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MOTIVATED CLOSED-MINDEDNESS AND CREATIVITY IN SMALL GROUPS

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An experiment was conducted to investigate whether the need for cognitive closure affects the degree of creativity in small groups. Participants in groups of four performed a task in which they had to create advertising slogans for a given product. Some of the groups were composed of individuals with high dispositional need for closure, whereas other groups were composed of individuals with low need for closure. Results showed that ideational fluency, degree of elaboration, and creativity, as rated by independent judges, was lower in high (vs. low) need-for-closure groups. These results suggest that the tendencies to restrict the number of hypotheses generated and to produce conventional ideas, consequences of the need for closure, lower the degree of creativity in interacting groups.

Keywords: *epistemic motivations; need for cognitive closure; group creativity; small groups*

This article explores the relation between the need for cognitive closure (Kruglanski & Webster, 1996; Webster & Kruglanski, 1998) and creativity in small groups. The need for nonspecific cognitive closure has been shown to play an important role in the process of knowledge construction at the individual and the group lev-

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els. At the individual level, the need for closure was shown to enhance the tendency to seize and freeze on early information contributing to the tendencies to base social judgments on culturally prevalent stereotypes, or on initial information about persons (Ford & Kruglanski, 1995; Kruglanski & Freund, 1983). At the group level, the Need for Closure Scale was shown to enhance consensus seeking (Kruglanski & Webster, 1991; Kruglanski, Webster, & Klem, 1993), the tendency to show an in-group bias and prefer homogenous to heterogeneous groups (Kruglanski, Shah, Pierro, & Mannetti, 2002; Shah, Kruglanski, & Thompson, 1998) as well as exhibit a tendency to evolve an autocratic (vs. a democratic) leadership and decision-making structure during a group process (De Grada, Kruglanski, Mannetti, & Pierro, 1999; Pierro, Mannetti, De Grada, Livi, & Kruglanski, 2003).

An important domain of the group process to which the need for closure has not been systematically linked thus far is the area of group productivity. This is clearly an important aspect of group interaction with a wide range of possible applications to various social and organizational contexts (Dihel & Stroebe, 1994; Guzzo & Dickson, 1996; Paulus, 2000). Specifically, teamwork is employed in almost all aspects of organizational life, including problem solving, decision making, negotiations, conflict resolution, and marketing research. From this perspective, understanding the factors that may influence group productivity is of utmost importance. As argued below, the need for cognitive closure is one such factor particularly related to creativity, considered one of the more significant dimensions of group productivity.

EPISTEMIC MOTIVATIONS AND THE NEED FOR CLOSURE

The theory of lay epistemic (Kruglanski, 1989) integrates cognitive and motivational accounts of behavior and refers to the process of how human knowledge is formed and modified. In this perspective, the knowledge construction process is guided by a motivated informational search according to two different phases of hypothesis generation and hypothesis testing. Hypothesis generation is

TABLE 1: A Classification of Epistemic Motivations

<i>Type of Motivating Closure</i>	<i>Disposition Toward Closure</i>	
	<i>Avoidance</i>	<i>Seeking</i>
Nonspecific	Need to avoid nonspecific closure	Need for nonspecific closure
Specific	Need to avoid a specific closure	Need for specific closure

assumed to be a function of persons' cognitive capability and their epistemic motivation, whereas the hypothesis validation is assumed to be based on relevant evidence and on "preexisting inference rules that link together different cognitive categories" (Kruglanski, 1990, p. 181). Research demonstrated that long-term capability relates to the availability of constructs in memory (Higgins, King, & Mavin, 1982), whereas short-term capability relates to their accessibility (Higgins & King, 1981). Nevertheless, beyond capability considerations, the person's tendency to generate hypotheses on a given topic, and search for relevant information, is assumed to be based on his or her epistemic motivations, namely the motivation toward knowledge as object (Kruglanski, 1989, 1990). These epistemic motivations can be classified in terms of two independent dimensions: disposition toward closure (seeking vs. avoidance) and type of motivating closure (nonspecific vs. specific; Kruglanski, 1989, 1990). This conceptualization yields a typology of four motivational orientations as reported in Table 1. Nonspecific closure refers to definitive knowledge on a given topic, regardless of the content of such knowledge, whereas specific closure is possessing knowledge with some special properties (i.e., knowledge that enhance self-esteem). In this perspective, we focus on the particular motivational orientation called *need for nonspecific closure* (see Table 1).

The *need for (nonspecific) cognitive closure* has been defined as a desire for a definite answer to a question, any firm answer, rather than uncertainty, confusion, or ambiguity (Kruglanski, 1989). The strength of this desire is assumed to depend on the benefits of possessing closure and the costs of lacking it. According to the lay epistemic theory, this particular motivation orientation can vary

across individuals and across situations (Kruglanski & Webster, 1996; Webster & Kruglanski, 1994, 1998). For instance, cognitive closure may be perceived to be very advantageous to reach a decision under high time pressure; on the other hand, some persons may generally value closure more than others.

In particular, the need for closure has been shown to rise in circumstances that render information processing difficult or unpleasant (hence increasing the perceived benefits of closure or costs of lacking closure), such as time pressure (Kruglanski & Freund, 1983; Kruglanski & Webster, 1991), noise (Kruglanski, Webster, & Klem, 1993), and mental fatigue (Webster, Richter, & Kruglanski, 1996). By contrast, the need to avoid closure may be promoted in those conditions that highlight the costs of a closure and the benefits of a lack of closure (i.e., accountability, fear of invalidity, evaluation apprehension). When aroused, the need for closure invokes a tendency to seek immediate and permanent answers; that is, individuals with high need for closure seek closure urgently yet also strive for relatively stable rather than transient closure that forestalls the necessity of future revisions and the attendant uncertainty and ambiguity these entail. This translates to a generation of fewer hypotheses under high (vs. low) need for closure and the tendency to seize and freeze on an early, plausible hypothesis (for reviews of the empirical evidence see Kruglanski & Webster, 1996; Webster & Kruglanski, 1998).

In addition to its situational antecedents, the motivational orientation toward a nonspecific closure constitutes also a dimension of individual differences. Some individuals may display a systematic proclivity to value closure positively, whereas others may tend to avoid closure and prefer openness (Webster & Kruglanski, 1994). These individual differences may stem from a variety of factors such as cultural and societal norms, socialization practices, or social learning processes where confidence in one's own opinions and judgments, order, and clearness are appreciated and rewarded (Webster & Kruglanski, 1998). An individual difference measure of the Need for Closure Scale was developed by Webster and Kruglanski (1994), who depicted its conceptual and empirical rela-

tions to several kindred notions (see De Grada, Kruglanski, Mannetti, Pierro, & Webster, 1996; Kruglanski, Atash, De Grada, Mannetti, Pierro, & Webster, 1997; Mannetti, Pierro, Kruglanski, Taris, & Bezinovic, 2002). The scale has been used extensively in research (for reviews, see Kruglanski & Webster, 1996; Webster & Kruglanski, 1998) and has been translated into several languages (Mannetti et al., 2002). More important, the Need for Closure Scale showed a very high construct validity because the same results were obtained across different situational and dispositional operationalizations of the construct.

Research has also indicated that the need for closure fosters a striving for consensus because it promotes epistemic stability across persons. For instance, Kruglanski and Webster (1991) found that individuals in small groups placed under high (vs. low) need for closure by means of time pressure or ambient noise were more likely to reject a confederate who professed to hold an opinion deviant from the other group members'. Similarly, Kruglanski, Webster, & Kelm (1993) found that individuals with high (vs. low) need for closure, either manipulated via noise or assessed via the Need for Closure Scale (Webster & Kruglanski, 1994), exhibited a stronger preference for agreement (vs. disagreement) with their dyadic partners.

GROUP CREATIVITY

As it has been used in the psychological literature at large, the concept of creativity usually denotes the production, by individuals or groups, of ideas and solutions considered not only original and innovative but also useful and appropriate (Amabile, 1996; Sternberg & Lupart, 1999). This particular definition of creativity highlights the quality of ideas considered creative. A different current use of the term harks back to the work of Guilford (1950) and characterizes creativity as the capacity to generate a great quantity of unique ideas, reflecting divergent thinking or *ideational fluidity* (Brown, Tumeo, Larey, & Paulus, 1998; Paulus, 2000; Paulus, Brown, & Ortega, 1999).

Empirical work relevant to the creativity of group products has focused on a number of personal and social factors that facilitate or inhibit group productivity (for reviews, see Paulus, 2000; Paulus, Legget Dugosh, Dzindolet, Coskun, & Putman, 2002; Paulus & Nijstad, 2003; Stroebe & Diehl, 1994), such as cohesiveness (Craig & Kelly, 1999; Evans & Dion, 1991), heterogeneity and diversity (McLeod, Lobel, & Cox, 1996; Milliken, Bartel, & Kurzberg, 2003; Rodriguez, 1998), minority influence (De Dreu & Beersma, 2001; De Dreu & West, 2001; Van Dyne & Saavedra, 1996), leadership style (Kirpatrick & Locke, 1996; Sosik, Kahai, & Avolio, 1998).

Most of the research on group creativity has employed brainstorming tasks and has focused on the comparison between nominal groups (individuals working alone whose efforts are then aggregated) and real groups, consistently showing that nominal groups outperform groups where individuals brainstorm together (Diehl & Stroebe, 1987; Stroebe & Diehl, 1994). Three explanations were found to account for this productivity loss in brainstorming groups: (a) evaluation apprehension (i.e., the presence of other group members might evoke evaluation apprehension and lead to self-censoring of ideas); (b) free riding (i.e., because the less identifiable individuals are less motivated when working in a group than when working alone); and (c) mutual production blocking (i.e., members can only speak in turn, and reduced time and repeated interruptions might decrease skills and motivation to produce ideas). An empirical test of these hypotheses found that mutual production blocking was the most important reason of production losses in brainstorming tasks, while evaluation apprehension and free riding only accounted for a limited proportion of the phenomenon (Diehl & Stroebe, 1987).

Subsequent research has concentrated on identifying the social and cognitive conditions capable to overcome this productivity loss (see, for review, Paulus, 2000; Paulus, Legget Dugosh, et al., 2002; West, 2002). Electronic brainstorming groups, for example, were found to perform as equal as, or outperform, nominal groups (Connolly, Routhieaux, & Schneider, 1993; Dennis & Valacich, 1993; Gallupe, Cooper, Grise, & Bastianutti, 1994; Paulus & Dzindolet,

1993; Valacich, Dennis, & Connolly, 1994). Moreover, social comparison processes were also found to reduce motivational losses and enhance group productivity. In fact, participation in teams can lead to high levels of creativity when group members are motivated to perform at higher levels of creativity by providing group members and teams with higher comparison standards and providing feedback on individual performance (Paulus, Dzindolet, Poletes, & Camacho, 1993; Paulus, Larey, Putman, Leggett, & Roland, 1996).

NEED FOR CLOSURE AND GROUP CREATIVITY

Thus far, these empirical studies have not included epistemic motivations as a possible dimension affecting group creativity. Nonetheless, there are reasons to believe that need for closure is a particularly pertinent factor in this regard, bearing on the quantitative and the qualitative aspects of creativity. As far as the quantitative aspect is concerned, the need for closure has been known to curtail the hypothesis-generation process (Mayseless & Kruglanski, 1987), reducing the number of engendered possibilities, hence restricting the ideational fluidity that is the hallmark of creativity (Guilford, 1950). As far as the qualitative aspect is concerned, the tendency of individuals with high need for closure to strive for consensus and to reject opinion deviates should bias them against innovative and original ideas that, by definition, are deviant from convention. It should follow, therefore, that under situational circumstances known to heighten the need for closure, groups should be less creative than under alternative circumstances conducive to a heightened need for closure. It should follow also that groups composed of individuals with a high (vs. low) need for closure should be less creative.

Different strands of evidence reported in the literature lend indirect support to these notions. Specifically, several individual difference dimensions, conceptually related to the need for closure, have been known to affect individual and/or group creativity. For instance, Brown and colleagues (1998) reported that individuals high on the divergent thought dimension are more likely to produce unique and original ideas and solutions, as do groups composed of

divergent thinkers. Other work reported empirical support for the notion that the Intolerance of Ambiguity, a facet of the need-for-closure construct, is negatively related to creativity (Petersen, Glover, Romero, & Romero, 1978; Tegano, 1990), innovativeness (Nicotera, Smilowitz, & Pearson, 1990), and fluidity (Houtz, Denmark, Rosenfield, & Tetenbaum, 1980). Similarly, dogmatism (or cognitive rigidity), a correlate of the need for closure (Webster & Kruglanski, 1994) was found to be negatively related to creative thinking (Faschingbauer & Eglevsky, 1977; Faschingbauer, Moore, & Stone, 1978; Parsons, Tittler, & Cook, 1984; Rouff, 1975) and problem solving (Goldsmith, 1984). Finally, a study by Rocchi (1998) found that individuals high (vs. low) on the need for closure generated figures and objects rated as less creative by external observers.

In addition, several factors assumed to constitute situational determinants of the need for closure were shown to affect group creativity. Thus, in a series of experiments Kelly and colleagues demonstrated that the quality, the originality, and the creativity of ideas generated by groups were lowered by time pressure (Karau & Kelly, 1992; Kelly & Karau, 1993; Kelly & McGrath, 1985), a factor assumed to heighten the need for closure. Other authors suggested that increasing evaluation concerns and accountability (assumed to lower the need for closure) resulted in improved group productivity (Shepperd, 1993). It was also demonstrated that minority influence, unconformity, dissent, and tolerance of opinion deviates, that is, the putative correlates of a low need for closure (De Grada et al., 1999; Kruglanski & Webster, 1991, 1996) facilitate divergent processes in groups and higher group originality (Nemeth, 1995; Nemeth & Nemeth-Brown, 2003; Van Dyne & Saaverda, 1996).

THE CURRENT RESEARCH

Building on the suggestive findings above, the current research explores the relation between the need for closure and group productivity more directly and comprehensively. An experiment was

conducted where the need for closure was operationally defined via scores on the scale designed to measure that construct (Webster & Kruglanski, 1994) and employed a group task wherein participants in four-member collectivities created advertising slogans for a given product. In the current study, the group composition in terms of dispositional need for closure was manipulated. Specifically, two different kinds of groups were formed. Some of the groups were composed of individuals who exhibited a high dispositional need for closure. The others were composed of individuals who possessed a low dispositional need for closure. Overall, 11 groups were composed of individuals characterized as low in the need for closure, and 10 groups were composed of individuals characterized as high in the need for closure. The current study addressed the quantitative aspect of creativity (i.e., ideational fluidity) and the qualitative aspects of creativity, assessed via independent judges' evaluations of the group products on various dimensions. Based on the theoretical analysis outlined earlier, we expected that the relation between the need for closure and group creativity will be negative, namely that groups composed of individuals high (vs. low) in need for closure will show less creativity across the different ways in which this construct was measured.

In particular we formulated the following hypotheses:

Hypothesis 1: Groups composed of high (vs. low) need-for-closure individuals exhibit less ideational fluency, that is, produce a minor amount of unique ideas.

Hypothesis 2: Groups composed of high (vs. low) need-for-closure individuals produce ideas that are separately rated as less (vs. more) creative.

Hypothesis 3: The output of groups composed of high (vs. low) need-for-closure individuals is overall evaluated as less (vs. more) creative.

Hypothesis 4a: Because of the tendency to seize on early ideas and freeze on them, groups composed of high (vs. low) need-for-closure individuals show less (vs. more) elaboration of the initial solution, that is, less ability to modify and transform the setting and go beyond the constraints of a given situation.

Hypothesis 4b: We expect that this latter result is mediated by situational consequences of the need for closure.

METHOD

PARTICIPANTS

Eighty-four female majors in psychology at the University of Rome–La Sapienza volunteered to participate in the study. Their average age was 20.7 years ($SD = 2.25$), and they were divided into 21 groups of four persons each. Eleven groups were composed of individuals characterized as low in the need for closure, and 10 groups were composed of individuals characterized as high in the need for closure.

PROCEDURE AND MEASURES

In a mass testing conducted 1 to 2 months prior to the current study, participants completed the Italian version of Webster & Kruglanski's (1994) Need for Closure Scale (Mannetti et al., 2002; Pierro et al., 1995). This scale consists of 42 items designed to measure five different facets of the Need for Closure Scale, namely: Preference for Order and Structure, Intolerance of Ambiguity, Need for Predictability, Closemindedness, and Decisiveness. In responding to this instrument, participants stated their agreement or disagreement to the various items using a 7-point scale with the response alternatives ranging from 1 (*completely disagree*) to 7 (*completely agree*). A general need-for-closure score is calculated by summing over the separate items of the scale. In the current study, we excluded items related to the Decisiveness facet that in prior psychometric work appeared to be less related to the total score than items from the remaining facets (for discussion see De Grada et al., 1999; Mannetti et al., 2002; Pierro et al., 1995).¹ In the current sample, the overall reliability of the scale was satisfactory. Specifically, the Cronbach's alpha of the scale was .86.

An overall need-for-closure score was thus computed and used to divide participants into highs, middles, and lows in need for closure. Participants in the lower tercile of the distribution ($M < 3.8$) were classified as low on the need for closure, whereas those in the

upper tercile ($M > 4.5$) were classified as high on the need for closure. Participants in both these categories were contacted by phone and asked to volunteer for a study of group interaction. Those agreeing to take part in the study were invited to appear at the laboratory of the Department of Social and Developmental Psychology at the University of Rome–La Sapienza.

On arrival, participants were greeted by the experimenter and accompanied to the lab. The experimenter then presented them with the instructions designed to introduce and explain the group task participants were about to complete. Specifically, participants performed a problem-solving task with no correct solution, using the nominal group technique. The task had participants role-play members of a team in an advertising company engaged in copy writing slogans advertising a given product.

Participants received a booklet containing detailed information about the advertising company and the product. The company was described as young and innovative, and one that recently experienced a fast and important growth, although an increasing competition among advertising companies lowered this tendency in the past 2 years. Therefore, the forthcoming advertising campaign was presented as extremely relevant for the company and its future. The product to be advertised consisted of an ultramodern lamp manufactured in Japan able to reproduce the sunlight in 12,000 different gradations of colors. Information was provided about the design of the product, the rationale behind its production, the consumer population targeted, the envisaged market position of the product, and the marketing objectives.

Group task was divided into two parts. The first part consisted of 15 minutes of individual work wherein participants went through the materials and attempted to come up with their own slogans. The second part consisted of 45 minutes of group interaction wherein participants discussed their individual slogans, created new ones, and selected four final slogans, and agreed on as the best this group has created. This concluded the experiment. All participants were thanked and debriefed. With their prior permission, their group interactions were audiotaped and videotaped.

CREATIVITY MEASURES

The final four slogans selected by each group were treated as the ultimate group product. Their creativity was subsequently evaluated by different sets of external judges. Four separate measures of creativity were computed as described below:

Group fluency. The absolute number of unique ideas (i.e., slogans) expressed by the groups was taken as a measure of ideational fluency. All distinct slogans produced by the groups were recorded by one external coder (who coded the videotaped materials).

Creativity of the slogans. A set of nine independent judges rated the ideas produced by the groups. They received a booklet containing (a) the instructions and information provided to the participants; (b) a brief definition of creativity stating that generally, the term *creativity* represents the capacity to produce original ideas, through a new combination or a reorganization of the elements requiring the use of abstract thinking (Moore, 2000). The judges then proceeded to rate each slogan separately on a 9-point scale ranging from 1 (*not very creative*) to 9 (*very creative*). The order of the slogans was mixed such that slogans from the same group did not necessarily follow one another. Judges' average agreement resulted in a satisfactory effective reliability of .77 (Rosenthal, 1987). The judges' scores for each slogan were then averaged and further combined, again by averaging across the four slogans chosen by a given group to yield an average measure of slogan-based group creativity.

Group creativity. A different approach was implemented in evaluating the overall creativity of the groups. Specifically, these evaluations were carried out by two independent judges who assessed the product of the group as a whole (i.e., the four slogans produced by the group and considered collectively). First, judges examined the instructions and information provided to participants. Second, they inspected the various groups' chosen slogans and rank ordered the groups from the most creative to the least creative. After having looked at these materials, participants evaluated the four slogans of

each group as a whole in terms of creativity, originality, and innovativeness. The judges' ratings were carried out on a 9-point scale ranging from 1 (*not at all*) to 9 (*very much*). These ratings showed good internal consistency across judges and were highly intercorrelated across the three dimensions tapped (the average interitem correlations being $r = .88$ for the first judge and $r = .75$ for the second). Consequently, we computed a unique index for each judge, adding this judge's ratings of the three dimensions for a given group. The judges' agreement on this index was significant, $r = .52$ ($p < .01$), and yielded a satisfactory effective reliability of .72 (Rosenthal, 1987). Thus, we created an index of group creativity by averaging the two judges' overall evaluations. Note that the foregoing procedure relied on the judges' intuitive definition of creativity (see Amabile, 1982, 1996), rather than on an experimenter's explicit definition.

Elaboration. This measure refers to the capacity to enrich and elaborate a particular answer and reflects the ability to modify and transform the setting and go beyond the constraints of a given situation. Initial slogans, generated in the first part of the task by participants working alone, were contrasted with slogans eventually chosen after group discussion by two coders whose agreement was $r = .90$ ($p < .001$). This particular measure ranges from the score of 1, when all final slogans were drawn from the initial set of individual slogans, to 5 when all four final slogans differed from the initial set.

In all our treatments of the data obtained in this experiment, the appropriate group averages constituted the units of analysis (Kenny, Kashy, & Bolger, 1998).

RESULTS

MANIPULATION CHECKS

As a first step, we checked whether our high and low need-for-closure groups indeed differed significantly on this variable. This was, in fact, the case, $F(1, 19) = 380.5$, $p < .001$. Specifically, the

high need-for-closure groups were composed of individuals whose average score was significantly higher ($M = 5.0$, $SD = .20$) than the low need-for-closure groups ($M = 3.3$, $SD = .20$), indicating that the groups we created differed on the dispositional need for closure as intended. An additional bit of evidence supporting that conclusion comes from the time the low and high need-for-closure groups took to conclude their discussion. Even though all groups had 45 minutes at their disposal, they could have terminated their discussion sooner if they deemed it appropriate. Indeed, all groups did so; however, the time taken by the high need-for-closure groups, $M = 20.8$, $SD = 6.1$, was significantly shorter than the time taken by the low need-for-closure groups, $M = 34.0$, $SD = 16.45$, $F(1, 19) = 6.2$, $p = .02$. This result is consistent with the urgency tendency assumed to characterize high need-for-closure persons (Kruglanski & Webster, 1996) and constitutes further testimony that our high and low need-for-closure groups indeed differed on this variable as intended.

GROUP CREATIVITY

Group fluency. An ANOVA was performed on our measure of group ideational fluency to test Hypothesis 1. This analysis yielded a significant effect, $F(1, 19) = 8.40$, $p < .01$, $\eta^2 = .31$, the high need-for-closure groups producing, on average, fewer slogans ($M = 16.60$) than low need-for-closure groups ($M = 26.64$; see Table 2).

Creativity of the slogans. An ANOVA performed on the combined index based on the nine judges' ratings of each group slogan yielded a significant need-for-closure effect (Hypothesis 2). Specifically, slogans of high (vs. low) need-for-closure groups had significantly lower scores on this measure of creativity as well, $F(1, 19) = 4.42$, $p < .05$, $\eta^2 = .19$; see Table 2.

Overall creativity of the group product. Our central hypothesis in this research was that the judges' overall ratings of product creativity would be lower for the high (vs. low) need-for-closure groups (Hypothesis 3). This hypothesis was confirmed with our

TABLE 2: Group Creativity, Creativity of Slogans, and Elaboration as a Function of Need for Closure (Standard Deviations in brackets)

	<i>Need for Closure Groups</i>					
	<i>High</i>			<i>Low</i>		
	M	(SD)	[Range]	M	(SD)	[Range]
Group fluency	16.60	(5.36)	[min 12, max 26]	26.64	(9.67)	[min 10, max 45]
Creativity of slogans	4.2	(0.75)	[min 2.89, max 5.17]	4.9	(0.76)	[min 3.69, max 5.96]
Group creativity	2.9	(0.79)	[min 1.83, max 4.33]	4.7	(1.48)	[min 2.33, max 6.83]
Elaboration	2.0	(1.25)	[min 1, max 4]	3.4	(1.37)	[min 1, max 5]

combined index of creativity, innovativeness, and originality described earlier. As expected, the product of the high (vs. low) need-for-closure groups was rated as significantly lower on this index, $F(1, 19) = 10.8, p < .01, \eta^2 = .36$; see Table 2.

Elaboration. Lower scores on our elaboration measure, described earlier, were considered to reflect a seizing and freezing on early stimuli or, in this case, on slogans formed individually prior to the group interaction (Hypothesis 4a). Higher scores, by contrast, indicated that genuine group process has taken place and that it generated emergent notions over and above the individual slogans contributed initially by the group members. If high (vs. low) need-for-closure participants tend to seize and freeze on initial notions, these groups should receive lower elaboration scores. And they did, $F(1, 19) = 6.4, p = .02$; see Table 2.

To test whether the situational manifestations of the need for closure mediate this relationship (Hypothesis 4b), we conducted a path analysis with elaboration as a dependent variable, group-average scores on the dispositional need for closure as an independent variable, and minutes of group discussion (assumed to reflect a situational consequence of the need for closure) as a mediator (see Figure 1). According to Baron and Kenny (1986), to prove mediation, β coefficients of three regression equations must be estimated and compared with one another: (a) first, the presumed mediator should be predicted by the independent variable; (b) sec-

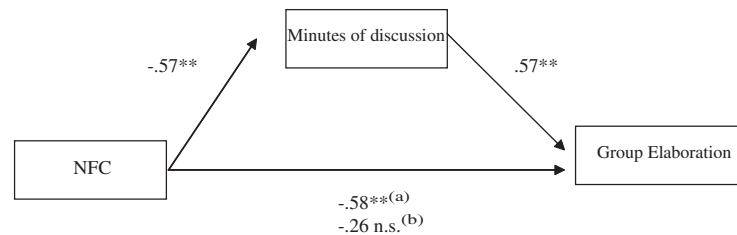


Figure 1: Minutes of Discussion as a Mediator

NOTE: Values are β coefficients.

a. β coefficient without need for closure.

b. β coefficient after controlling for need for closure.

** $p < .01$.

ond, the dependent variable should be predicted by the mediator and by the independent variable; and (c) last, controlling for the mediator the independent variable should no longer predict the dependent variable.

The appropriate regression equations were estimated according to this procedure. In the first equation, dispositional need for closure was found to be significantly related to the mediator ($\beta = -.57$, $p < .01$). In the second equation, dispositional need for closure significantly predicted elaboration ($\beta = -.58$, $p < .01$). In the third equation, controlling for the mediator, the effect of dispositional need for closure on elaboration dropped to nonsignificance ($\beta = -.26$ *ns*) whereas the effect of the mediator remained significant ($\beta = .57$, $p < .01$; Figure 1). This finding further supports the notion that it is the situational manifestation of the need for closure, reflected in the amount of discussion time, that determines group elaboration.

DISCUSSION

The results of the current study support the notion that the need for cognitive closure exerts an adverse effect on creativity in groups. Specifically, groups composed of individuals high (vs. low) in need for closure revealed a lower degree of productivity across multiple measures of group creativity. High (vs. low) need-

for-closure groups exhibited significantly lesser fluency of ideas. In addition, high (vs. low) need-for-closure groups generated products rated as less creative, original, and innovative by external judges. Finally, high (vs. low) need-for-closure groups exhibited lesser elaboration of ideas. The latter result, as well as the lesser ideational fluency of the high (vs. low) need-for-closure groups, is consistent with the notion that during group discussion those groups tended to seize and freeze on initial slogans, resulting in less elaborated and original ideas, and in a lesser production of new ideas.

The current findings are consistent with prior, individual-level data implying a relation between the need for closure and creativity, including the generation of fewer hypotheses by individuals under high (vs. low) need for closure (cf. Mayseless & Kruglanski, 1987; Rocchi, 1998). The current study thus appears to generalize to the group level of analysis a phenomenon previously obtained at the individual level of analysis.

According to the urgency principle assumed by the theory (Kruglanski & Webster, 1996), individuals under heightened need for closure should limit the number of ideas they produce and freeze on some of those ideas. Restricted ideational fluency observed in the current study is consistent with this assumption. Further supportive of the freezing notion is the lower degree of ideational elaboration by high (vs. low) need-for-closure individuals. Apparently, individuals with a heightened need for closure are not much inclined to alter their initial ideas but rather tend to adhere to them in a somewhat rigid fashion. Finally, the permanence principle of the theory, implying the striving for consensus by persons with a high degree of need for closure, is also supported by the current finding that products of high (vs. low) need-for-closure groups were evaluated as less creative, and hence as less deviant from social conventions (representing one form of consensus).

The current findings have different implications. First of all, they further extend the effects of need for closure at group level. Besides affecting group processes and group interactions, need for closure was also found to influence group outcomes. This is to say that the motivation to early close the epistemic process has conse-

quences not only on how the group reaches the solution or the decision through the discussion but also on the conclusion or the outcome of the discussion. The current results indicate that the quantity and quality of the solutions (or ideas) reached by a group are affected by the need for closure, namely that solutions proposed by groups with high (vs. low) need for closure are less numerous and are rated as less creative. These findings have evident implications also for organizational settings where problem solving plays a key role, or for domains such as team building, group training, or personnel selection. In complex organizations, most of the innovative work is carried out in groups and teams. Therefore, the consequences of the need for closure on group interaction and group performance should be taken into account by managers and group leaders. In these cases, the need for closure could be considered as a relevant variable that can inhibit or facilitate the creative processes of the group.

As previously claimed, the current hypothesis about the relation between need for closure and group creativity extrapolates to the group level of analysis a phenomenon assumed to occur within individuals. In other words, the lesser group creativity in groups composed of high (vs. low) need-for-closure members was assumed to derive from the lesser creativity of high (vs. low) need-for-closure members (cf. Rocchi, 1998) rather than from some emergent property occurring in high (vs. low) need-for-closure groups. Because in prior brainstorming work, individual creativity, or creativity in so-called nominal groups, was found superior to creativity in interacting groups, it is possible that such difference too is due to individual-level differences in need for cognitive closure. Specifically, even though the actual amount of time available to each member of a nominal group is typically equal to that available to each member of an interactive group, it is possible that members in the interactive group feel a greater time pressure, sensing that others are impatiently waiting to seize the floor and express their ideas. If that were true, the subjective time pressure on individuals in interacting groups could induce a greater need for closure in these persons as compared with members of the nominal groups (cf. Kruglanski & Freund, 1983), hence limiting their creativity

(Diehl & Stroebe, 1987). This possibility is speculative at this point, and it must await further research for its validation.

Consequences of diversity in the group composition should also be investigated because cognitive diversity (Paulus, 2000) and group heterogeneity (Watson, Kumar, & Michaelsen, 1993) were considered factors capable to facilitate group creativity (see also Milliken et al., 2003). Therefore, future studies should consider the performance of heterogeneous groups that vary in dispositional need for closure. For instance, homogeneous groups in need for closure (highs vs. lows) should be compared with heterogeneous groups composed of individuals with high and low dispositional need for closure. More interesting, different sources of need for closure should also be contrasted to investigate the associated effects of situational and dispositional need for closure on group creativity.

NOTE

1. The decision to exclude Decisiveness from the total score of need for closure stems from an empirical observation. Originally this facet was intended to be part of the construct of need for closure (Webster & Kruglanski, 1994). However, subsequent studies, employing samples of different countries (including the United States), have consistently shown that decisiveness is unrelated to the rest of the subscales (Mannetti et al., 2002; Pierro et al., 1995).

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