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Motivational correlates of need for cognition

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Abstract

Need for cognition is usually characterized as an intrinsic desire to engage in challenging intellectual activity. In achievement situations, however, it could be associated with more extrinsic goals such as success or the avoidance of failure. Three experiments examined this possibility. Participants in all studies were led to believe they would perform either an easy or a difficult intellectual task that they were likely to fail. After inducing this expectation, indices of extrinsic motivation were obtained. Participants with high need for cognition became more motivated to avoid negative consequences of their behavior (e.g., failure) when they expected the task they would perform to be difficult. In contrast, participants with low need for cognition were not appreciably affected by these expectancies. The anticipation of engaging in intellectual activity apparently stimulates different motives in people with high and low need for cognition, and the mindset induced by these motives influences their later behavioral decisions. Copyright © 2008 John Wiley & Sons, Ltd.

The motivation to engage in demanding cognitive activity can obviously determine the impact of information on attitudes and behavior. A measure of this motivation (Cacioppo & Petty, 1982; Cacioppo, Petty, Feinstein, & Jarvis, 1996), which is typically referred to as *need for cognition*, has consistently predicted the effort that people expend on tasks that require thought and reasoning, as reflected in the influence of the arguments contained in a persuasive communication (Priester & Petty, 1995) and the use of heuristic bases for judgment (Haugtvedt, Petty, & Cacioppo, 1992). The need for cognition scale has been among the most successful individual difference measures ever developed (for an extensive review of relevant research and theory, see Cacioppo et al., 1996).

The motivational roots of need for cognition are nevertheless somewhat ambiguous. Need for cognition is often assumed to reflect an intrinsic desire to engage in challenging cognitive activity. However, the need is multidimensional (Lord & Putrevu, 2006). Moreover, although individuals with high and low need for cognition may differ in their intrinsic motivation to engage in cognitive activity, they may differ in extrinsic motivation as well. The present research investigated the nature of these differences.

Extrinsic motives can include both a desire to attain positive outcomes of a behavior or decision (*approach* motivation) and a desire to avoid negative consequences (*avoidance* motivation). Classical theories of *approach/avoidance* motivation (Atkinson, 1964) are refined in a recent model of self-regulation (Förster, Grant, Idson, & Higgins, 2001; Higgins, 1997). According to this formulation, some individuals conceptualize the alternative outcomes of an achievement test as ''success'' and ''non-success'' and evaluate them as positive and neutral, respectively. Others interpret the same outcomes as ''non-failure'' and ''failure'' and evaluate them as neutral and aversive, respectively. Thus, although both types of individuals might desire to do well on the task, the former individuals are more likely to be motivated by the positive value of success, whereas the latter are more likely to be motivated by aversion to failure. Individual differences in approach or avoidance motivation might be traceable in part to such differences in framing.

In short, cognitive activity can often be stimulated by approach and avoidance motives as well as by the intrinsic pleasure of engaging in this activity. Moreover, the motives are not necessarily restricted to achievement situations.

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Attention to the quality of arguments in a persuasive message, for example, could be motivated in part by the personal satisfaction that comes from effectively refuting the arguments' implications. Alternatively, it could stem from a desire to avoid being gullible. Thus, individuals with high and low need for cognition may differ in the sheer pleasure they derive from intellectual activity but other motives could operate as well.

In this regard, the need for cognition is a presumably a stable motivational disposition that generalizes over situations (Amabile, Hill, Hennessey, & Tighe, 1994; Brett, Bodo, & Stephanie, 2004; Cacioppo & Petty, 1982; Cacioppo et al., 1996). In contrast, approach and avoidance motives are more likely to be situationally dependent (Foxall & Yani-de-Soriano, 2005; Pham & Avnet, 2004). For example, differences in the concern with positive or negative behavioral outcomes might be activated by describing the outcomes of a decision as either gains versus non-gains or non-losses versus losses (Lee & Aaker, 2004; Monga & Zhu, 2005). They can also be induced by (a) activating individuals' concepts of themselves as independent or interdependent (Lee, Aaker, & Gardner, 2000; see also Hamilton & Biehl, 2005), (b) stimulating thoughts about hopes and aspirations as opposed to duties and responsibilities (Liberman, Molden, Idson, & Higgins, 2001), or (c) varying individuals' awareness of themselves as members of a group (Aaker & Lee, 2001; Briley & Wyer, 2002). Although chronic individual differences in the relative emphasis placed on success and the avoidance of failure can result from differences in social learning (Miller, Wiley, Fung, & Liang, 1997), they are often not apparent unless situational factors activate the values that underlie them (Briley, Morris, & Simonson, 2000, 2005).

The relative emphasis placed on positive versus negative consequences of a behavioral outcome could reflect a more general *mindset* that once activated, influences behavior and decisions in not only the situation that gives rise to it but other, ostensibly unrelated situations. In Briley and Wyer's (2002) research, for example, increasing participants' awareness of their membership in a group stimulated them to prefer products that had the least undesirable features despite the fact that these products also had the least desirable ones. It also led them to allocate resources to themselves and another that were likely to minimize the negative affect that resulted from these allocations, and to endorse proverbs that emphasized the desirability of compromise. Finally, it led participants to choose candies of different types rather than of the same type as a reward for participating in the experiment (thereby minimizing the risk of making a ''wrong'' choice).[1]

If the relative emphasis placed on positive and negative decision consequences reflects the activation of a mindset, it can have diagnostic value. Suppose an individual works especially hard to solve an intellectual problem. This behavior could be attributed to a desire to succeed (approach motivation), a desire to avoid failure (avoidance motivation) or both. If these motives give rise to different mindsets (Briley & Wyer, 2002), however, their influence on an individual's efforts to solve the problem might be inferred from his or her behavior in subsequent situations in which the two motives have different implications. This behavior could include both behavioral decisions that require a tradeoff between the acquisition of positive outcomes and the receipt of negative ones (Briley et al., 2000, 2005; Briley & Wyer, 2002) and responses to questionnaire measures of the relative emphasis placed on these outcomes (Higgins, Idson, Freitas, Spiegel, & Moldan, 2003; Lockwood, Jordon, & Kunda, 2002; Sengupta & Zhou, 2007).

An avoidance-focused mindset and a success-focused mindset are presumably represented in memory as motivation-based concepts and procedures and may coexist in memory. To this extent, their activation and use in any given instance may depend on both situational and chronic individual difference factors that influence their relative accessibility in memory (Higgins, 1996; Wyer, 2008). The likelihood of failure, for example, is greater when a task is difficult but success on such a task is more rewarding. Therefore, an avoidance-focused mindset and a success-focused mindset could both be activated by the anticipation of performing such a task. Thus, if individuals with high need for cognition are more motivated to engage in effortful cognitive activity than individuals with low need for cognition (Brett et al., 2004; Cacioppo & Petty, 1982), it could reflect the operation of either of these mindsets. However, which disposition predominates may be reflected in responses in other situations that reflect the disposition in question.

Three experiments examined these possibilities. The first two studies demonstrated that leading high need for cognition individuals to anticipate performing a task on which they were likely to fail increases their motivation to avoid negative consequences of their behavior as reflected in two different questionnaire measures of this motivation (Higgins, Roney, Crowe, & Hymes, 1994; Lockwood et al., 2002). In contrast, the motivational orientation of low need for cognition individuals is unaffected. The third experiment showed that once these motivational orientations are activated, they influence behavioral decisions in unrelated tasks that participants perform subsequently.

[1]When the choice alternatives are unfamiliar, variety seeking can sometimes reflect a desire for novelty and a willingness to take a risk. When the alternatives are familiar, however, it is more likely to reflect an unwillingness to forego one attractive alternative for another option that is also desirable.

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EXPERIMENT 1

Participants at different levels of need for cognition were told that they would be asked to perform (a) an easy task that most people performed successfully, (b) a very difficult task that most persons failed, or (c) a task that was very difficult but could be performed successfully with sufficient effort. Then, before performing the task, participants completed a measure of approach and avoidance motivation developed by Lockwood et al. (2002). The effect of task expectations on responses to this measure was expected to indicate their influence on the motivation either to seek success or, alternatively, to avoid failure. A comparison of motives under the two difficult task expectation conditions was expected to distinguish between the motivational influence of expected task difficulty *per se* and the impact of the anticipated failure that often accompanies these expectations. That is, if participants are motivated to perform difficult tasks independently of the probable consequences, their motivation should be high in both conditions. If, however, participants are motivated by the desire to avoid failure, their motivation should be less when they perceive can perform successfully than it is when the likelihood of failure is more apparent.

Method

Participants

One hundred five introductory business students participated. They were randomly assigned to a three cells design of expected task difficulty: difficult task, failure versus difficult but solvable versus easy.

Procedure

Participants were introduced to the study with instructions that we were interested in pre-testing some measures of intellectual ability. Participants under *easy task* expectation conditions were told they would perform a problem-solving task that was easy and that others typically solved the problems with little difficulty. Participants in *difficult task, failure* expectation conditions were told that the task was thought provoking, intellectual, and challenging and that others usually fail to solve the problems successfully. In a third, *difficult but solvable task* expectation condition, they were also told that the task was very difficult and challenging and that people often fail to solve the problems, but they can succeed if they expend sufficient effort.

Participants were then told that we were also interested in students' perceptions of experience of the sort that occur in college and that therefore, before performing the task, we wanted to obtain information about these perceptions. On this pretense, they completed a measure of approach and avoidance motivation constructed by Lockwood et al. (2002). Specifically, participants were asked to indicate the extent to which each of 18 items reflected their perceptions of themselves. Nine items assessed their motivation to attain positive behavioral outcomes (e.g., ''I see myself as someone who is primarily striving to reach my ''ideal self'' — to fulfill my hopes, wishes, and aspirations'') and nine others assessed their motivation to avoid negative outcomes (e.g., ''I am more oriented toward preventing losses than I am toward achieving gains''). Responses were made along a scale from 1 (not at all true of me) to 5 (very true of me). Responses to each set of items were averaged to provide separate estimates of approach and avoidance motivation.

Upon completion of the questionnaire, participants were asked to perform a problem-solving task that was the same in all experimental conditions. It consisted of a series of 10 anagrams constructed by Jain, Agrawal, and Maheswaran (2006; see also Higgins et al., 1994). They were informed that each anagram (e. g., ''tofsomcir'') was the brand name of a commercial product (''Microsoft''), and that they would be given 5 minutes to solve as many anagrams as they could.

Finally, they completed the 18-item need for cognition scale developed by Cacioppo, Petty, and Kao (1984). Participants reported their agreement with the items (e.g., ''I prefer my life to be filled with puzzles that I must solve'') along a scale from 1 to 5. Need for cognition was assessed after participants had performed the achievement task and completed other measures, and so there was some risk that it would be influenced by these measures. Because need for cognition has been demonstrated to be very stable in previous research, however, we expected the risk to be justified.

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Table 1. Mean approach and avoidance motivation as a function of need for cognition and anticipated task difficulty—Experiment 1

	Expectation conditions		
	Difficult task, failure	Easy	Difficult but solvable
Approach motivation			
High need for cognition	4.06	4.10	4.09
Low need for cognition	3.92	3.73	3.70
Avoidance motivation			
High need for cognition	3.32_{a}	2.84_{b}	2.83_{b}
Low need for cognition	2.78_{b}	2.95_{b}	2.68_{b}
Anagrams solved			
High need for cognition	5.70_{a}	4.83_{ab}	4.56_{ab}
Low need for cognition	3.86_{b}	3.50_{b}	4.50_{ab}

Note: Cells with unlike subscripts differ at $p < .05$.

Results

Need for Cognition

The 18 need for cognition items had high internal consistency ($\alpha = .86$) and were averaged. Need for cognition was similar regardless of whether participants expected an easy task ($M = 3.43$), a difficult task they were likely to fail ($M = 3.47$) or a difficult but potentially solvable task ($M = 3.37$), $F < 1$. Participants were then classified as high or low in need for cognition based on a median split (Mdn = 3.50). This led 57 participants to be categorized as low in need for cognition and 48 to be classified as high.

Approach and Avoidance Motivation

The first two sections of Table 1 show the approach and avoidance motives reported by participants as a function of need for cognition and anticipated task difficulty. Participants with high need for cognition were generally more approach oriented ($M = 4.08$) than participants with low need for cognition ($M = 3.76$), $F(1, 97) = 6.13$, $p < .01$. However, this difference in orientation did not depend on task expectation conditions. An analysis of approach motivation as a function of need for cognition and expectation conditions yielded no significant effects involving expectations ($p > .10$).

Participants with high need for cognition were also generally more avoidance oriented than participants with low need for cognition (3.00 vs. 2.80, respectively, $F(1, 99) = 3.32$, $p < .07$). However, this difference was greater when they expected to perform a difficult task on which they were likely to fail ($M_{diff} = 0.54$) than when they expected to perform either a simple task ($M_{diff} = -0.11$) or a difficult task that could be solved with effort ($M_{diff} = 0.15$). The interaction of need for cognition and expectancy conditions was marginally significant, $F(2, 99) = 2.69$, $p < .07$. Furthermore, the avoidance motivation of high need for cognition participants who anticipated failing a difficult task was greater ($M = 3.32$) than it was in the other five combinations of need for cognition and expectancy conditions combined ($M = 2.79$), $F(1, 99) = 9.42$, $p < .01$, whereas the latter five conditions did not differ from one another. Between-cell comparisons confirmed that the avoidance motivation of participants with high need for cognition under difficult task, failure expectancy condition was significantly greater than that of participants in each of other experimental conditions considered separately (see Table 1). Thus, these results indicate that the expectation of possible failure induces avoidance motivation in high need for cognition participants but not among low need for cognition participants, and that these effects are independent of the anticipated difficulty of the task *per se*.

The differential effects of expectation conditions were also reflected in the correlation between the approach and avoidance orientations and the need for cognition scale. The correlation between avoidance orientation and need for cognition was significantly greater when participants anticipated a difficult task on which they might fail ($r = .64$, $p < .01$) than when they either anticipated an easy task ($r = .06$) or a difficult task that was solvable ($r = .08$). The difference

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between the first correlation and each of the other two was significant, $z > 2.44$, $p < .05$. In contrast, the correlation between approach motivation and the need for cognition was significant only when the task was described as difficult by solvable ($r = .39$, $p < .05$) and did not significantly differ from the correlation in either other condition ($r = .18$ and .22 in difficult task, failure expectancy vs. easy task expectancy conditions, respectively).

Anagram Task Performance

If participants' performance on the anagram task reflects their motivation to avoid failure and, therefore, the amount of effort they expended in an attempt to perform well, differences in this performance should parallel differences in their avoidance motivation, as assessed by the questionnaire measure we administered. This was in fact the case. The last section of Table 1 shows the number of anagrams solved by participants as a function of need for cognition and anticipated task difficulty. Participants with high need for cognition solved more anagrams ($M = 4.98$) than participants with low need for cognition ($M = 4.01$, $F(1,98) = 6.51$, $p < .05$). However, this difference was greater when participants expected a difficult task on which they were likely to fail (5.70 vs. 3.86) than when they expected either a simple task (4.83 vs. 3.50) or a difficult but solvable one (4.56 vs. 4.50). Although the interaction of need for cognition and expectancy conditions was not significant ($p > .10$), it was similar in form to the effects of these variables on avoidance motivation. Thus, the anagram performance of high need for cognition participants who anticipated failing a difficult task was marginally better ($M = 5.70$) than it was in the other five combinations of need for cognition and expectancy conditions combined ($M = 4.30$), $F(1, 100) = 3.54$, $p < .06$.

Mediation Analysis

To determine if the greater task performance of high need for cognition participants under difficult task and failure condition was the result of their increased avoidance motivation, we reanalyzed task performance in this condition as a function of need for cognition using avoidance motivation as a covariate. The effect of need for cognition, which was significant without controlling for avoidance motivation, $F(1, 98) = 4.06$, $p < .05$, was reduced to nonsignificance when avoidance motivation was covaried ($F < 1$). Furthermore, avoidance motivation was found to have a significant direct effect on the number of anagrams solved, $F(1,98) = 4.57$, $p < .05$.

EXPERIMENT 2

Experiment 1 indicated that participants with high need for cognition had a generally greater approach motivation than did participants with low need for cognition regardless of the type of task they anticipated performing. However, these individuals also had a disposition to avoid negative outcomes and that this motivation is particularly likely to be activated when they anticipate having to perform a task on which they are likely to fail. Experiment 2 sought to confirm these conclusions using a different type of task to induce expectations and a different measure of avoidance motivation.

Method

Overview and Design

Participants were asked to perform a problem-solving task that they expected to be either easy or difficult. Independently of their expectations, the actual difficulty of the task was also manipulated. One hundred sixty-eight undergraduate participants were randomly assigned to four combinations of expected task difficulty (easy vs. difficult) and actual task difficult (easy vs. difficult) along with a fifth, control condition in which participants neither expected to perform a task nor actually did so.

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Procedure

Participants were introduced to the study with instructions that we were interested in pre-testing some measures of intellectual ability. In *difficult task expectation* conditions, the instructions went on to indicate that the measures had been used successfully to evaluate the ability of graduate school applicants in physics and mathematics, that we were interested in determining whether they will be useful in evaluating business school applicants as well, but that an initial study suggested that most business school students find the problems very difficult and usually fail to solve them. In *easy task expectation* conditions, they were told that the measures were designed to evaluate the ability of high school students who do not plan to attend college and are applying for vocational training, that we were interested in determining whether some of the tests will be useful in predicting success in college as well, but that an initial study suggested that most business school students find the problems easy and have little difficulty solving them.

Assessment of Motivation

Before performing the task, however, participants' approach and avoidance motives, as well as their need for cognition were assessed, being given instructions similar to those provided in Experiment 1. Need for cognition was measured using the 18-item scale employed in the first experiment. Approach and avoidance motives were assessed using a measure proposed by Higgins et al. (1994), and employed by Sengupta and Zhou (2007). Specifically, participants were asked to rate the importance of each 14 self-descriptive items, an equal number of which reflected an emphasis on positive consequences of behavior (e.g., being smart, making new friends) and an avoidance of negative consequences (e.g., ensuring personal safety at night, not looking unfashionable). Responses were made along a scale from 1 (strongly disagree) to 9 (strongly agree).

To evaluate possible changes in motivational orientation after performing the achievement task, the items composing both the need for cognition measure and the indices of approach and avoidance motivation were divided randomly into two subsets, one of which was administered before the task was performed and the other of which was administered afterwards. (The particular set of items administered at each point in time was counterbalanced within each combination of manipulated variables, so that each set was represented with equal frequency at each point.)

Upon completion of the questionnaire, participants were reminded of the achievement task that had been mentioned earlier. Participants were then given the problem task, which was either difficult or easy.[2] For example, the *simple* problem was presented as follows:

> ''There are four people, a tunnel and only one flash light. The tunnel is very dangerous in the dark, and a flashlight is necessary in order to walk through it safely. The first person can go through the tunnel in 1 minute. The second person can go through the tunnel in 2 minutes. The third person can go through the tunnel in 4 minutes. The fourth person can go through the tunnel in 5 minutes. It is possible to go through the tunnel either alone or in pairs. However, no more than two people can go through at any one time. The flashlight can remain lit for only 12 minutes. How can the four individuals go through the tunnel safely?''

In contrast, the *difficult* problem was identical except that participants were told that the flashlight would remain lit for only 12 minutes rather than 16.

Control Conditions

Participants in control conditions were administered the 18-item need for cognition scale and the measure of promotion and prevention focus without being given an indication they would be asked to perform an intellectual task.

[2]A pre-test on 28 participants confirmed that the difficult problem was perceived as more difficult ($M = 6.15$) than the easy task ($M = 4.00$, $t(25) = -2.09$, $p < .05$) and also as less likely to be solved (2.28 vs. 3.28), $t(26) = 3.26$, $p < .05$).

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Results

Need for Cognition

Need for cognition was virtually identical both before and after performing the achievement task (3.19 and 3.18, respectively), and did not depend on whether the task was easy or difficult. Specifically, need for cognition was no different when participants expected a difficult task ($M = 3.16$) than when they expected an easy one ($M = 3.21$) or did not expect to perform a task at all ($M = 3.14$), $F < 1$. These data confirm our assumption that the need for cognition was stable and insensitive to situation-specific experimental manipulations. Therefore, the 18 need for cognition items ($\alpha = .83$) were averaged to create an index of need for cognition levels. Participants were then classified as high or low in need for cognition based on a median split (Mdn = 3.17). This led 87 participants to be categorized as low in need for cognition and 81 to be classified as high.

Approach and Avoidance Motivation

Table 2 shows the approach and avoidance motives reported by participants as a function of need for cognition and anticipated task difficulty. The implications of these data confirm the conclusions drawn from Experiment 1.

That is, expectancies had little impact on the approach motivation of either high or low need for cognition participants. Analyses of these data as a function of need for cognition and experimental conditions yielded no significant effects, $F < 1$. In contrast, avoidance motivation depended on both need for cognition and expectancy conditions. Although the interaction of these variables was only marginally significant, $F(2, 162) = 2.45$, $p < .09$, it is quite consistent with expectations and the results of Experiment 1.

Specifically, participants with high need for cognition reported generally greater avoidance motivation than participants with low need for cognition did (6.48 vs. 6.14). $F(1, 162) = 5.79$, $p < .05$. More important, high need for cognition participants reported on greater avoidance motivation when they anticipated a difficult task on which they might fail ($M = 7.18$) than when they anticipated an easy task ($M = 6.37$) or had no expectations at all ($M = 6.09$), $F(2,162) = 8.01$, $p < .05$, whereas the effect of expectations on the motivation of low need for cognition participants was negligible ($p > .10$). Between-cell comparisons (see Table 2) indicated that the avoidance motivation of high need for cognition participants who expected a difficult task was greater ($M = 7.18$) than that of participants under each of the other five combinations of need for cognition and expectancy conditions. Furthermore, it differed from the latter five cells combined ($M = 6.15$), $F(1,167) = 19.69$, $p < .01$, whereas these cells did not differ from one another.[3]

This pattern of results is similar to those obtained in Experiment 1. Thus, the results of all studies converge on the conclusion that participants with high need for cognition are more likely to avoid negative outcomes when they anticipate performing a demanding cognitive task.

Table 2. Mean approach and avoidance motivation as a function of need for cognition and anticipated task difficulty—Experiment 2

	Expectation of difficult task	Expectation of easy task	No expectation
Approach motivation			
High need for cognition	6.63	6.65	6.56
Low need for cognition	6.60	6.43	6.67
Avoidance motivation			
High need for cognition	7.18_a	6.37_b	6.09_b
Low need for cognition	6.32_b	6.07_b	6.08_b

Note: Cells with unlike subscripts differ at $p < .05$.

[3]Regression analyses of avoidance motivation as a function of a task expectations (simple vs. difficult vs. control) and a continuous variable of need for cognition revealed a significant interaction between the expected difficulty of the task and need for cognition, $F(1,166) = 13.90$, $p < .05$.

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Effects of Task Performance

High need for cognition participants performed better on the anagrams task in Experiment 1 under those conditions in which they reported high avoidance motivation (i.e., when they expected the task to be difficult and that failure on the task was likely; see Table 1). Comparable results were not observed in the present study. Participants were more likely to solve the easy puzzle (73.6%) than the difficult one (26.4%), but this difference was similar regardless of whether they were high in need for cognition (78.8 vs. 21.2%) or low (71.1 vs. 28.9%). Although the failure to confirm the performance differences observed in the first experiment was disappointing, the single-item performance measure used in this experiment may have been insufficiently sensitive for differences to be detected.

EXPERIMENT 3

The first two studies provided converging evidence that expectations for an achievement task to be difficult increased high need for cognition participants' motivation to avoid negative behavioral outcomes. We speculated that once this motivation was activated, it might generalize to other situations in which the avoidance of negative outcomes might influence behavior. Evidence that an increased concern about negative consequences induces a mindset that influences behavioral decisions in quite different situations was obtained by Briley and Wyer (2002). To investigate this possibility in the present study, participants in anticipation of performing either an easy or a difficult achievement task made decisions in three ostensibly unrelated choice situations that Briley and Wyer (2002) found to be associated with the disposition to avoid negative outcomes. If approach and avoidance motives mediate attraction to the problem-solving task, and these motives produce a mindset that generalizes to other situations, differences in these motives should be reflected in these decisions.

Method

Sixty undergraduate students were randomly assigned to each of two levels of expected task difficulty. Their need for cognition, which was assessed during the experiment, was an additional independent variable. Participants were introduced to the study with instructions that its purpose is to examine the thinking skills of college students. Then, participants in one (*difficult task expectation*) condition were told that they would be required to perform an achievement task that was thought provoking, intellectual, and challenging, and that others usually failed to perform it successfully. Participants in a second (*easy task expectation*) condition were told they would perform a task that was easy and that others typically performed it with little difficulty (Smith, Kerr, Markus, & Stasson, 2001). Before participating in the task, however, they were asked to perform two other measures as part of an ostensibly different experiment.

Product Choice Task

The first task was similar to that employed by Briley et al. (2000). Participants were told that we were interested in the reasons that underlie people's preferences for choice alternatives and that we wished to examine the choices that people make after they have narrowed the potential selections down to a few options that differed along two primary dimensions. On this pretense, participants were given four shopping scenarios, each involving a choice between three products. Each set of products was in a different domain (specifically, personal computers, 35 mm cameras, restaurants, and stereo equipment). Each scenario contained a short description of a category and the features of the available alternatives. One option had a high value along one dimension and a low value along the other; a second option had a low value along the first dimension and a high value along the second, and the third option had moderate values along both dimensions. For example, the options pertaining to a 35 mm camera was described as follows:

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	Reliability rating (0–100) of expert panel (typical range: 40–70)	Maximum autofocus range (typical range: 12–28 m)
Option A	45	25
Option B	55	20
Option C	65	15

Thus, a choice of either A or C, which have the most favorable features, indicates a disposition to focus on positive outcomes to the exclusion of negative ones, whereas a choice of B, which has the least unfavorable features, indicates a disposition to avoid negative outcomes regardless of the positive ones available.

In each case, participants first wrote a sentence or phrase giving a reason for selecting one option over the others, and then indicated their choice. The proportion of ''compromise'' (B) choices was used as an index of the disposition to avoid negative outcomes.

Resource Allocation Task

This task, similar to that employed by Briley and Wyer (2002), was introduced by asking the participants to imagine that a firm in which they are working had given a monetary bonus to themselves and a coworker for their work on a special project, that the firm was considering several alternative possibilities for distributing the money, and that they wished to know which alternative they would prefer. With this preamble, participants were given eight possible allocation schemes and asked to rank them in order of preference.

The allocations composing each alternative scheme, in units of $1000, are shown in Table 3. As the table indicates, the eight possibilities compose a three-factor design involving (a) the equality of allocations to the participant and the coworker, and (b) the joint allocation to the two individuals, and (c) which individual (the participant or the coworker) is allocated the most money. Participants ranked the eight allocation alternatives using 1 to denote the most preferred allocation, 2 to denote the next most preferred, and so on. Then, the ranking of the eight schemes were reverse scored so that higher numbers reflect stronger preferences. We assumed that individuals would anticipate negative feelings to result from allocations that either (a) favored one party over the other or (b) were generally low regardless of who received them. Therefore, we used the mean ranking of the outcomes that were high in both equality and joint gain, which minimized the likelihood of these negative feelings, as an indication of participants' aversion to negative outcomes.

Need for Cognition

After completing these tasks, all participants were asked to undertake a problem-solving task that was actually impossible. They were told to work on it as long as they wished and then to go on to the next questionnaire. The amount of time spent on the task was recorded. Finally, participants were asked to complete a measure that was ostensibly part of an international survey on college students' attitudes and opinions, being told that similar questionnaires were being administered in other countries as well. On this pretense, they were administered the 18-item need for cognition scale as was conducted in the Experiments 1 and 2.[4]

Table 3. Eight possible allocation schemes considered by participants in Experiment 3 (in units of $1000)

	Allocation favoring self		Allocation favoring other	
	High joint gain	Low joint gain	High joint gain	Low joint gain
High equality	8, 7	7, 6	7, 8	6, 7
Low equality	9, 6	8, 5	6, 9	5, 8

Note: Cell entries are in units of $1000. The first number in each cell denotes the allocation to self, and the second denotes the allocation to the other.

[4]Need for cognition was assessed after participants had performed the achievement task and completed other measures, and so there was some risk that it would be influenced by these measures. However, because need for cognition has been demonstrated to be very stable in previous studies as well as in Experiment 2 of the present research, we expected the risk to be justified.

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Candy Choices

A third, unobtrusive index of the tendency to avoid negative behavioral outcomes was obtained at the end of the experiment. After completing the need for cognition scale, participants were told that the experiment was over. However, they were told that in addition to the money they were paid for participating, they could have two pieces of candy that were known to be popular among students in the country in which the study was conducted. Each type of candy was placed in a different bowl on a table near the door, and participants took two pieces of candy as they left. The experimenter unobtrusively observed and recorded their choice (two candies of the same type or one candy of each type). Briley and Wyer (2002) found that inducing a disposition to avoid negative consequences of a decision was reflected in the choice of candies of different types, thereby minimizing the regret that might result from making a ''wrong'' choice. Thus, the choice of different candies was used as a third index of avoidance motivation in the present study.

Results

Need for Cognition

The 18 need for cognition items, rated on scale from 1 to 5, had high internal consistency ($\alpha = .86$) and were averaged. As expected, need for cognition was unaffected by our expectancy manipulation; it was no different when participants had expected a complex task ($M = 3.53$) than it was when they had expected a simple one ($M = 3.76$), $F(1, 58) = 2.27$, $p > .10$). Participants were then classified as high or low in need for cognition based on a median split (Mdn = 3.72). This led 29 participants to be categorized as low in need for cognition and 31 to be classified as high.

Avoidance Behavior

If the anticipation of failure on a difficult task induces an aversion to negative outcomes among individuals with high need for cognition, this aversion may induce a more general mindset that generalizes to other, task-unrelated activity (Briley & Wyer, 2002). That is, it may be reflected by preferences for alternatives in the product choice task, preferences for equality in the resource allocation task, and the choices of candy upon leaving the experiment.

Results summarized in Table 4 support this hypothesis. These data show a very consistent pattern over the three tasks. Participants with high need for cognition showed relatively more avoidance of negative outcomes when they anticipated a difficult task than when they anticipated an easy one. In particular, they were more inclined to make compromise choices in the product decision task, more likely to prefer equality in the resource allocation task, and more likely to choose different kinds of candies upon leaving the experiment. In contrast, low need for cognition individuals did not differ appreciably in their aversion to negative decision outcomes in the two task difficulty conditions. The interaction of need for cognition and anticipated task difficulty was significant in a multivariate analysis involving the compromise choices and the preferences for equality and joint gains, $F(2, 53) = 5.52$, $p < .05$, as well as within the univariate analyses of

Table 4. Indices of avoidance motivation as a function of need for cognition and anticipated problem difficulty—Experiment 3

	Anticipated problem difficulty	
	Difficult	Easy
Proportion of compromise choices		
High need for cognition	$.47_a$	$.25_b$
Low need for cognition	$.38_a$	$.42_a$
Preference for equality and joint gain		
High need for cognition	7.00_a	5.81_b
Low need for cognition	6.37_b	6.14_b
Percentage of participants choosing candies of different types		
High need for cognition	100%	78%
Low need for cognition	58%	69%

Note: Cells with unlike subscripts differ at $p < .05$.

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Table 5. Studies included in the meta-analysis of avoidance motivation as a function of need for cognition and anticipated task difficulty

	N	*r*
Study 1	58	0.29[a]
Study 2	83	0.19[a]
Study 3	37	0.30[a]

[a]The value of *r* was calculated from *F* statistic.

product choices alone, $F(1, 54) = 7.76$, $p < .05$, and within the univariate analyses of resource allocations alone, $F(1, 54) = 5.49$, $p < .05$.[5] The interaction was also significant in a logistic analyses of candy choices, Wald $\chi^2 = 3.55$, $p < .06$. The consistency of the pattern over three quite different indices of avoidance motivation is noteworthy.

Correlations between the dependent measures provide additional support to our findings. The correlation between the product selection task and the resource allocation task was found to be significant ($r = .33$, $p < .05$); as well as the correlation between the product selection task and the candy selection ($r = .28$, $p < .056$). Thus, the more participants were compromising in their choices, the more they allocated equally their resources or selected one candy of each kind.

Meta-Analysis

A meta-analysis of the interaction effect of need for cognition and the anticipated task difficulty on avoidance motivation was performed. To create a common base of the three studies, the meta-analysis consisted of only the two expectation conditions that were identical in all studies. Thus, it excluded difficult by solvable task expectation conditions in Experiment 1 and the control condition of Experiment 2. Finally, the meta-analysis was based on the avoidance motivation measure based on Lockwood et al. (2002) scale (study 1), the avoidance motivation measure based on Higgins et al. (1994) scale (study 2) and the resource allocations index (study 3). That is, it excluded the compromise and candy choices indices from the third study. Table 5 presents the studies included in the meta-analysis of avoidance motivation as a function of need for cognition and anticipated task difficulty.

We conducted the meta-analyses using the procedures described by Hunter and Schmidt (1990). Specifically, we computed the weighted mean of the correlations set. Next, we calculated the standard deviation of the mean and the standard error (Field, 2000) and a 95% confidence interval around each of the correlation means (Hedges & Olkin, 1985). If a confidence interval includes 0, the results of a meta-analysis suggest that the correlation may not be different from 0 in the population (i.e., the correlation is not significant). Finally, we calculated the percentage of variance that can be attributed to random sampling error (%EV). If the percentage were 100%, it would indicate that all variance between studies is random and thus no variability in true *r* is expected (Hunter & Schmidt, 1990).

Table 6 presents the meta-analytic estimates of the calculated *r*-values relations of avoidance motivation as a function of need for cognition and the expected task difficulty, based on Hunter and Schmidt's method.

We found that the average *r*-value across all studies has a positive association with the avoidance motivation (0.25). The confidence interval results, suggest that the sample-size-weighted average *r*-value deviates significantly from 0. Moreover, the percentage of variance among samples that can be attributed to random sampling error is relatively low (25%). This supports the notion that the relationships found are beyond chance.

GENERAL DISCUSSION

People's need for cognition can often predict their desire to engage in challenging intellectual activity. Moreover, this interest may sometimes be due in part to the intrinsic enjoyment they derive from this activity. As our results indicate,

[5]Regression analyses of the product choices as a function of an expected difficult task versus an expected easy task and the continuous variable of need for cognition revealed a marginally significant interaction between the expected difficulty of the task and need for cognition, $F(1,54) = 3.67$, $p < .06$. A comparable analysis of preferences for equality in the resource allocation task yielded an analogous interaction, $F(1,56) = 4.42$, $p < .05$.

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Table 6. Meta-analytic estimates of the calculated *r*-values relations across the studies, based on Hunter & Schmidt's method[a]

	n	*k*	*r*-value	LCL	UCL	%EV
Avoidance as a function of need for cognition and task expectations	178	3	0.25	0.19	0.31	0.25

[a]*n*, number of people across all studies; *k*, number of samples; LCL, 95% lower confidence limit; UCL, upper confidence limit; %EV, percentage of variance among samples that can be attributed to random sampling error.

however, it is influenced by extrinsic motives as well. If persons with high need for cognition anticipate engaging in difficult achievement activity and the likelihood of failure is high, they are stimulated to think about this possibility. These thoughts, in turn, may induce a motivational mindset that influences not only their self-reported motivation but also their disposition to minimize the negative consequences of behavioral decisions in situations that are not directly related to the circumstances that activated the thoughts.

Other motives are called into question by our findings. There was no indication, for example, that participants with high need for cognition were motivated by the reward value of success. If these were so, they should have exhibited stronger approach motivation when they anticipated a challenging task on which they could succeed with sufficient effort. However, there was no evidence of this tendency in Experiment 1 based on the questionnaire measure of approach motivation that we employed. Furthermore, high need for cognition participants performed no better on the anagrams task in this condition than they did when the task was easy, and performed more poorly than they did when they thought they might fail.

However, analogous effects on participants with low need for cognition were not apparent. Expectancy manipulations had very little effect on either the motivation that these participants expressed or their actual performance. Individuals with low need for cognition are presumably uninterested in engaging in intellectual activity, and this could indicate that they are low in both intrinsic and extrinsic motivation. Perhaps the low need for cognition participants that we identified were not low enough for differences in their extrinsic motivation orientation to be detected. Future research is required to examine more fully the motivational orientation of this group.

Two other considerations are important in evaluating the implications of our findings. First, the evidence that individuals with high and low need for cognition differ in their extrinsic motivation does not necessarily undermine the difference in intrinsic motivation that these individuals experience. Although differences in need for cognition are likely to be traceable to differences in past reinforcement history in achievement and social situations, they may become functionally autonomous of these past experiences. The extrinsic motivation that people manifest in achievement situations could be a reflection of this reinforcement history. Therefore, it may simply be correlated with need for cognition and may not be a component of it.

Second, the approach and avoidance dispositions we investigated are akin to the motivational orientations postulated by Higgins' (1997) theory of regulatory focus. As noted earlier, promotion focus is characterized by a tendency to conceptualize outcomes in terms of gains (which are positively valenced) versus non-gains (which are neutral), whereas prevention focus is characterized by a tendency to interpret them in terms of non-losses (which are neutral) or losses (which are negative). To this extent, our results could suggest that individuals with high need for cognition tend to characterize performance outcomes in terms of loss-related concepts when they contemplate engaging in demanding achievement activity, whereas individuals with low need for cognition are less inclined to do so.

The relation of our findings to other research on regulatory focus may be worth noting in this context. For example, Förster et al. (2001) found that success increased participants' motivation to perform a task only if they had a promotion goal, whereas failure decreased participants' motivation to perform the task only if they had a prevention goal. These findings place constraints on the assumption that performance feedback influences achievement motivation through its mediating influence on expectations to perform well. The present research further complicates matters by suggesting that the effect of expectations on prevention and promotion motivation can depend on need for cognition.

Need for cognition can influence cognitive activity in numerous situations that do not obviously involve intellectual achievement. For example, people with high need for cognition may be more inclined to spend time on a challenging crossword puzzle, or researching choice alternatives in a purchase decision. In the laboratory, they are more likely to assess the quality of arguments in a persuasive message rather than relying on judgment criteria that take less effort to apply (e.g., source characteristics); see Cacioppo et al. (1996). These activities could be motivated in part by the pleasure derived from intellectual activity. However, approach and avoidance motives could also operate. In the persuasion paradigm, for

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example, people may carefully evaluate message arguments in order to avoid appearing gullible. Thus, if individuals with high need for cognition are motivated to avoid negative outcomes of their behavior, this could contribute to the attention they pay to message arguments. Other behavioral decisions associated with need for cognition (for a review, see Cacioppo et al., 1996) could be conceptualized similarly.

These possibilities call attention to the desirability of isolating people's intrinsic interest in intellectual activity from other motives that may be operating, and of circumscribing more carefully their relative contributions. Outside the laboratory, need for cognition may exert an influence at two stages of processing. First, when people are confronted with a choice of activity, need for cognition may govern the type of activity they choose. Thus, as normally assumed, high need for cognition individuals are relatively more likely to choose a challenging task than a more routine one. Once the choice is made, however, the anticipation of actually engaging in the activity may elicit other motives that operate in the absence of any external demand. Thus, people may seek challenging intellectual tasks in order to ''test'' themselves and ensure that they are competent as they like to assume. However, this latter motivation may be manifested in a desire to avoid the self-perception of incompetence rather than the desire for success.

Caution should nonetheless be taken in overgeneralizing our findings. One concern is methodological. That is, instructions to participants concerning the anticipated difficulty of the tasks explicitly mentioned the likelihood that other participants normally failed or succeeded. This could have activated thoughts about success or failure that might otherwise not have existed. Moreover, although it was not explicitly stated, participants may have believed that their performance was likely to be made public, thus inducing social motivation as well. These factors could have induced motives that had effects over and above that produced by the type of task *per se*.

Second, the activation of these motives may be of relatively short duration. As Experiment 3 suggests, however, these motivational orientations may induce a mind-set that influences behavior and decisions in situations that arise a short time after they are induced. The fact that the anticipation of performing an easy or difficult task can influence people's choice of candies upon leaving the experiment, in ways that are predictable from the need for cognition, is clearly nonintuitive. Therefore, although the tasks employed in Experiment 3 were used primarily to diagnose the different motivational orientations that underlie need for cognition, they provide interesting avenues for further research in this area.

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