individuals who were neither controlling nor autonomy-supportive, but with a general set of negative or positive characteristics. We included these two additional nominations so that the participants do not readily guess that we are only interested in comparing the effects of autonomy supportive versus controlling individuals. The directions were identical to the above. The characteristics for one person included “someone who is 1) disorganized, forgets where they put things or what they were saying; 2) incompetent, or incapable of doing their jobs; 3) irresponsible, blames their mistakes on others; and 4) does not care about the people over whom they have authority (e.g. students, employees, etc).” In contrast, the characteristics for the other person included “1) someone who often makes jokes; 2) someone funny, who always makes everyone else laugh; 3) knows how to lighten any
situation; and 4) outgoing, with a good sense of humour.” For each of the four persons nominated, participants indicated the name of the person and their relationship to this person, and completed a measure of autonomy support, closeness, and vividness of recall.

Approximately two weeks later, participants came into the lab for a study of attention to detail. For the first part of the study, they were given written instructions to describe in as much detail as possible the appearance of one of the individuals who they nominated in the online questionnaire (in the autonomy-supportive and controlling other conditions), or to describe in as much detail as possible the steps they would take to mail a letter (neutral condition). The name of the target person was assigned by another experimenter in order to assure the experimenters were blind to the allotted condition. As approximately 20% of participants nominated a parent as the autonomy supportive or controlling other, the experimenter responsible for assigning participants into conditions ensured that these participants were assigned in such a way that their primed person was not their parent (i.e. if they indicated a parent as a controlling other, they were assigned to either the autonomy supportive or neutral condition). The visualization lasted 5 minutes.

Participants were then introduced to a novel computer picture-searching task where they were presented with a photograph and were asked to find an object hidden in that photograph. Once participants clicked on the object, the name of the next hidden object appeared. Each photograph contained three hidden objects. If participants were unable to find an object after 30 seconds, a ‘next’ button appeared on the screen. Participants could then continue to look for the object, or click on the ‘next’ button to move on to the next object. The task automatically stopped after eight minutes and a
prompt appeared on the screen asking the participants to contact the experimenter who was waiting outside the room for the next part.

Participants then completed the Intrinsic Motivational Inventory which assessed how enjoyable they found the task. After the completion of these questionnaires, the experimenter then told the participants that she had forgotten to make photocopies for the next part of the experiment. Participants were told that it will take the experimenter a few minutes to make the photocopies, and that in the meantime they could relax, read some magazines, or do some more puzzles. During this free-choice period, the computer program recorded the number of additional pictures participants viewed and how many objects they found. After the 7 minutes, the experimenter returned to the room to debrief the participants and probe for suspicion.

Measures

Locus of Causality. Autonomy and controlled motivational orientations were assessed in the same manner as in study 1. The reliability was low for autonomous orientation, $\alpha = .66$, and satisfactory for controlling orientation, $\alpha = .74$. As in study 1, we used the subscales to classify participants into one of two groups corresponding to an overall autonomy ($Z$-scored autonomy $> Z$-scored control) and a controlled ($Z$-scored control $> Z$-scored autonomy) orientation.

Attachment anxiety and avoidance. Attachment avoidance and anxiety was examined using the Experiences in Close Relationships Scale (ECRS, Brennan et al, 1998). The ECRS is a self-report measure assessing adult attachment styles, specifically, how people generally experience romantic relationships. The items on the questionnaire for the purpose of the present study were modified to focus on relationships in general
rather than just romantic partners. The questionnaire consists of 36 items reflecting two orthogonal factors of avoidant (18 items) and anxious-ambivalent (18 items) attachment styles. Items for assessing relationship anxiety include “My desire to be very close sometimes scares people away” and “I need a lot of reassurance that I am loved by my partner”, while avoidance items include “I want to get close to others, but I keep pulling back” or “I prefer not to show other people how I feel deep down”. Participant ratings are scored using a 7-point Likert-type scale ranging from 1 (disagree strongly) to 7 (agree strongly). The scale was reliable, $\alpha = .91$ for the anxiety subscale and $\alpha = .94$ for the avoidance subscale.

**Autonomy support of target.** As in Study 1, we measured the autonomy support of each nominated target using the autonomy need satisfaction subscale of the Basic Need Satisfaction in Relationships questionnaire (La Guardia et al., 2000). The subscale was reliable, $\alpha = .87$ for the target person.

**Closeness to target.** Closeness to target was measured using two items, “How close are/were you to this person?” and “How close is/was this person to you?” on a scale of 1 (not at all) to 7 (extremely). The two items were strongly correlated, $r = .91$, $p<.001$.

**Vividness of target.** Participants were asked to rate each nominated person on the item “How vividly can you recall the image of this person in your mind?” on a scale of 1(not at all) to 7(very).

**Self-report Intrinsic Motivation.** Intrinsic motivation was measured in the same way as in study 1. The scale was reliable, $\alpha = .86$.

**Behavioural intrinsic motivation.** As in study 1, a measure of behavioural free-choice persistence was computed as a second indicator of intrinsic motivation using the
standardized scores of the time spent, the number of images viewed, and the number of objects found in the free choice period. These three measures were highly correlated, \( r = .97 - .99 \).

*Results and brief discussion*

*Preliminary analyses*

Participants in the autonomy support condition visualized a target who was significantly higher on autonomy support (\( M = 6.13 \)) than participants in the controlling condition (\( M = 2.77 \)), \( F (1, 56) = 334.81, p < .001 \). There were no differences in the vividness of the target person, \( F (1, 56) = .45, \) n.s. Table 4 presents the means, standard deviations and correlations of all study variables. Gender was not related to any of the other study variables, and age was only marginally related to free-choice behaviour, with older participants persisting slightly longer on the free-choice task. Causality orientation was related to attachment avoidance, with control-oriented participants reporting greater avoidance. Additionally, causality orientation was related to the behavioural measure of intrinsic motivation, with control-oriented participants persisting less on the free choice task. Unlike the first study free-choice behaviour was not significantly associated with the self-report measure of intrinsic motivation.
Table 4: Means, standard deviations and correlations of study 2 variables.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</thead>
<tbody>
<tr>
<td>1. Age:</td>
<td>19.44</td>
<td>1.59</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Gender:</td>
<td>1.68</td>
<td>.47</td>
<td>-.03</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Causality orientation</td>
<td>.50</td>
<td>.50</td>
<td>-.13</td>
<td>-.02</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Anxiety</td>
<td>3.71</td>
<td>1.07</td>
<td>.01</td>
<td>.04</td>
<td>.12</td>
<td>--</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Avoidance</td>
<td>3.49</td>
<td>.89</td>
<td>.07</td>
<td>-.01</td>
<td>.33**</td>
<td>.10</td>
<td>--</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Self-report intrinsic motivation</td>
<td>5.23</td>
<td>.73</td>
<td>.10</td>
<td>.06</td>
<td>.03</td>
<td>-.03</td>
<td>-.06</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>7. Behavioural intrinsic motivation</td>
<td>.00</td>
<td>.99</td>
<td>.18†</td>
<td>.01</td>
<td>-.24*</td>
<td>.01</td>
<td>.13</td>
<td>.14</td>
<td>--</td>
</tr>
</tbody>
</table>

Note: Gender 1 = Male, 2 = Female. Causality orientation: 0 = autonomous, 1 = controlled

† p<.10, *p<.05, **p<.01.

Central analyses

We expected that the manipulation would affect both self-reported and behavioural measures of intrinsic motivation, and that this effect would be moderated by participants’ locus of causality. We conducted 3*2 ANOVAs (condition X causality orientation) on both measures of intrinsic motivation. There were no main effects or interactions on the self-report measure of intrinsic motivation. A significant main effect of motivational orientation was found for behavioural intrinsic motivation, F(1, 84) = 4.63, p <.05, with participants who were autonomy-oriented exhibiting greater
behavioural intrinsic motivation than those who were control-oriented, irrespective of condition. There were no other significant effects or interactions.

To better compare the results of the current study with the first study, we re-ran the above analyses for only the autonomy-support and controlling conditions (eliminating the neutral condition). Table 5 shows the means and significance tests for each analysis. We found a marginal main effect of condition for self-reported intrinsic motivation, and a main effect of causality orientation on behavioural intrinsic motivation. There were no other main effects or interactions. The main effect reflected the fact that participants in the autonomy supportive condition tended to report greater intrinsic motivation than those in the controlling condition.

Table 5. Study 2 ANOVA results for intrinsic motivation: means and significance tests.

<table>
<thead>
<tr>
<th></th>
<th>Self-report Intrinsic Motivation</th>
<th>Behavioural Intrinsic Motivation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Aut supportive</td>
<td>Controlling</td>
</tr>
<tr>
<td><strong>Causality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aut GCO</td>
<td>5.45</td>
<td>4.88</td>
</tr>
<tr>
<td>Cont GCO</td>
<td>5.32</td>
<td>5.24</td>
</tr>
<tr>
<td><strong>Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition</td>
<td>$F(1, 53) = 2.77^\dagger$</td>
<td>$F(1, 53) = .13$</td>
</tr>
<tr>
<td>GCO</td>
<td>$F(1, 53) = .35$</td>
<td>$F(1, 53) = 4.95^* $</td>
</tr>
<tr>
<td>Interaction</td>
<td>$F(1, 53) = 1.58$</td>
<td>$F(1, 53) = .95 $</td>
</tr>
</tbody>
</table>

Note: Aut = autonomy, cont = control, GCO = global causality orientation.

$^\dagger p < .10$ *$p < .05$. 
While no interaction was significant, an examination of the means did suggest some possible differences for autonomously-oriented participants in the autonomous and controlling conditions. To probe these differences, we split the file by motivational orientation and performed one-way ANOVAs for each group separately, focusing on the contrast between the autonomy supportive and controlling conditions. While there were no condition effects for participants with a controlled orientation, those with an autonomous orientation who were primed with a controlling other reported significantly less intrinsic motivation ($M = 4.88$ vs. $M = 5.45$; $t(42) = 2.40, p < .05$). No differences were found for the behavioural measure of motivation.

*Interaction with attachment anxiety and avoidance*

In addition to examining causality orientations, we thought that attachment anxiety and avoidance could also moderate the effect of the prime. As anxiety and avoidance were continuous rather than categorical variables, we tested this hypothesis by conducting multiple regressions on our dependent variables. Additionally, as avoidance and anxiety are theoretically separate dimensions (Brennan et al., 1998), we examined their effects in separate regressions. One set of multiple regressions was conducted which included anxiety, a dummy-coded variable for condition (comparing autonomy-supportive and controlling conditions only), and an interaction between those variables. Results from the regressions are summarized in Table 6.
Table 6: Standardized regression coefficients of intrinsic motivation on condition and attachment.

| Predictors | Anxiety | | | | | Avoidance | | | |
|------------|---------|---------------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|            | Self-Report | Behavioural | Self-Report | Behavioural | | | | |
| Condition  | .18 (1.38) | -.05(-.40) | .21(1.60) | .01(.03) | | | | |
| Anxiety    | .08(.66) | .10(.77) | -.04(-.27) | .07(.51) | | | | |
| Interaction| -.33(-2.60)* | -.31(-2.33)* | -.20(-1.54) | .08(.57) | | | | |
| R²         | .16 | .10 | .09 | .01 | | | | |
| F          | 3.42* | 1.99 | 1.80 | .21 | | | | |

*p<.05;

Significant interaction effects emerged for both self-report intrinsic motivation ($\beta = -.33, p < .05$) and the behavioural measure ($\beta = -.31, p < .05$). Figures 3 and 4 illustrate these interactions. Participants who were low in anxiety reported greater intrinsic motivation, and persisted longer in the free-choice period when primed with an autonomy-supportive other, while the opposite was true for highly anxious participants. There were no main effects or interaction effects of avoidant attachment.
Figure 3: Interaction between attachment anxiety and priming condition on self-report intrinsic motivation.

Figure 4: Interaction between attachment anxiety and priming condition on the behavioural measure of intrinsic motivation.
To examine whether the manipulation had a particularly strong effect for a subset of participants, we probed the significant interactions at 1 standard deviation above and below the means of anxiety (Aiken & West, 1991). The regression slope of condition was significant for self-report intrinsic motivation only for participants low on anxiety, $\beta = .50$, $p < .01$. This suggests that participants high on anxiety were not significantly affected by the condition, while participants low on anxiety were affected. The opposite was found for the behavioural measure of intrinsic motivation, with the regression of slope of condition marginally significant at 1 SD below the mean for anxiety, $\beta = -.36$, $p < .08$. Participants high on anxiety were less likely to persist in the free-choice period in the autonomy support condition than in the controlling condition.

*Brief discussion*

We again only found limited support for our main hypothesis in this study. When examining only the controlling and autonomy supportive conditions, a marginally significant main effect of condition was found, with participants primed with an autonomy supportive other expressing marginally more interest than participants primed with a controlling other. Additionally, autonomy-oriented participants who were primed with a controlling other reported significantly less intrinsic motivation than those primed with an autonomy-supportive other, while no such effect was evident for control-oriented participants. This was different from the first study, where it was the control-oriented participants who were affected by the prime.

In addition to causality orientations, we found that attachment anxiety played a role in the effectiveness of the prime, moderating the priming effect for both measures of
intrinsic motivation. Participants low in anxiety reporting more intrinsic motivation in the autonomy-supportive rather than controlling condition, while participants high in anxiety persisted slightly longer in the controlling condition. The results for all the analyses involving attachment remained essentially the same when we controlled for causality orientations.

General Discussion and Summary

In summary, results from two studies provide virtually no support for our first “main effect of condition” hypothesis and some support for our “interaction” hypothesis, suggesting that priming autonomy-supportive and controlling significant others may have an effect on motivation which differs based on participants’ personality. Across the four possible tests of main effects for autonomy versus controlling prime across our two studies, only one yielded an effect that approached significance. There were also 4 interaction effects involving causality orientations that were tested, and again only one of them was marginally significant. However, in both studies, separating participants based on causality orientation showed that the priming manipulation had a significant main effect in one subset of participants, suggesting that there were some differences in the effect of prime based on personality (i.e. the prime worked for participants in one orientation but not another). Additionally, we tested four interaction effects involving attachment variables and two of these were significant, both of which involved attachment anxiety. Combined, these results suggest that personality constructs may play a role in moderating primes of autonomy-support and control.

Our studies suffered from a number of limitations which may have played a role in our lack of significant findings. One important limitation of the study is the number of
suspicious participants we had to remove. In each study, approximately 10% of participants indicated they were suspicious during the funnelled debriefing (they either guessed our hypothesis, or immediately saw through the free choice task). Additionally, a number of people indicated that towards the end of the free choice period they began suspecting that it was strange that the experimenter was taking so long. We did not remove these participants from our sample unless they told us that they were immediately suspicious of the free-choice period or unless they thought that they were expected to continue with the task. The high rate of suspicion does suggest that our ‘cover story’ was not fully credible, and that other participants may have been suspicious without telling us.

In addition to losing participants due to the suspicion rate, the problems with the computerized NINA task in the first study resulted in lost data from 11 participants. While we addressed the problem in the second study, the task may not have been equivalent. Particularly, in the second study, self-reported motivation was unrelated to behavioural motivation – the reasons for this are unclear, but could include fatigue from the task (i.e. even participants who were interested and enjoyed the task found it too long and did not want to continue with it), or it could indicate ego-involved persistence (Ryan, Koestner, & Deci, 1991). Another limitation of the study was the low reliability of the causality orientation measure in the 2nd study, which could mean that participants were not classified according to their true causality orientation, thus weakening our results.

Given the limitations of these studies and the marginal significance of many of our findings, the following conclusions and implications are presented with reservation and are only tentative. Further studies which address some of the above limitations would
enable us to draw more definitive conclusions. Nevertheless, these studies do have potentially important implications which will be discussed below.

Our first prediction was that the motivation experienced with autonomy-supportive and controlling significant others would transfer to new situations when participants were primed with these others. The results did not support this prediction, although in the second study there was some (marginal) evidence that participants primed with an autonomy-supportive other reported greater self-interest on a subsequent task. One potential reason for this null finding could be that schemas associated with the primed target person were multifaceted and contained a large amount of varied information. Previous research on priming goals has shown that when a significant other possesses many goals (outside of the target goal) for the participant, priming that person will have less of an effect than priming someone who only holds that target goal for the participant (Shah, 2003a). It is possible that in our research, and particularly in the first study, the link between the target significant other and autonomy support or control was not narrow enough to elicit activation of motivational constructs. In other words, if a person has a broad array of associations with a significant other (as people undoubtedly do for parents and friends), it may be less likely that activating the representation of the person will activate the motivation component of the schema rather than some other components.

One of the goals of the study was to examine the interaction between global causality orientations and situational influences of the prime. Previous studies have found mixed results, particularly for control-oriented participants who are placed in autonomy-supportive conditions (Kernis, 1982; Weinstein & Hodgins, 2009). In our research,
different results are suggested by each of the two studies. In the first study, control-oriented participants reported significantly lower intrinsic motivation when primed with an autonomy-supportive rather than a controlling other, while there were no differences between conditions for autonomy-oriented participants. In the second study, there were no effects of condition on control-oriented participants, while autonomy-oriented participants fared worse in the control condition.

One potential reason why we found controlled and autonomous individuals to react differently to the conditions in the two studies could be related to the type of primes used in these studies. In the first study, the autonomy-supportive prime was most often a peer, rather than someone in a position of authority. It is possible that for control-oriented individuals, cues which activate representations of an authority figure affect motivation independently of whether this figure is autonomy supportive or controlling, while activation of peers does not have the same affect.

Additionally, there could have been an interaction with the goals held by the primed significant others, as peers often hold different goals than authority figures. Previous research has shown that when representations of significant others are activated, these others’ goals can affect task progress and commitment for tasks related to that goal (Shah, 2003a). While in the current studies the task was not tied to any particular goal, participants may still have inferred a goal such as achievement, which is a goal that is more likely held for them by their parents than by their peers. Future studies can examine this distinction by having people nominate both peers and authority figures who are autonomy supportive or controlling. One way to accomplish this could be to ask people to list the 5 most important peers and 5 most important authority figures in their life, and
to rate each one on autonomy support. The most controlling or most autonomy-supportive in each of these categories can then be used as the prime target. This would eliminate the need to think of someone who fits a specific category, and allow us to use significant others who serve a variety of roles (not just authority figures).

In the second study, we also found that anxious attachment plays a role in the outcome of the activation of interpersonal schemas. As expected, individuals with maladaptive interpersonal schemas reacted differently to the primes than non-anxiously individuals. Specifically, the prime had no effect on the self-reported interest of the more anxious participants, while those who were low on anxiety were affected by the primes. Interestingly, it was non-anxious participants primed with a controlling other who reported the least intrinsic motivation. This suggests that securely attached individuals who are used to others being responsive to their needs may be particularly affected by controlling significant others who challenge their positive representation of others. A surprising aspect of this finding is that the anxious participants reported relatively high levels of intrinsic motivation, similar to the levels of secure participants primed with autonomy-supportive others. This could occur as a result of affective adaptation on the part of the insecure participants – their emotions (such as feelings of motivation) are no longer dependent on the presence of significant others. However, this seems to be a contradiction for anxious participants, as attachment anxiety is associated with hypervigilant monitoring of others’ signals (Mikulincer & Shsver, 2003). Further investigation is needed to better understand these findings.

Our finding that personality variables can moderate the effects of a priming manipulation may have some implications for social cognitive research, which often
assumes that primes operate the same way across everyone. Confirming the importance of person by situation interactions (Mischel, 2004), this study adds to the growing social cognitive literature which examines the role of personality in nonconscious processing (e.g. Chartrand et al., 2007; Morrison, Wheeler & Smeesters, 2007). In research on the unconscious goal activation using the goals that others hold for us (e.g. Fitzsimmons & Bargh, 2003; Shah, 2003a), the extent to which primed participants pursue goals that their significant others hold for them could depend on whether these others are controlling or autonomy supportive, and also on participants’ causality orientations and attachment. It would be interesting to examine whether control-oriented individuals would be more likely to pursue the primed goals than autonomy-oriented individuals. Additionally, in the studies that found closeness to the target to be a moderator of the effectiveness of the prime (Shah, 200a3), this effect could potentially be a by-product of the autonomy-support provided by the target, as our research shows that ratings of autonomy support and closeness are highly correlated. Future studies can elaborate on that and examine these interactions.

Our research provides some insight on how subtle cues in the environment can affect people’s motivation for a novel activity. Particularly, cues which non-consciously remind us of other people could potentially influence people’s interest and enjoyment for a new activity. An autonomy-oriented adolescent who begins guitar lessons and whose teacher reminds him of his very strict, controlling 5th grade teacher might be less likely to enjoy guitar and continue with the lessons than if the teacher reminded him of his autonomy-supportive hockey coach, while the opposite may be true for a control-oriented individual. A particularly interesting aspect of such a scenario would be to consider
whether that guitar teacher was controlling or autonomy-supportive. Future studies can examine how non-conscious cues and motivational orientations interact with actual autonomy supports and controls in a situation.

In summary, this thesis examined how external cues which activate nonconscious representations of autonomy-supportive and controlling significant others interact with individuals’ personality to influence motivation. In some cases, causality orientations moderated the effect of the primes, as did anxious attachment. Autonomy-oriented participants exhibited more intrinsic motivation when primed with an autonomy-supportive other, while the opposite was true for control-oriented participants. Additionally, the controlling prime seemed to have a greater effect on non- anxiously attached participants. Overall, this study adds to the literature on person by situation interactions within social cognition.
References


Appendix A: Example of NINA puzzle from study 1
Appendix B: Example from image search task from study 2

A bench
Appendix C: General Causality Orientation Scale

These items pertain to a series of hypothetical sketches. Each sketch describes an incident and lists three ways of responding to it. Please read each sketch, imagine yourself in that situation, and then consider each of the possible responses. Think of each response option in terms of how likely it is that you would respond that way. (We all respond in a variety of ways to situations, and probably most or all responses are at least slightly likely for you.) If it is very unlikely that you would respond the way described in a given response, you should circle answer 1 or 2. If it is moderately likely, you would select a number in the mid range, and if it is very likely that you would respond as described, you would circle answer 6 or 7.

1. You have been offered a new position in a company where you have worked for some time. The first question that is likely to come to mind is:

   a) What if I can't live up to the new responsibility?
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely
   b) Will I make more at this position?
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely
   c) I wonder if the new work will be interesting.
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely

2. You have a school-age daughter. On parents' night the teacher tells you that your daughter is doing poorly and doesn't seem involved in the work. You are likely to:

   a) Talk it over with your daughter to understand further what the problem is.
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely
   b) Scold her and hope she does better.
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely
   c) Make sure she does the assignments, because she should be working harder.
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely

3. You had a job interview several weeks ago. In the mail you received a form letter which states that the position has been filled. It is likely that you might think:

   a) It's not what you know, but who you know.
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely
   b) I'm probably not good enough for the job.
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely
   c) Somehow they didn't see my qualifications as matching their needs.
      1  2  3  4  5  6  7
      very unlikely  moderately likely  very likely
4. You are a plant supervisor and have been charged with the task of allotting coffee breaks to three workers who cannot all break at once. You would likely handle this by:

a) Telling the three workers the situation and having them work with you on the schedule.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

b) Simply assigning times that each can break to avoid any problems.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

c) Find out from someone in authority what to do or do what was done in the past.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

5. A close (same-sex) friend of yours has been moody lately, and a couple of times has become very angry with you over "nothing." You might:

a) Share your observations with him/her and try to find out what is going on for him/her.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

b) Ignore it because there's not much you can do about it anyway.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

c) Tell him/her that you're willing to spend time together if and only if he/she makes more effort to control him/herself.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

6. You have just received the results of a test you took, and you discovered that you did very poorly. Your initial reaction is likely to be:

a) "I can't do anything right," and feel sad.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

b) "I wonder how it is I did so poorly," and feel disappointed.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

c) "That stupid test doesn't show anything," and feel angry.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

7. You have been invited to a large party where you know very few people. As you look forward to the evening, you would likely expect that:

a) You'll try to fit in with whatever is happening in order to have a good time and not look bad.
   
   1 2 3 4 5 6 7
   very unlikely moderately likely very likely

b) You'll find some people with whom you can relate.
c) You'll probably feel somewhat isolated and unnoticed.

very unlikely  moderately likely  very likely

8. You are asked to plan a picnic for yourself and your fellow employees. Your style for approaching this project could most likely be characterized as:

a) Take charge: that is, you would make most of the major decisions yourself.

very unlikely  moderately likely  very likely

b) Follow precedent: you're not really up to the task so you'd do it the way it's been done before.

very unlikely  moderately likely  very likely

c) Seek participation: get inputs from others who want to make them before you make the final plans.

very unlikely  moderately likely  very likely

9. Recently a position opened up at your place of work that could have meant a promotion for you. However, a person you work with was offered the job rather than you. In evaluating the situation, you're likely to think:

a) You didn't really expect the job; you frequently get passed over.

very unlikely  moderately likely  very likely

b) The other person probably "did the right things" politically to get the job.

very unlikely  moderately likely  very likely

c) You would probably take a look at factors in your own performance that led you to be passed over.

very unlikely  moderately likely  very likely

10. You are embarking on a new career. The most important consideration is likely to be:

a) Whether you can do the work without getting in over your head.

very unlikely  moderately likely  very likely

b) How interested you are in that kind of work.

very unlikely  moderately likely  very likely

c) Whether there are good possibilities for advancement.

very unlikely  moderately likely  very likely

11. A woman who works for you has generally done an adequate job. However, for the past two weeks her work has not been up to par and she appears to be less actively interested in her work. Your reaction is likely to be:
a) Tell her that her work is below what is expected and that she should start working harder.

very unlikely 2 3 4 5 6 7

b) Ask her about the problem and let her know you are available to help work it out.

very unlikely 2 3 4 5 6 7

c) It's hard to know what to do to get her straightened out.

very unlikely 2 3 4 5 6 7

12. Your company has promoted you to a position in a city far from your present location. As you think about the move you would probably:

a) Feel interested in the new challenge and a little nervous at the same time.

very unlikely 2 3 4 5 6 7

b) Feel excited about the higher status and salary that is involved.

very unlikely 2 3 4 5 6 7

c) Feel stressed and anxious about the upcoming changes.

very unlikely 2 3 4 5 6 7
Appendix D: Instructions for nomination task for study 1

Please nominate a person who is important in your life for each category on the next few pages. Indicate the person’s name as well as their relationship to you. For each person, please answer the series of questions that follow.

A) Someone who is always interested in how you feel about things and who supports you in all your decisions and encourages you to do what you want to do and to pursue your dreams.

Name of person __________________________
Relationship __________________________

B) Someone who you like to hang out with, a person with whom you can just relax and party with.

Name of person __________________________
Relationship __________________________

C) Someone with whom you like to go shopping – someone who has a good taste in clothes and fashion, and can give you advice on what to buy.

Name of person __________________________
Relationship __________________________

D) Someone who has high expectations of you, who strongly encourages you to do what they think would be in your best interest.

Name of person __________________________
Relationship __________________________

E) Someone who tells you all their secrets, who confides in you and asks you for advice.

Name of person __________________________
Relationship __________________________
Appendix E: Ratings of nominated individuals, study 1

Please answer the following questions about this person:

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<tbody>
<tr>
<td></td>
<td>not at all true</td>
<td></td>
<td></td>
<td>Somewhat true</td>
<td></td>
<td></td>
<td>Very true</td>
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1) When I am with XXXXXXX, I feel free to be who I am. ___
2) When I am with XXXXXXX, I feel like a competent person. ___
3) When I am with XXXXXXX, I feel loved and cared about. ___
4) When I am with XXXXXXX, I often feel inadequate or incompetent. ___
5) When I am with XXXXXXX, I have a say in what happens, and I can voice my opinion. ___
6) When I am with XXXXXXX, I often feel a lot of distance in our relationship. ___
7) When I am with XXXXXXX, I feel very capable and effective. ___
8) When I am with XXXXXXX, I feel a lot of closeness and intimacy. ___
9) When I am with XXXXXXX, I feel controlled and pressured to be certain ways. ___
10) I feel close to XXXXXXX. ___
11) XXXXXXX feels close to me. ___
Appendix F: Visualization task instructions

Visualization Task

We are conducting an experiment to assess how personality factors relate to one’s attention to detail. We gathered information about people in your life from the online questionnaire. Now we want you to form a vivid image of ___________________________ in your mind; think about him/her in as much detail as possible. Please describe his/her appearance as fully as possible. You have five minutes to complete this task.

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Appendix G: Intrinsic motivation Inventory

Picture Task Evaluation Questionnaire

For each of the following statements, please indicate how true it is for you, using the following scale:

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| not at all true | somewhat true | very true

1. While I was working on the picture search task I was thinking about how much I enjoyed it. ____
2. I did not feel at all nervous about doing the picture search task. ____
3. I felt that it was my choice to do the picture search task. ____
4. I think I am pretty good at this picture search task. ____
5. I found the picture search task very interesting. ____
6. I felt tense while doing the picture search task. ____
7. I think I did pretty well at this activity, compared to other students. ____
8. Doing the picture search task was fun. ____
9. I felt relaxed while doing the picture search task. ____
10. I enjoyed doing the picture search task very much. ____
11. I didn’t really have a choice about doing the picture search task. ____
12. I am satisfied with my performance at this picture search task. ____
13. I was anxious while doing the picture search task. ____
14. I thought the picture search task was very boring. ____
15. I felt like I was doing what I wanted to do while I was working on the picture search task. ____
16. I felt pretty skilled at this picture search task. ____
17. I thought the picture search task was very interesting. ____
18. I felt pressured while doing the picture search task. ____
19. I felt like I had to do the picture search task. ____
20. I would describe the picture search task as very enjoyable. ____
21. I did the picture search task because I had no choice. ____
22. After working at the picture search task for awhile, I felt pretty competent. ____
Appendix H: Experiences in Close Relationships Scale

Instructions: The following statements concern how you feel with people in general. We are interested in how you generally experience relationships, not just in what is happening in a current relationship. Respond to each statement by indicating how much you agree or disagree with it. Write the number in the space provided to the left, using the following rating scale:

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<tr>
<td></td>
<td>Disagree Strongly</td>
<td>Neutral/Mixed</td>
<td>Agree strongly</td>
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1. I prefer not to show other people how I feel deep down.
2. I worry about being abandoned.
3. I am very comfortable being close to other people.
4. I worry a lot about my relationships.
5. Just when my partner starts to get close to me I find myself pulling away.
6. I worry that other people won’t care about me as much as I care about them.
7. I get uncomfortable when another person wants to be very close.
8. I worry a fair amount about losing my partner.
9. I don't feel comfortable opening up to other people.
10. I often wish that my partner's feelings for me were as strong as my feelings for him/her.
11. I want to get close to other people, but I keep pulling back.
12. I often want to merge completely with romantic partners, and this sometimes scares them away.
13. I am nervous when others get too close to me.
15. I feel comfortable sharing my private thoughts and feelings with other people.
16. My desire to be very close sometimes scares people away.
17. I try to avoid getting too close to other people.
18. I need a lot of reassurance that I am loved by my partner.
19. I find it relatively easy to get close to other people.
20. Sometimes I feel that I force my partners to show more feeling, more commitment.
21. I find it difficult to allow myself to depend on other people.
22. I do not often worry about being abandoned.
23. I prefer not to be too close to other people.
24. If I can't get my partner to show interest in me, I get upset or angry.
25. I tell my partner just about everything.
26. I find that other people don't want to get as close as I would like.
27. I usually discuss my problems and concerns with other people.
28. When I'm not involved in a relationship, I feel somewhat anxious and insecure.
29. I feel comfortable depending on other people.
30. I get frustrated when my partner is not around as much as I would like.
31. I don't mind asking other people for comfort, advice, or help.
32. I get frustrated if important others are not available when I need them.
33. It helps to turn to other people in times of need.
34. When other people disapprove of me, I feel really bad about myself.
35. I turn to others for many things, including comfort and reassurance.
36. I resent it when my partner spends time away from me.
Appendix I: Instructions for nomination task for study 2

In this study, we are also interested in the influence certain people have in your life. Below, you will be presented with descriptions of people who exhibit a particular set of characteristics. Please think back to some of the memorable people in your life who were in a position of authority over you (a teacher, coach, employer, supervisor, etc.) and choose a person who fits each description. This could be a person from when you were younger, or someone who you currently know and work with. For each person, please answer the series of questions that follow.

A) Please think of someone in a position of authority (teacher/professor, coach, employer, supervisor, etc) who typically exhibits the following set of characteristics:
- Has a strong focus on evaluation and performance, setting very high standards
- Only accepts and acts well towards you when you are successful
- Is often disappointed with you and voices that disapproval
- Emphasizes doing things the ‘right’ way
- Dictates what you should do and/or how your should behave

Please answer the following questions about this person:
For the next set of questions, please imagine that you are with this person, and think about how they make you feel. If this person is someone from your past, remember how you used to feel when you were with them.

Name of person _______________________
Relationship _______________________

Please nominate a person who is important in your life who fits the following criteria:
B) Please think of someone in a position of authority (teacher/professor, coach, employer, supervisor, etc) who typically exhibits the following set of characteristics:
- Disorganized, forgets where they put things or what they were saying
- Incompetent, or incapable of properly doing their job
- Irresponsible, blames their mistakes on others
• Does not care about the people over whom they have authority (students, employees, etc.)

Name of person _________________________
Relationship _________________________

Please nominate a person who is important in your life who fits the following criteria:

C) Please think of someone in a position of authority (teacher/professor, coach, employer, supervisor, etc) who typically exhibits the following set of characteristics:
• Understanding and accepting of you as a person
• Patient, even when you make mistakes
• Believes and trusts in you
• Encourages you to be yourself and pursue your own interests
• Supportive of your choices and decisions

Name of person _________________________
Relationship _________________________

Please nominate a person who is important in your life who fits the following criteria:

D) Please think of someone in a position of authority (teacher/professor, coach, employer, supervisor, etc.) who typically exhibits the following set of characteristics:
• Often makes jokes
• Someone funny, who makes everyone else laugh
• Knows how to lighten any situation
• Outgoing, with a good sense of humour

Name of person _________________________
Relationship _________________________
Appendix J: Ratings of nominated individuals, study 2

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<tr>
<td>1) How close are/were you to this person?</td>
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<td>2) How close is/was this person to you?</td>
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<td>3) How vividly can you recall the image of this person in you mind?</td>
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<td>1) When I am with XXXXXXX, I feel free to be who I am.</td>
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<td>2) When I am with XXXXXXX, I feel like a competent person.</td>
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<td>3) When I am with XXXXXXX, I feel loved and cared about.</td>
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<td>4) When I am with XXXXXXX, I often feel inadequate or incompetent.</td>
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<td>5) When I am with XXXXXXX, I have a say in what happens, and I can voice my opinion.</td>
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<td>6) When I am with XXXXXXX, I often feel a lot of distance in our relationship.</td>
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<td>7) When I am with XXXXXXX, I feel very capable and effective.</td>
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<td>8) When I am with XXXXXXX, I feel a lot of closeness and intimacy.</td>
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