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# Attachment Moderates the Effects of Autonomy-Supportive and Controlling Interpersonal Primes on Intrinsic Motivation

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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 relational schemas and that having schemas characterised by insecurity can compromise normative functioning. The present study examined how such insecurity, operationalized as attachment anxiety and avoidance, moderates the effects of priming an autonomy-supportive or controlling other on intrinsic motivation and persistence. Ninety participants were primed with either an autonomy-supportive or controlling authority figure and engaged in a novel picture-search task. Although individuals low in anxiety and avoidance responded to the primes as expected (decreasing intrinsic motivation and persisting less in the controlling-prime condition), participants high in anxiety and avoidance did not show the expected changes in intrinsic motivation in response to the primes, and participants high in anxiety responded to the controlling prime with increased persistence.

*Keywords:* motivation, attachment, self-determination theory, priming

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 et al., 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 (La Guardia & Patrick, 2008). Through perspective taking, empathy, and the provision of choice, autonomy-supportive others can foster autonomous motivation for contexts in which they are embedded (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 develop mental representations, or interpersonal schemas, of significant others (Baldwin, 1992). These schemas will encode certain relationships as secure, accepting, and supportive, and others as insecure, unreliable, and risky, depending on one's experiences with those partners; moreover, one's experiences will determine whether one has relatively more secure or insecure schemas available and chronically accessible (Baldwin, Fehr, Keedian, Seidel, & Thomson, 1993; Baldwin, Keelan, Fehr, Enns, & Koh-Rangarajoo, 1996). One's various interpersonal schemas can be nonconsciously activated by subtle cues in the environment to guide one's perceptions, emotions, and behaviour (e.g., Baldwin, Carrell, & Lopez, 1990). This article examines how having more insecure interpersonal schemas chronically available (i.e., being chronically interpersonally insecure) might moderate the motivational effects of activating representations of specific autonomy-supportive and controlling others.

## Intrinsic Motivation in Self-Determination Theory

According to the self-determination theory (SDT), intrinsic motivation fuels learning and development of the self. Intrinsic motivation refers to engagement in a particular behaviour for the behaviour's own sake. Intrinsically motivated behaviours are interesting and pleasurable, and do not provide any external benefits other than the enjoyment inherent in the activity. Children and adults who play and explore for the joy and fun of it are said to be intrinsically motivated. Intrinsic motivation is thought to stem from the innate propensity of all humans toward exploration, spontaneous interest, and mastery (Deci & Ryan, 2000). It has been associated with a host of adaptive processes, including the pursuit of challenge, enhanced creativity, positive emotions, good interpersonal relations, and greater conceptual learning (Ryan & Deci, 2000).

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Multiple studies have examined how contextual factors can enhance or decrease intrinsic motivation: Rewards, deadlines, competition, and threats have all been shown to undermine intrinsic motivation (Deci, Koestner & Ryan, 1999; Deci, Betley, Kahle, Abrams, & Porac, 1981; Plant & Ryan, 1985), while the provision of choice, the acknowledgment of feelings, opportunities for self-direction, and noncontrolling positive feedback can enhance it (Ryan, Mims & Koestner, 1983; Zuckerman, Porac, Lathin, Smith, & Deci, 1978). More recently, Levesque and Pelletier (2003) activated autonomy-support and control nonconsciously in a study where participants primed with words related to intrinsic motivation reported more interest and persisted longer on an unrelated puzzle task compared to participants primed with extrinsic motivation. The hypothesis that motivational processes can be transferred to new situations was further supported in a study by Ratelle, Baldwin, and Vallerand (2005). In their study, a neutral cue (an audio tone) was paired with controlling feedback ("You did the puzzle as you should have, now you have to continue with the next one, as is expected of you.") during a puzzle task. This controlling feedback led participants who subsequently heard this tone in a novel puzzle task to report less autonomous motivation for this task and to continue with the puzzles less frequently during a free-choice period.

In addition to the specific characteristics of an environment, significant others can also be an important source of autonomous motivation, and can be instrumental in developing and maintaining this motivation in a given context. 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, p.18). 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 (for autonomy, competence, and relatedness; see Deci & Ryan, 2008) 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 specific accomplishments of the individual, therefore diminishing the person's autonomy and competence (La Guardia, Ryan, Couchman & Deci, 2000). Research has shown that autonomy-supportive and controlling others such as teachers, parents, employers, health care providers, coaches, and even friends and romantic partners can influence an individual's motivation in many spheres of life (e.g., Black & Deci, 2000; Joussemet, Landry, & Koestner, 2008; Baard, Deci, & Ryan, 2004; Williams et al., 2006; La Guardia et al., 2000).

## Interpersonal Schemas

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 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).

Research has shown that the activation of mental representations (i.e., priming) of significant others can have consequences for perceptions of self, others, and new situations (Baldwin et al., 1990; Baldwin & Holmes, 1987; Glassman & Andersen, 1999), affect (Andersen, Reznik, & Manzella, 1996), motivation (Shah, 2003), and overt behaviours (Berk & Andersen, 2000; Fitzsimons & Bargh, 2003; Shah, 2003). Overall, this 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, 2003), a result similar to the one typically found when the goal of achievement is primed directly (Bargh, Gollwitzer, Lee-Chai, Barndollar & Troetschel, 2001). We expect that this could also be the case for autonomy and control—that is, priming individuals with autonomy supportive or controlling 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).

## Attachment

An important aspect of interpersonal schemas is that they can be influenced by prior interpersonal experiences, and that schemas for new relationships are encoded in ways that conform to existing interpersonal expectations (Baldwin, 1992). The development of interpersonal schemas through positive or negative relational experiences, their persistence, and their continuing influence in new and ongoing relationships has been studied extensively within the framework of attachment theory (Bowlby, 1969/1982, Mikulincer & Shaver, 2007).

Attachment theory proposes that we first develop working models (mental constructs analogous to the schemas described above) detailing how relationships operate in infancy, based on early experiences with primary caregivers; these working models can then be generalised to new relationships, guiding cognition and behaviour through adulthood (Bowlby, 1969/1982; see also Ainsworth, Blehar, Waters, & Wall, 1978; Hazan & Shaver, 1987; Mikulincer & Shaver, 2003, 2007). Ideally, one's attachment figures will be available, responsive, and supportive, allowing for the development of attachment security and providing a secure base for the subsequent pursuit of growth activities and exploration. However, if attachment figures are unreliable and unsupportive, one will experience attachment insecurity and will accordingly adopt suboptimal though functional secondary strategies to mitigate this distress. Attachment theory proposes two forms of insecurity. Avoidant insecurity develops if others are consistently unavailable. People who are high in attachment avoidance are uncomfortable with dependency and pursue strategies that deactivate the attachment system: suppressing negative emotions and relying on the self instead of others for security. Conversely, anxious insecurity develops if others are inconsistently available. Individuals high in attachment anxiety are preoccupied with their relationships, and they pursue hyperactivating strategies: they are hypervigilant to cues of abandonment or rejection and intensify

proximity seeking in an effort to compel others to provide security (Mikulincer & Shaver, 2003, Mikulincer & Shaver, 2007).

Although people generally have more schemas consistent with secure rather than insecure relationships available in memory, one's chronic attachment style informs the relative availability of avoidant and anxious schemas, as well as what styles of schemas are chronically accessible (Baldwin et al., 1993; Baldwin et al., 1996). Attachment security and insecurity can thereby bias everyday social cognition, including person perception, and our expectations and attributions for others' behaviour (Dykas & Cassidy, 2011; Mikulincer & Shaver, 2007). Securely attached individuals view the social world as generally more positive, trustworthy, and benevolent compared with those high in either or both anxiety or avoidance (Collins & Read, 1990; Hazan & Shaver, 1987); they similarly have more positive interpersonal expectations for specific, current relationships (Baldwin, 1992; Collins, 1996). This positivity of the securely attached and negativity of the anxiously and avoidantly attached toward their social world has also been shown to occur implicitly and automatically (Baldwin et al., 1993; Zayas & Shoda, 2005). Although most research has investigated these biases in the context of relationships with attachment figures (e.g., romantic partners, parent–child relationships), these processes have been shown to influence our perceptions of novel individuals and developing relationships (e.g., Baldwin et al., 1996; Brumbaugh & Fraley, 2006; Zhang & Hazan, 2002).

## Present Study

The present study examines whether chronic insecurity, operationalized as attachment anxiety and avoidance, moderates the effects of priming the motivational aspects of interpersonal schemas. Participants were primed with a controlling or autonomy-supportive authority figure and completed a novel picture-search task. Although it would normally be expected that priming someone with an authority figure who was autonomy supportive rather than controlling would result in enhanced intrinsic motivation, we hypothesised that this effect would be moderated by insecurity. That is, we expected that only secure participants would respond to the autonomy-supportive figure prime in the positive way predicted by SDT; the negative biases that inform insecure participants' social cognition, and so their formation of interpersonal schemas, would complicate their responses to the prime, as detailed below. We also expected that secure participants would be most vulnerable to the negative effects of a controlling figure prime, as this type of relationship is a greater violation of their chronically positive views of their social world than of anxious and avoidant participants' chronically negative views.

Additionally, we hypothesised that anxious insecurity and avoidant insecurity would have differing, characteristic effects on the prime. By definition, people who are high in attachment anxiety are more dependent upon their relationships with others than are those who are high in attachment avoidance. Avoidance is associated with deactivation of the attachment system and with compulsive self-reliance (Mikulincer & Shaver, 2003, Mikulincer & Shaver, 2007), and so participants who are high in avoidance may be insensitive to relational primes, be that autonomy-supportive or controlling. By contrast, anxious participants are more likely to react to such primes, even if they may react in ways inconsistent with SDT (e.g., relaxing their behaviour in the face of an autonomy-supportive other who is unlikely to reject them) or maladaptive (e.g., increasing task persistence in an effort to gain the approval of a controlling other).

## Method

### Participants

Participants were undergraduate 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 $15 for their participation. After removing participants who were suspicious during the experiment, we were left with 90 participants (67.8% female). Participants were between the ages of 17 and 28 with a mean age of 19.44 ($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 assessing attachment anxiety and avoidance. In this online session they were also 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 voices 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.

To disguise the purpose of the study, 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. 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 and vividness of recall.

Approximately two weeks later, participants came into the lab for a study of attention to detail. Forty-eight participants who completed the online survey did not come to their scheduled lab session, and did not respond to our attempts to reschedule. The participants who completed both parts of the study did not differ on attachment anxiety or avoidance from those who only completed the online portion, $F(1, 145) = .44$, *ns*, and $F(1, 147) = .54$, *ns*, for anxiety and avoidance, respectively.

For the first part of the lab portion of the study, participants were given written instructions to describe in as much detail as possible the appearance of a target person whose name was taken from 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). This was done to ensure that the targets were not also attachment figures. 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 search for the object, or click on the "next" button to move to the next object. The task automatically stopped after 8 min 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. The experimenter then told the participants that she had forgotten to make photocopies for the next part of the experiment, and that while she went to make those copies 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 the number of objects they found. After 7 minutes, the experimenter returned to the room to debrief the participants and probe for suspicion. This was done by asking participants their thoughts about the nature of the experiment as a whole and about the experimenter going to get more photocopies. Participants who guessed our hypotheses about the priming, or who said that they thought we wanted to see whether they would continue with the pictures-searching task during the free-choice period were excluded from the study.

## Measures

**Attachment anxiety and avoidance.** Attachment avoidance and anxiety were assessed using the Experiences in Close Relationships Scale (ECR; Brennan, Clark & Shaver, 1998). The ECR is a self-report measure assessing adult attachment styles, specifically, how people generally experience romantic relationships. For the purpose of the present study, the items were worded to focus on relationships in general. The questionnaire consists of 36 items reflecting two orthogonal factors of avoidant insecurity (18 items) and anxious insecurity (18 items). Items for assessing 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 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 ($\alpha = .92$, 95% confidence interval [CI] [.89, .94] for the anxiety subscale and $\alpha = .88$, 95% CI [.84, .92] for the avoidance subscale).

**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" (reversed). Participants rated how true each item was for them using a scale from 1 (*not at all true*) to 7 (*very true*). The subscale was reliable ($\alpha = .87$ for the target person, 95% CI [.79, .92]).

**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 you mind?" on a scale of 1 (not at all) to 7 (extremely).

**Self-report intrinsic motivation.** The intrinsic motivation subscale of the Intrinsic Motivation Inventory (IMI) was used to assess participants' subjective experience of intrinsic motivation on the picture-search task (Ryan et al., 1983). Participants rated seven statements on the extent to which each was true for them using a 7-point scale ranging from 1 (*not true at all*) to 7 (*very true*). Examples of items include: "I would describe this task as very enjoyable" and "Doing the picture search task was fun." Past research has shown that the IMI is a valid and reliable instrument (McAuley, Duncan, & Tammen, 1989). In the present study, the scale was reliable at $\alpha = .93$, 95% CI [.90, .95].

**Behavioural measure of persistence.** Data were collected on the amount of time participants spent doing the puzzle during the free-choice period. The computer program recorded the amount of time spent looking at each picture in the free-choice period, as well as of the number of images viewed and the number of objects found during the free-choice period. As these three measures were highly correlated (*r*s = .97–.99), we combined them to form a measure of persistence by taking the mean of the standardized scores of these three measures.

## Results

### Preliminary Analyses

We first examined the ratings of the nominated targets to determine whether attachment predicted ratings of autonomy support or vividness. In a multiple regression, neither anxiety, nor avoidance, nor their interaction was related to the level of autonomy or the vividness of either the controlling or the autonomy-supportive person whom the participants nominated. We also performed a manipulation check, which confirmed that participants in the autonomy support condition visualized a target who was significantly higher on autonomy support ($M = 6.13$; 95% CI [5.90, 6.35]) than participants in the controlling condition, $M = 2.77$; 95% CI [2.44, 3.09], $F(1, 56) = 334.81$, $p < .01$. There were no differences in the vividness of the target person, $F(1, 56) = .45$, *ns*.

An examination of our key variables showed that there were two outliers on the self-report measure of intrinsic motivation, which affected the skew of the variable. Removing these outliers normalized the distribution; they were thus removed for all further analyses. There were no violations of key regression assumptions for the predictor variables. As the behavioural measure was not normally distributed (because many people did not continue with the picture search task in the free choice period), we also looked at a dichotomous variable of whether participants continued with the task. Logistic regression analyses with this variable yielded essentially the same results as the multiple regressions with the continuous variable; for ease of understanding and for comparison with self-report motivation, we report the latter results.

Table 1 presents the means, standard deviations, and correlations of all study variables. None of the variables were significantly correlated, although the correlation between self-reported intrinsic motivation and the behavioural measures of persistence was marginal, $r = .20$, $p = .06$. Gender was also uncorrelated with any study variables, and was not examined further. Participants' levels of anxiety and avoidance were neither high nor low but approximated the midpoint. Participants generally found the picture-search task interesting, as self-reported intrinsic motivation was significantly higher than the midpoint ($M = 5.42$, $t = 12.36$, $p < .01$).

### Intrinsic Motivation

We first examined the self-report measures of intrinsic motivation using a hierarchical multiple regression. In Step 1 we included anxiety and avoidance (both standardized) as well as condition, coded from controlling (–1) to autonomy-supportive (1), with the neutral condition in the middle (coded as 0). In Step 2 we included the two-way interactions, and in Step 3 the three-way interactions. In the first step there was a marginal main effect of condition on the self-report measure of intrinsic motivation ($\beta = .21$, $t = 1.93$, $p = .06$), reflecting that participants tended to report greater intrinsic motivation in the autonomy supportive condition; however, this was moderated in Step 2 by a significant condition by anxiety interaction ($\beta = –.24$, $t = –2.32$, $p < .05$), and a significant condition by avoidance interaction ($\beta = –.21$, $t = –2.00$, $p < .05$). These interactions are illustrated in Figures 1 and 2. The anxiety by avoidance interaction was not significant, and the three-way interaction in the third step was not significant. Table 2 reports all the regression coefficients.

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 and avoidance (Aiken & West, 1991). First, for anxiety and self-report intrinsic motivation, the regression slope of condition was significantly different from zero only for participants at 1 standard deviation below the mean, $\beta = .43$, $t = 3.05$, $p < .01$. This suggests that condition affected the interest of participants low in anxiety, but not of those who were high in anxiety. This effect of condition for low anxiety participants was in the expected direction: For these participants intrinsic motivation was lower when primed with the controlling figure than when primed with the autonomy supportive figure. There was no linear effect for the highly anxious because they experienced significantly greater intrinsic motivation with a controlling prime compared with the neutral condition ($\beta = .35$, $t = 2.32$, $p < .05$) and marginally greater intrinsic motivation with an autonomy supportive prime compared with the neutral condition ($\beta = .29$, $t = 1.86$, $p = .07$).

We also probed the interaction of avoidance and condition on self-reported interest, finding that the effect of condition was significant for participants low on avoidance ($\beta = .37$, $t = 2.64$, $p < .05$) but not for participants high on avoidance ($\beta = –.01$, $t = –.05$, *ns*). This effect of condition for low avoidance participants was again in the expected direction: These participants reported lower intrinsic motivation in the controlling than in the autonomy supportive condition. By contrast, high avoidance participants' intrinsic motivation was insensitive to the primes.

Finally, we examined the effect of anxiety and avoidance within each condition using dummy variable coding (Aiken & West, 1991). Analyses showed that anxiety was significantly positively related to intrinsic motivation in the controlling condition ($\beta = .65$, $t = 3.55$, $p < .01$), where lower anxiety was associated with lower intrinsic motivation. The effect of anxiety was not significant in the autonomy-supportive condition ($\beta = –.04$, $t = .21$, *ns*). Avoidance, on the other hand, was significantly negatively related

Table 1
*Means, Standard Deviations, and Correlations of Study Variables*

| Variable | *M* | Min | Max | *SD* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|---|---|
| 1. Anxiety | 3.72 | 1.33 | 6.06 | 1.05 | — | | | |
| 2. Avoidance | 3.51 | 1.33 | 5.72 | .89 | .09 | — | | |
| 3. Self-report intrinsic motivation | 5.43 | 2.29 | 7.00 | 1.09 | –.07 | –.02 | — | |
| 4. Behavioural intrinsic motivation | –.01 | –.78 | 1.71 | .98 | .05 | .15 | .20† | — |

† $p < .10$.

to intrinsic motivation in the autonomy supportive condition ($\beta = -.34$, $t = -2.18$, $p < .05$) but not in the controlling condition ($\beta = .16$, $t = .97$, *ns*), showing that lower avoidance was associated with greater intrinsic motivation in the autonomy-supportive condition only.

## Persistence

Next, we replicated these analyses with the behavioural measure of persistence.[1] The first step of the hierarchical regression did not show any main effects of condition, anxiety, or avoidance. In the second step, only the interaction of condition by anxiety was significant, $\beta = -.32$, $t = -3.00$, $p < .05$ (see Figure 3). As with the self-report measure, the interaction of avoidance and anxiety was not significant and the three-way interaction added in Step 3 did not add anything to the model.

When we probed the interaction, the effect of condition was significant in the expected direction for participants low on anxiety ($\beta = .36$, $t = 2.48$, $p < .05$). There was a trend in the opposite direction for participants high on anxiety, $\beta = -.30$, $t = -1.87$, $p = .07$). Participants low on anxiety demonstrated greater persistence with the task when primed with the autonomy supportive figure than when primed with the controlling figure. The opposite appeared to be the case for highly anxious participants. Simple effects tests revealed that the highly anxious who were primed with the controlling figure persisted longer on the task than those in both the neutral ($\beta = .43$, $t = 2.43$, $p < .05$) and the autonomy supportive ($\beta = .40$, $t = 2.04$, $p < .05$) conditions. An examination of the effects of anxiety in each condition separately showed that anxiety was significantly related to increased persistence in the controlling condition ($\beta = .60$, $t = 3.09$, $p < .05$), but not in the autonomy-supportive condition ($\beta = -.23$, $t = -1.25$, *ns*).

## Discussion

In this study, we examined how attachment avoidance and anxiety moderate the effects of priming an autonomy-supportive or controlling authority figure on intrinsic motivation and persistence.

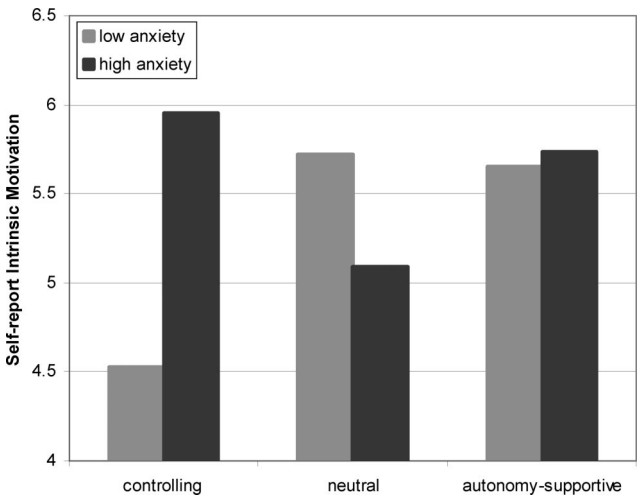


*Figure 1.* Interaction of condition and anxiety on the self-report measure of intrinsic motivation.

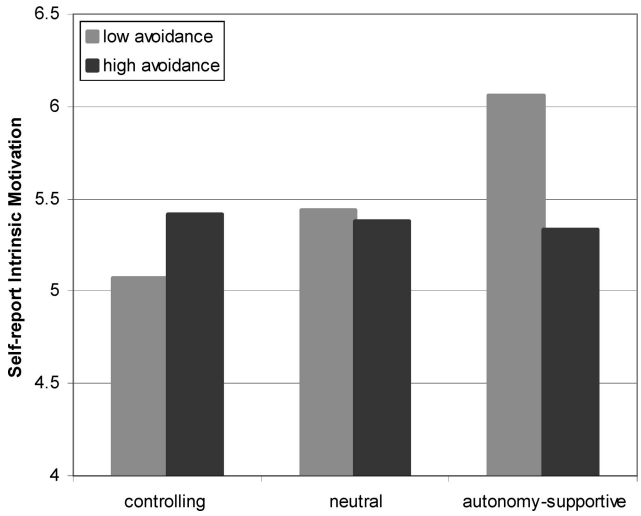


*Figure 2.* Interaction of condition and avoidance on the self-report measure of intrinsic motivation.

Results showed that attachment anxiety moderated the effect of the primes on both self-reported intrinsic motivation and on the behavioural measure of persistence, while avoidance only moderated the effect on intrinsic motivation. For participants low in attachment anxiety and for those low on attachment avoidance, the primes had effects consistent with the literature. When primed with a controlling other, these participants reported lower intrinsic motivation for a novel task compared with when they were primed with an autonomy-supportive other. This was also the case for participants low on attachment anxiety on the behavioural measure of motivation. However, for insecure participants, the effects of condition were not what SDT would predict: For participants high in avoidance, intrinsic motivation was unaffected by the prime and for participants high in anxiety, the difference between the controlling and autonomy-supportive conditions was eliminated (in the case of self-reported intrinsic motivation) or even reversed (in the case of the behavioural measure).

Our results also produced two somewhat unexpected findings. First, the self-report measure of intrinsic motivation was uncorrelated with the behavioural measure of persistence, suggesting that some participants may have persisted despite finding the task uninteresting, while others who were intrinsically motivated to do the task did not engage in it further during the free-choice period. Although persistence typically signifies the presence of intrinsic motivation, participants may sometimes persevere on a task despite not finding the task particularly enjoyable. This has especially been shown to occur when the participants are ego-involved in the task (i.e., when their self-esteem is contingent on their performance; Ryan, Koestner & Deci, 1991), and may have been the case in our study. Thus, although behavioural measures are

[1] A logistic regression with the dichotomous variable of persistence yielded essentially the same results as the multiple regression with the continuous variable, suggesting that the interaction between anxiety and condition was related to whether or not participants continued with the image search task in the free-choice period.

Table 2
*Hierarchical Multiple Regression Analyses Predicting Intrinsic Motivation From Condition, Attachment Anxiety and Avoidance, and Their Interactions*

| Predictor | Self-Report | | | Behavioural | | |
|---|---|---|---|---|---|---|
| | b | β | *t* | b | β | *t* |
| Step 1 | | | | | | |
| Condition | .28 | .21 | 1.93† | .08 | .06 | .59 |
| Anxiety | .08 | .07 | .64 | .04 | .04 | .39 |
| Avoidance | –.06 | –.06 | –.53 | .15 | .16 | 1.43 |
| Step 2 | | | | | | |
| Condition × Anxiety | –.34 | –.24 | –2.32* | –.41 | –.32 | –3.00* |
| Condition × Avoidance | –.26 | –.21 | –2.00* | .08 | .07 | .66 |
| Anxiety × Avoidance | –.10 | –.10 | –1.00 | .04 | .04 | .37 |
| Step 3 | | | | | | |
| Condition × Anxiety × Avoidance | –.10 | –.08 | –.69 | –.11 | –.10 | –.85 |

† $p < .10$. * $p < .05$.

considered the "gold standard," research on intrinsic motivation has suggested that self-report measures could be important to differentiate between the various internal states which could underlie otherwise similar behaviour. Additionally, the opposite may have also occurred, where participants did not continue with the task in the free-choice period despite finding it interesting and enjoyable because they have had enough of it, or because they were occupied by something else. The participants high in attachment anxiety may have been particularly likely to do this in the autonomy-support condition, as discussed further below. Although participants were told that they had the option of continuing with the task or reading magazines, they also had their personal belongings with them in the room, so it was possible that some participants used their music players or cell phones while they waited for the experimenter.

Our second unexpected finding was the marginally significant main effect of the prime on intrinsic motivation. Given the consistent findings of previous research showing the effects of controlling and autonomy-supportive environments on motivation (e.g., Deci et al., 1999), there was reason to expect a stronger effect. Our results are likely due to the nature of the prime. Unlike previous studies which manipulated task cues, such as providing instructions in a certain manner, or providing choice, rewards, or deadlines, our study used interpersonal cues. As we had expected, not everyone responded to such cues, thereby weakening the main effect, although the prime did work as expected for participants low on attachment anxiety and for those low on attachment avoidance. Another potential issue with the prime is that we did not measure or control for the exposure to the authority figure (i.e., how frequently they see the person, and how long ago they last saw them), which may have weakened the effectiveness of the prime.

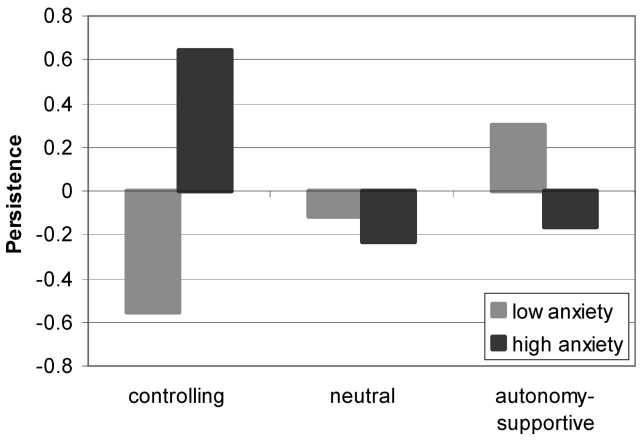


*Figure 3.* Interaction of condition and anxiety on persistence.

Overall, results suggest that low anxious and high anxious participants reacted to the conditions in opposite ways, but that this was strongest for the controlling prime, where attachment anxiety was significantly positively related to reported intrinsic motivation and to increased persistence—the opposite of the expected response to such a prime. Definitionally, individuals high in anxiety have experienced that attachment figures are inconsistent and unreliable in their love and support. Thus the anxious had to learn and adapt in order to function in such an interpersonal environment. The clear, contingent acceptance afforded by a controlling prime comes closest to the best that anxious people have come to expect from significant others—contingent acceptance being better than no acceptance at all—and they accordingly behave in ways which will maximize their chances of achieving their interpersonal goals within this suboptimal interpersonal environment. By contrast, a more secure person might disdain the acceptance of a controlling figure, being confident in their opportunities for acceptance elsewhere.

Of particular interest were the results obtained on the behavioural measure of persistence, as participants high in attachment anxiety were affected by the prime in the opposite way to what would be predicted by SDT. For those low in anxiety, however, the effects of the conditions on persistence were significant in the predicted, SDT consistent direction. Although the simple effect across all three conditions for high anxiety was marginal, those high in anxiety exhibited significantly more persistence than those in both the autonomy supportive and neutral conditions. Additionally, anxiety was significantly positively associated with persistence in the controlling condition, such that more anxious partic-

ipants persisted longer when primed with a controlling other. These results could have occurred if the persistence exhibited by the anxious participants was a controlled persistence (Ryan et al., 1991), where these participants might have felt compelled by internal pressures to continue with the task. Priming a controlling figure might have made the anxious person more eager to please them, and as authority figures are typically associated with achievement, this may have translated into greater persistence from the anxious participants. Conversely, being primed with an autonomy-supportive figure may have allowed anxious people to be relatively more relaxed in their behaviour, allowing them to enjoy the task but not necessitating persistence.

Participants high in avoidance did not show effects of the prime on intrinsic motivation, and attachment avoidance did not moderate the effect of the prime on persistence. Participants high in avoidance were less sensitive to the primes than were those high in anxiety, potentially because the avoidant type of insecurity would promote self-protective disengagement from hurtful others, in contrast to the anxious' tendency toward merging and dependence at the cost of the self.

These results can also be integrated with the SDT literature. According to SDT, repeated thwarting of the basic psychological needs for autonomy, competence, and relatedness which occurs in controlling contexts leads to accommodation to protect the organism (Deci & Ryan, 2000). Given that insecure attachment patterns develop as a result of inattentive, unavailable, or rejecting caregivers—situations in which basic psychological needs are chronically thwarted—it is possible that insecure individuals adapt to their environment by developing nonautonomous regulatory styles and causality orientations. The latter refer to stable and enduring personality variables which drive whether people engage in behaviours out of choice (autonomous orientation), because of external controls such as rewards or punishments or because of internal introjects (controlling orientation), or whether they experience behaviours as outside of their control (impersonal orientation; Deci & Ryan, 1985). Thus, insecure individuals might not react negatively to controlling circumstances because they have habituated to such circumstances and may even express a preference for them, even though having this controlling causality orientation has negative consequences (Deci & Ryan, 1985).

Our findings also converge with previous research on attachment and the exploration system. Attachment theory posits the existence of an innate exploration system, which develops and is pursued optimally under conditions of attachment security, specifically having a secure base (Mikulincer & Shaver, 2007). There is evidence to suggest that attachment insecurity compromises the exploration system, beginning with Ainsworth's work on "the strange situation" but also including research on curiosity and cognitive processing (Mikulincer, 1997; Mikulincer & Sheffi, 2000). Moreover, priming attachment security has been shown to increase exploration (Green & Campbell, 2000; Mikulincer & Arad, 1999). While exploration, which focuses on openness in task performance, is not the same as interest or persistence, it is generally viewed in self-determination theory as an important component of autonomous motivation (Deci & Ryan, 2000). As our study showed that insecurely attached participants, especially those high in anxiety, do not react to interpersonal cues of autonomy support or control as the SDT literature would suggest, it could indicate that their ability to experience autonomous motivation is compromised. Interestingly, in the exploration studies, the insecure participants had overall lower levels of exploration, which was not replicated in our study (i.e., there were no main effects for anxiety or avoidance on intrinsic motivation). It would be interesting to replicate the present study with other components of autonomous motivation such as exploration.

Previous research on attachment and self-determination theory has shown that autonomy in specific relationships is associated with increased security (La Guardia et al., 2000; Deci, La Guardia, Moller, Scheiner, & Ryan, 2006). This suggests that there should be considerable overlap in significant others who are autonomy supportive and significant others who are secure attachment figures, and raises the issue of theoretical overlap between the two constructs. Schemas for either an autonomy supportive relationship or a secure attachment relationship would include features such as responsiveness, supportiveness, and noncontingent acceptance (Mikulincer & Shaver, 2007; Ryan, Brown, & Cresswell, 2007). In the current study, the primes consisted of authority figures rather than of intimate others who typically become attachment figures. This was done to ensure that these primes were activating autonomy support or control and not felt security or insecurity. Future research can attempt to disambiguate these concepts, and examine the effects of priming autonomy-supportive or controlling attachment figures.

Confirming once again 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, Dalton & Fitzsimmons, 2007; Morrison, Wheeler & Smeesters, 2007). Our finding is also important for the plethora of research which uses significant others as primes (e.g., Shah, 2003). As our research shows, the effectiveness of these types of primes can be affected by individuals' chronic interpersonal insecurity, which alters the ways in which they perceive and respond to significant others.

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