

Effects of Need for Closure on Creativity in Small Group Interactions

ANTONIO CHIRUMBOLO,^{1*} STEFANO LIVI,¹ LUCIA MANNETTI,¹
ANTONIO PIERRO¹ and ARIE W. KRUGLANSKI²

¹University of Rome 'La Sapienza', Italy

²University of Maryland, USA

Abstract

Three experiments investigated the consequences of the epistemic motivation toward closure on the emergence of creative interactions in small groups. In the first study, need for closure was manipulated via time pressure. Results showed that in groups under high need for closure (i.e. under time pressure) the percentage of creative acts during group discussion was reduced. The second study replicated this result using an individual differences operationalization of the need for closure. In the third study, groups composed of individuals high (versus low) in need for closure performed less creatively, and exhibited less ideational fluidity during group interaction. Moreover, it was demonstrated that conformity pressure mediates the negative relationship between dispositional need for closure and group creativity. Copyright © 2004 John Wiley & Sons, Ltd.

INTRODUCTION

Within the framework of the Lay Epistemic Theory (Kruglanski, 1989), Need for Cognitive Closure was defined as a desire for a quick firm answer (any answer) to a question (Kruglanski & Webster, 1996; Webster & Kruglanski, 1998). From this point of view, the term 'need' is used to indicate a motivational tendency or a inclination, rather than a material deficit, that is a function of an individual's analysis of costs and benefits of cognitive closure (or lack of closure) (Kruglanski & Webster, 1996). Need for closure can be situationally induced, and it varies along a continuum ranging from a high need to obtain closure to a strong need to avoid closure. The antecedents of the epistemic motivation towards a non-specific closure can be found in those circumstances that highlight the perceived benefits and de-emphasize the perceived costs of closure. Those contextual factors are, for instance, *time pressure*, *environmental noise*, *mental fatigue*, *boredom*, or *dullness of a cognitive task*. By contrast, the need to avoid closure may be instilled in those conditions that stress the costs of closure and the benefits of a lack of closure (i.e. accountability, fear of invalidity, or evaluation apprehension). Moreover, need

*Correspondence to: Antonio Chirumbolo, Department of Social and Developmental Psychology, University of Rome 'La Sapienza', Via dei Marsi 78, I-00185 Roma, Italy. E-mail: chirumbolo@uniroma1.it

Received 18 September 2003

Accepted 5 December 2003

for closure can also represent a stable individual disposition. Thus, some individuals may display a systematic proclivity to value closure positively, while others may be predisposed to avoid closure and prefer openness (Webster & Kruglanski, 1994).

Major consequences of need for closure consist of the urgency and permanence tendencies. The urgency tendency refers to the inclination to quickly seize on closure, relying on early cues and first answers regardless of their validity. The permanence tendency reflects the propensity to freeze on existing knowledge in order to preserve past and future cognition. Need for closure has both cognitive and social consequences, as the urgency and the permanency tendencies affect a wide range of psychosocial phenomena mediated by information processing at individual, interpersonal, and group levels (for a review see Kruglanski, 1996; Kruglanski & Webster, 1996; Webster & Kruglanski, 1998).

Our main concern in the present paper is the relation between need for closure and creativity. There are reasons to believe that need for closure is negatively related to creativity on grounds that are both cognitive and social. Need for closure limits the extent of information processing and the generation of alternative solutions (Mayseless & Kruglanski, 1987; Webster, Richter, & Kruglanski, 1996). In other words, individuals under high (versus low) need for closure are expected to express less (versus more) ideational fluidity, which is usually considered an important component of individual and group creativity (Diehl & Stroebe, 1994; Guilford, 1950; Paulus, Legget Dugosh, Dzindolet, Coskun, & Putman, 2002). In additive tasks (such as brainstorming), lower individual fluidity under high need for closure will result in reduced group productivity as well as in decreased quality and creativity of group products (Chirumbolo, Mannetti, Pierro, Areni, & Kruglanski, manuscript submitted for publication). Rocchi (1998) has shown in two experiments that individuals high on the need for closure engaged in a creative task produced figures and objects that were judged as less creative by external observers than those produced by individuals low on the need for closure. Similarly, other studies demonstrated that outcomes generated by problem-solving groups composed of high need for closure individuals were evaluated by different sets of independent judges as less original, innovative, and creative compared with groups composed of individuals low on the need for closure (Chirumbolo et al., manuscript submitted for publication). However, these studies did not examine the processes and interactions occurring in group discussion and their relationship to group creativity.

There is empirical evidence that the need for closure promotes rejection by the group of opinion deviates (Kruglanski & Webster, 1991), conformity pressures, task orientation, and the emergence of an autocratic leadership in group discussions (De Grada, Kruglanski, Mannetti, & Pierro, 1999), as well as the longing for group consensus (Kruglanski, Webster, & Klem, 1993). Furthermore, although framed within the Time Interaction and Performance theory (McGrath, 1991; McGrath & Kelly, 1986), Kelly and colleagues also showed that groups under time pressure (presumed to induce the need for closure) were less creative and original (Kelly & Karau, 1993; Kelly & McGrath, 1985), focusing more on task-oriented acts, that facilitate reaching group consensus and task conclusion, and less on aspects that would otherwise improve the quality of the performance, e.g. discussing approaches and ideas in depth (Karau & Kelly, 1992).

Researchers of group creativity phenomena have shown that premature consensus and conformity pressure in groups are negatively associated with productivity and creativity, since they lead to a process loss (Nijstad & Paulus, 2003). Creativity inevitably entails processes that are both divergent and convergent (Milliken, Bartel, & Kurtzberg, 2003). First of all, ideas and solutions must be generated. This is a divergent process in which idea

quantity and an open minded approach are helpful and valuable. In this case, premature consensus may lead the group to close the epistemic process quickly and to rely only on the few early ideas and later 'freeze' on them. After the generation process, however, ideas and solutions must be evaluated in order to select only the most interesting and promising among them. This is a convergent process in which a constructive debate among group members should lead to better decisions (Nijstad & Paulus, 2003). Under a high need for closure, however, group members are motivated to reach a rapid decision that interrupts the epistemic process. In this circumstance, it is likely that groups will reject divergent opinions and approaches that delay decision making; urgently striving to forge a group consensus. In turn, premature group consensus and conformity pressure may elicit a 'groupthink' type of process, leading the group to choose a bad idea or approach (Nijstad & Paulus, 2003; Paulus, 1998). Other authors have claimed that a *normative influence*, including again the request for consensus, approval, and a sense of belonging to the group (Deutsch & Gerard, 1955; Kaplan, 1987), has a negative effect on creativity and on the quality of group decisions (Kaplan & Wilke, 2001). Similarly, it was shown that minority influence, non-conformity, authentic dissent, opinion diversity, and tolerance of dissent facilitated divergent processes in groups and promoted higher group originality (Nemeth, 1995; Nemeth & Nemeth-Brown, 2003; Van Dyne & Saavedra, 1996). It is therefore legitimate to suppose that conformism, emerging in groups under high need for closure, could function as a mediator between need for closure and group creativity.

Overview of the studies and hypotheses

This research investigated the tendency of groups with members high (versus low) on need for cognitive closure to reduce the number of creative acts (Studies 1 and 2) as well as group creativity (Study 3).

The first study tested the key hypothesis that need for closure, manipulated via time pressure, has an impact on creativity expressed in interactions taking place in discussion groups (see e.g. Kelly, Jackson, & Huston-Comeaux, 1997; Karau & Kelly, 1992; Kelly & Karau, 1993). It was expected that participants in groups under high (versus low) need for closure induced by time pressure would perform fewer creative acts within the group, and hence reduce the quality of the performance.

The second study replicated and clarified the findings of the first one by assessing the effect of the need for closure, measured as a stable individual disposition, on creativity within groups. As in the previous study, we hypothesized that a higher *dispositional* need for closure would be negatively related to the proportion of creative acts performed in group discussions.

Finally, the third study tested the negative effect of dispositional need for closure on a more specific measure of group creativity (i.e. ideational fluidity manifest in group interaction). The hypothesis that conformity pressure mediates this relationship was also tested.

STUDY 1

Method

Participants

Participants were psychology students at the University of Rome 'La Sapienza'. The sample included 10 groups of four persons each ($N = 40$). Six of these were put under time

pressure and the remaining four were not. All groups were composed of men participating on a voluntary basis. Their mean age was 22.5 years ($SD = 3.14$).

Procedure and instruments

Upon arrival, participants were ushered to a room and seated around a table, where an experimenter gave the instructions for the group task (see also De Grada et al., 1999; De Grada, Mannetti, & Pierro, 1997; Pierro, Mannetti, De Grada, Livi, & Kruglanski, 2003). Specifically, each participant was asked to role-play a department manager at a meeting of an awards committee of their company, each representing four different departments of the company (heads of the sales, marketing, data-processing, and social-benefits departments). The committee's task was to consider four subordinates nominated for a merit-based monetary award in accordance with the company's policy of rewarding its workers for special achievements. Each participant was further told that the company's limited resources did not allow it to make a substantial award to all the deserving candidates (only \$5000 in award funds were available).

Each participant then received information about the candidate of his department including a brief resume and a recommendation letter from the candidate's supervisor justifying his/her nomination for the award.

During the committee's discussion, each participant's task was (i) to present valid arguments in favour of his candidate and (ii) concomitantly help the committee to arrive at a best decision concerning the allocation of the available funds.

The time pressure procedure used here was similar to the manipulation employed in previous studies (i.a. De Grada et al., 1999, 1997). After 30 minutes, for the six groups assigned to the time-pressure condition, a 'maintenance person', role-played by an experimenter's confederate, entered the room and in a clearly audible voice announced that because of a sudden emergency at the department, the room where the study was taking place was needed for another purpose and had to be cleared as soon as possible. The experimenter communicated this message to the group members without, however, placing a specific time-limit upon their deliberations. No similar interruption occurred for members of the four remaining groups pre-assigned to the no-time-pressure condition.

Groups exposed to time pressure continued their discussion for another 11 minutes (beyond the initial discussion phase of 30 minutes), whereas those without time pressure continued for another 45 minutes. This difference was significant ($F(1, 8) = 13.1$, $p < 0.01$), suggesting that our manipulation successfully imposed a degree of time pressure on the participants.

The room where the group deliberations took place contained a one-way mirror concealing a video-camera, which recorded the entire group interaction. The purpose of these recordings was to analyse creativity in social interaction by means of the Bales' Interaction Process Analysis (IPA; 1970) coding scheme.

Measures

As a measure of creativity expressed in interaction, the second category of the IPA was employed, referred to as 'Dramatize'. This category is meant to include non-conforming acts divergent from the assigned tasks (Mannetti & Pierro, 1998; Pierro & Livi, 2001), such as *spontaneous* and *original* symbolic gestures, and/or *fantasy themes* related to interpersonal situations (Bales, 1970). Previous studies have demonstrated, in fact, that this category is related to creative patterns of interactions (Pierro & Livi, 2001). In the present research, two observers were trained to apply the 12 IPA categories in accordance with Bales' (1970) instructions. Following the training period, these observers,

blind to the experimental condition, coded the acts emitted in the interaction including the second category (Dramatize). Two different variables were created for all subjects: acts emitted *before* and *after* 30 minutes. That means that for groups in the time pressure condition, acts were coded *before* and *after* the introduction of time pressure.

To assess the observers' reliability, we followed Rosenthal's (1987, pp. 9–13) suggestion by correlating the two sets of counts and using the Spearman–Brown prophecy formula to derive the final reliability index. This reliability coefficient was satisfactory, with a coefficient of 0.67.

For the subsequent data analysis, the mean percentage of creative acts, identified by the two independent observers, was employed as an index of the frequencies of creative acts performed by group members. This measure was obtained by dividing the number of creative acts by the total number of acts detected by each observer.

Results

Using data collected in group interactions, we controlled the non-independence relation within groups for each dependent variable (Kenny, Mannetti, Pierro, Livi, & Kashy, 2002). As suggested by Kenny and Judd (1986), results can be seriously affected by non-independence because of the mutual influence among participants of interacting groups (see also Kenny, Kashy, & Bolger, 1998). The simplest strategy to control for these effects is firstly to estimate the intraclass correlation (IC) on acts emitted both before and after the time pressure, and then to choose the group as a unit of analysis if the IC is significant or the individual if the IC is not significant (Kenny et al., 2002). In the present study, for acts emitted both before and after the time pressure, the IC was 0.33 ($p < 0.05$). This suggests that, within groups, participants were subjected to a positive mutual influence. That is, regarding the creative acts performed, persons in the same groups were more similar to one another than persons in different groups. For this reason, subsequent analyses employed groups as unit of analysis, computing the mean acts expressed by the participants in each group.

In order to assess the effects of time pressure on creative acts, a repeated measure MANOVA was performed, using time pressure (groups under TP versus control groups) as a between-groups factor, and percentage of creative acts emitted before and after the introduction of the TP as a within-groups factor. Results showed a significant interaction between creative acts before and after TP on the one hand and time pressure on the other hand ($F(1, 8) = 7.87, p < 0.05$) (cf. Table 1). Moreover, two separate paired *t*-test analyses were performed in order to verify whether the within-groups factor was significant in the time-pressure condition, while being non-significant in the no-time-pressure condition. Results showed that under TP the difference of creative acts was significant ($t(23) = -6.26, p < 0.000$), while in the no-TP condition it was not ($t(15) = -0.60, p = 0.56$).

Figure 1, reporting the means, clearly shows that the number of creative acts emitted before the time pressure is almost the same in the two conditions. After the introduction of time pressure, creative acts were considerably reduced, while the number of creative acts slightly increased in the control condition.

Table 1. Summary of the results of the repeated measure MANOVA ($N = 40$)

Source of variation	<i>F</i>	<i>p</i>	η^2
Acts before and after TP	3.47	0.10	0.30
Time pressure	4.75	0.06	0.37
Acts before and after TP \times time pressure	7.87	0.02	0.50

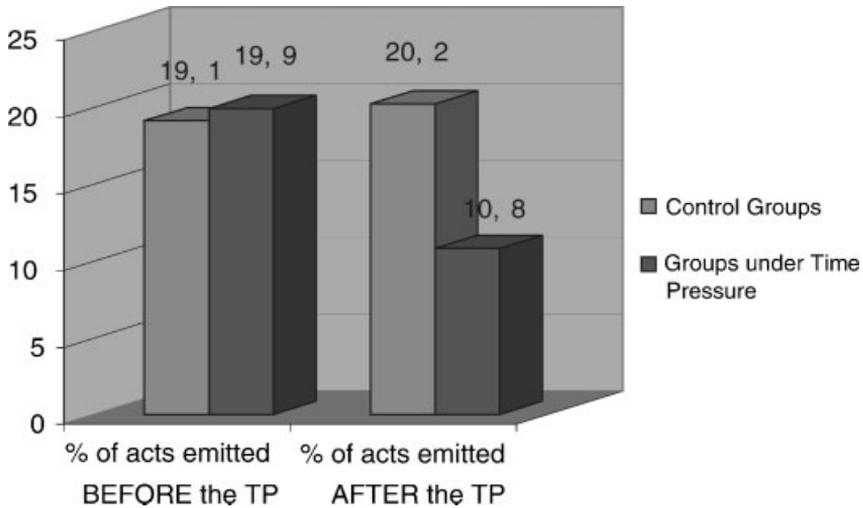


Figure 1. Percentage of acts emitted before and after 30 in groups under time pressure and in control groups.

Discussion

In prior research, time pressure has often been used to operationally define the need for cognitive closure (cf. Kruglanski & Freund, 1983; Shah, Kruglanski, & Thompson, 1998; for reviews see Kruglanski & Webster, 1996; Webster & Kruglanski, 1998) based on the assumption that, under time pressure, the implicit threat of failing to meet a deadline makes information processing subjectively costly. Time pressure was also employed to induce need for closure also in the present study.

The results of this study provide empirical support for the claim that, within groups, the frequency of creative acts is reduced by higher level of need for cognitive closure induced by time pressure. Groups in the time-pressure condition, as compared to groups in the control condition, performed significantly fewer creative acts.

Whereas the present results are consistent with the claim that the need for closure reduces creativity in groups, it is possible that the time pressure employed in this research exerted a direct effect on creativity without mediation through the need for closure (Karau & Kelly, 1992; Kelly & Karau, 1993). To obtain further evidence relevant to this issue, our second study was designed to replicate Study 1 by operationalizing the need for closure as an individual disposition, assessed via the Need for Closure Scale (Webster & Kruglanski, 1994).

STUDY 2

Method

Participants

Ninety-six women (mean age = 20.4, SD = 1.88) were divided into 10 groups of four participants each and 8 groups of eight participants each. All participants were psychology

students at the University of Rome 'La Sapienza' taking part in the research on a voluntary basis.

Procedure and instruments

As in the previous study, a leaderless discussion task was used. However, in this case, the task was cooperative (contrasting with the rather competitive task of Study 1). Specifically, participants were invited to join a consultation meeting in order to provide collective solutions to two different company problems. Groups composed of four subjects took 33 minutes for their discussion, while in groups of eight discussion lasted for 40 minutes. Again, all discussions were video-recorded in order to analyse creativity in social interaction by means of the Bales' Interaction Process Analysis (IPA) coding scheme (Bales, 1970).

One to two months prior to the experimental session, participants had filled out a battery of various instruments including the Italian version of the Need for Closure Scale (De Grada, Kruglanski, Mannetti, Pierro, & Webster, 1996; Pierro et al., 1995; Mannetti, Pierro, Kruglanski, Taris, & Bezinovic, 2002; Webster & Kruglanski, 1994).

Measures

Creativity of interaction. Following the procedure described in Study 1, two independent observers analysed the interactions in accordance with Bales' IPA scheme. The reliability coefficient for the second category (Dramatize) was again satisfactory with an r of 0.89 ($p < 0.0001$). As in the previous study, the mean percentage of creative acts detected by the two independent observers was employed as an index of the frequencies of creative acts performed by group members.

Need for closure scale. This scale consists of 42 items designed to measure five different facets of need for closure, namely (1) *preference for order and structure*, (2) *intolerance of ambiguity*, (3) *need for predictability*, (4) *close-mindedness* and (5) *decisiveness* (Webster & Kruglanski, 1994). Participants indicated their agreement/disagreement with the various items on a seven-point scale with response options ranging from (1) *completely disagree* to (7) *completely agree*.

A total need for closure score was calculated by summing over the items of the scale. In the present study, we excluded items related to the decisiveness facet that appeared in prior psychometric work to be less related to the total score than items from the remaining facets (for discussion see De Grada et al., 1996, 1999; Mannetti et al., 2002). In the present sample, the overall reliability of the reduced scale was a Cronbach α of 0.82.

Results

In the present study, the analysis of non-independence on the creative acts showed a non-significant value: the intraclass correlation was 0.001 for groups of four subjects, and -0.088 for groups of eight subjects, allowing us to treat individuals as units of analysis (Kenny et al., 2002).

To assess the influence of Need for Cognitive Closure, controlling for the size of the group, a multiple regression analysis was performed using these two variables and their interaction as predictors, and the Dramatize category of IPA¹ as criterion.

¹For a statistical reason the variable 'group size' was recoded -1 for groups with four participants and 1 for groups of eight participants. For the same reason, the Need for Closure composite score was standardized. The interaction between those two variables is the result of the simple product of the variables.

Table 2. Results of the multiple regression for Study 2 ($N = 96$)

Predictors	Beta	<i>t</i>	Sig.
Need for closure	-0.22	-2.03	0.04
Group size	-0.13	-1.23	0.22
NFC \times group size	-0.09	-0.90	0.37

Results showed that only need for closure significantly and negatively predicted creative acts, with a standardized regression coefficient of -0.22 ($t = -2.03, p < 0.05$) (cf. Table 2). This means that subjects high in the need for closure tended to show fewer creative acts than those low on the need for closure. Neither group size nor the interaction between group size and need for closure were significant predictors.

Discussion

The results of this study provided further empirical support for the claim that in a group interaction setting individuals with higher level of need for closure emitted fewer creative acts. Moreover, results from the regression model pointed out that need for closure affected the percentage of creative acts expressed by each participant, controlling for group size.

Considered collectively, Studies 1 and 2 demonstrated the effect of need for closure on the creativity of group interactions. However, thus far we have not included in our studies measures of creative *performance*, whereas other investigations on group creativity employed diverse measures of creativity, including ideational fluidity (i.e. the number of expressed ideas), creativity of the groups' outcomes (e.g. creativity/quality of products, solutions, ideas, decisions), or an overall evaluation of groups in terms of creativity (for a review see Chirumbolo, manuscript under editorial review). Therefore, the following study was designed to evaluate the effect of need for closure on the creativity of the group defined in terms of *ideational fluidity* expressed in group interaction. In addition, as noted earlier, there are reasons to suppose that the effect of the need for closure on group creativity is mediated by conformity pressures. Thus, another purpose of our third study was to test for such a mediation.

STUDY 3

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 ($SD = 2.25$), and they were divided into 21 groups of four persons each. Eleven groups consisted of individuals characterized as low in need for closure, and 10 groups consisted of individuals characterized as high in the need for closure.

Procedure and instruments

In a mass testing conducted one to two months prior to the present study, participants completed the Italian version of the need for closure scale by Webster and Kruglanski

(1994; Pierro et al., 1995). Based on an overall need for closure score, participants in the lower tercile of the distribution (classified as low on need for closure) and those in the upper tercile (high on need for closure) were contacted by phone and asked to volunteer for a study of group interaction.

Upon arrival, participants were greeted by the experimenter and accompanied to the laboratory. The experimenter then presented them with instructions designed to introduce and explain the group task. The task asked participants to role-play members of a team in an advertising company engaged in creating slogans to advertise a particular 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 experienced a fast and important growth, although increasing competition among advertising companies had slowed down this tendency in the last two years. Therefore, the forthcoming advertising campaign was presented as extremely important for the company and its future. The product to be advertised was an ultra-modern lamp manufactured in Japan able to reproduce the sunlight in 12 000 different gradations of colours. 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.

The group task was divided into two parts: the first part consisted of 15 minutes of individual work where participants went through the materials and attempted to come up with their own slogans. The second part consisted of 45 minutes of group interaction, in the course of which participants discussed their individual slogans, created new ones, and selected four final slogans. At the end of the experiment, all participants were thanked and debriefed. All group interactions were audio as well as video taped.

Measures

Need for Closure scale. Participants completed the Italian version of the Need for Cognitive Closure scale (see Study 2; Pierro et al., 1995). In the present sample, the overall reliability of the scale was a Cronbach α of 0.86. The average group score on the Need for Closure scale was treated as the independent variable.

Conformity pressure. Conformity pressure was measured by the evaluation of an independent observer who coded the video-taped material. This independent observer was blind to the aim of the research and to the composition of the groups in terms of the Need for Closure of its members. The contributions of each group member were ranked on four items measuring the tendency to conform to group choices and procedures, and the tendency to be affected by group norms and ideas. The four items were (i) 'She conforms to the group choices'; (ii) 'She is affected by group norms'; (iii) 'She is affected by the solution and the ideas proposed by the group'; (iv) 'She proposes alternative procedures' (reversed item). The observer ranked these behaviours according to a scale ranging from 'Never' (1) to 'Always' (5). A principal component analysis performed on these items yielded a one factor solution that explained 67.2% of the variance with factor loadings ranging from 0.73 to 0.87. The reliability of the scale was $\alpha = 0.83$.

Creativity. Creativity was operationalized as ideational fluency during group discussion and was evaluated by the same independent observer who coded the conformity pressures. Thus, the behaviour of each group member was ranked on three items measuring the actual production of new ideas during the group discussion. These items were (i) 'She proposes new and alternative slogans'; (ii) 'She develops new slogans upon others' ideas'; (iii) 'She

produces many ideas/slogans'. The observer ranked these behaviours on a scale ranging from (1) never to (5) always. A principal component analysis performed on these items yielded a one factor solution that explained 90.7% of the variance with factor loadings ranging from 0.93 to 0.96. The reliability of the scale was $\alpha = 0.95$.

Results

In order to test the hypothesis of this study, a mediational analysis was conducted. According to Baron and Kenny (1986), in order to prove mediation, β coefficients of three regression equations must be estimated and compared: (i) first, the mediator should be predicted by the independent variable; (ii) second, the dependent variable should be predicted by the mediator and by the independent variable; (iii) last, the regression of dependent variable on the independent variable should become non-significant when controlling for the mediator. If everything goes in the predicted direction, then a mediation holds when, controlling for the mediator, the independent variable no longer predicts the dependent variable. As in the previous two studies, we first checked for the appropriate unit of analysis using the intraclass correlation (IC) (Kenny et al., 2002). This index resulted in a significant IC = 0.69 ($p < 0.05$). Therefore, data analysis was conducted using the group as the appropriate unit of analysis.

The regression equations outlined above were estimated to test whether the effect of *need for closure* on *group creativity* was mediated by *conformity pressure*. In the first equation, *need for closure* significantly predicted the proposed mediator, *conformity pressure* ($\beta = 0.56$; $t = 2.95$, $p < 0.01$). In the second equation, the effect of *need for closure* on *creativity* was also significant, and it was negative ($\beta = -0.56$; $t = -3.22$, $p < 0.01$). After controlling for the mediator *conformity pressure* in the last equation, the effect of *need for closure* on *creativity* was reduced to non-significance, $\beta = -0.28$ ($t = -1.49$, n.s.), while the effect of *conformity pressure* significantly predicted *creativity* ($\beta = -0.56$; $t = -2.99$, $p < 0.01$).

Discussion

This study showed that groups composed of individuals with higher (versus lower) dispositional need for closure tended to be less creative and to be more sensitive to group norms. In fact, members of high (versus low) need for closure groups were more likely to be affected by the other members' choices and solutions, and by the group norms.

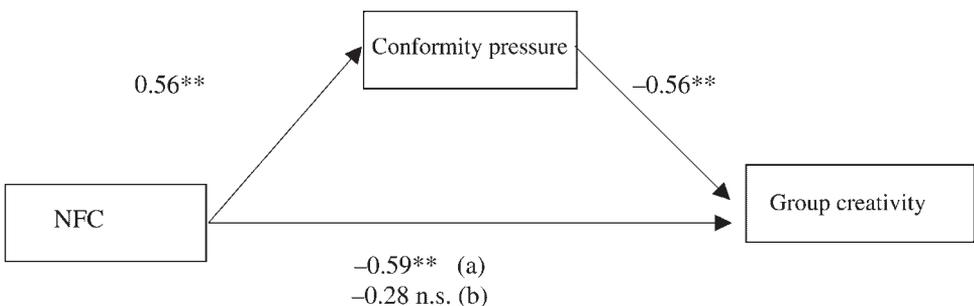


Figure 2. Conformity pressure as a mediator of need for closure effects on group creativity. Values are β coefficients. (a) β coefficient without conformity pressure. (b) β coefficient after controlling for conformity pressure. ** $p < 0.01$.

Moreover, members of low (versus high) need for closure groups produced a higher number of different and novel solutions that stimulated and inspired other members' ideas.

The tendency to conform and to quickly reach group consensus typically occurs in groups under high need for closure, promoting a premature close of the epistemic process (De Grada et al., 1999; Kruglanski et al., 1993). Previous studies have demonstrated that high (versus low) need for closure groups were less (versus more) productive and their outcomes were rated as less (versus more) creative (Chirumbolo et al., manuscript submitted for publication). In the present study, it was shown for the first time that conformity pressures, in groups with members higher on need for closure, mediates the negative effect of need for closure on group creativity.

GENERAL DISCUSSION

Overall, the evidence presented in this paper confirms the idea that the dynamics of motivated social cognition may lie behind a number of important group phenomena (Levine, Resnick, & Higgins, 1993; Kruglanski, 1996). Within the framework of Kruglanski's Lay Epistemic Theory (Kruglanski, 1989), the present studies investigated the relationship between need for cognitive closure and creativity in small groups. Group creativity was studied as a function of a number of personal and social factors, such as individual differences in divergent thinking, heterogeneity, and diversity of group composition, motivation, groupthink, social influence, social comparison, time pressure, and so on (for a review see Chirumbolo, manuscript under editorial review; Diehl & Stroebe, 1994; Paulus & Nijstad, 2003; Paulus et al., 2002). The present research demonstrated that the motivation to prematurely close the epistemic process, namely the need for closure, had a negative effect on creativity in group interactions.

In particular, Study 1 examined the relationship between time pressure and creativity of interactive acts. The percentage of creative acts performed in control groups (with no time pressure) remained substantially the same throughout the entire discussion. In contrast, in the experimental groups the percentage of creative acts dramatically dropped after the introduction of time pressure. This result confirms that time pressure has a negative effect on creativity in group interaction. This effect might be related to the fact that need for closure increases task-oriented acts in group discussion, as shown in a previous study (De Grada et al., 1999), and to maintain a narrow focus on the task as conventionally defined. In order to show that this situational effect is peculiar to the need for closure, the second study employed a dispositional measure of need for closure using the Italian version of the Need for Closure scale (Pierro et al., 1995). This study replicated the negative effect of need for closure, showing that participants with higher dispositional need for closure performed a smaller number of creative acts during group interaction. Moreover, this effect was obtained independently of group size. Finally, the third study showed that the negative effect of need for closure on creativity can be attributed to conformity pressure observed in groups composed of high (versus low) need for closure members.

These findings may have important implications for group training, team management, and personnel selection within organizational contexts. Since most of the innovative work is developed in groups and teams, group effects of the need for closure should be taken into account by managers and group leaders in order to maximize the creative performance of the groups involved. Moreover, need for closure can be considered as a relevant construct

to differentiate people who vary in information processing skills and in their propensity to facilitate the creative process in groups to which they may belong.

REFERENCES

- Bales, R. F. (1970). *Personality and interpersonal behavior*. New York: Holt, Rinehart and Winston.
- Baron, R., & Kenny, D. (1986). The moderator–mediator variable distinction in social–psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*, 1173–1182.
- Chirumbolo, A. (2003). La creatività nei gruppi [Creativity in groups]. Manuscript under editorial review.
- Chirumbolo, A., Mannetti, L., Pierro, A., Areni, A., & Kruglanski, A. W. (2003). Motivated closed mindedness and creativity in small groups. Manuscript submitted for publication.
- De Grada, E., Kruglanski, A. W., Mannetti, L., & Pierro, A. (1999). Motivated cognition and group interaction: Need for closure affects the contents and the processes of collective negotiations. *Journal of Experimental Social Psychology*, *35*, 346–365.
- De Grada, E., Kruglanski, A. W., Mannetti, L., Pierro, A., & Webster, D. (1996). Un'analisi strutturale comparativa delle versioni USA e Italiana della scala di 'Bisogno di Chiusura Cognitiva' di Webster e Kruglanski [A comparative structural analysis of the US and Italian versions of the Need for Cognitive Closure scale]. *Testing, Psicomtria, Metodologia*, *3*, 5–18.
- De Grada, E., Mannetti, L., & Pierro, A. (1997). Motivazioni epistemiche e struttura delle relazioni interpersonali in piccoli gruppi [Epistemic motivations and the structure of interpersonal relations in small groups]. *Giornale Italiano di Psicologia*, *3*, 523–552.
- Deutsch, M., & Gerard, H. (1955). A Study of Normative and Informational Social Influences upon Individual Judgment. *Journal of Abnormal and Social Psychology*, *51*, 629–636.
- Diehl, M., & Stroebe, W. (1994). Why groups are less effective than their members: On productivity loss in idea generating groups. In W. Stroebe, & M. Hewstone (Eds.), *European review of social psychology* (Vol. 5, pp. 271–303). Chichester: Wiley.
- Guildford, J. P. (1950). Creativity. *American Psychologist*, *5*, 444–454.
- Kaplan, M. P. (1987). The influencing process in group decision making. In C. Hendrich (Ed.), *Group processes: Review of personality and social psychology* (Vol. 8, pp. 189–212). Thousand Oaks, CA: Sage.
- Kaplan, M. P., & Wilke, H. (2001). Cognitive and social motivation in group decision making. In J. P. Forgas, & K. D. Williams (Eds.), *The social mind: Cognitive and motivational aspects of interpersonal behavior* (pp. 406–428). New York: Cambridge University Press.
- Karau, S. J., & Kelly, J. R. (1992). The effects of time scarcity and time abundance on group performance and interaction. *Journal of Experimental Social Psychology*, *28*, 542–571.
- Kelly, J. R., Jackson, J., & Huston-Comeaux, S. (1997). The effects of time pressure and task differences on influence modes and accuracy in decision-making groups. *Personality and Social Psychology Bulletin*, *23*, 10–22.
- Kelly, J. R., & Karau, S. J. (1993). Entrainment of creativity in small groups. *Small Group Research*, *24*, 179–198.
- Kelly, J. R., & McGrath, J. E. (1985). Effects of time limits and task types on task performance and interaction of four-person groups. *Journal of Personality and Social Psychology*, *49*, 395–407.
- Kenny, D. A., & Judd, C. M. (1986). Consequences of violating the independence assumption in analysis of variance. *Psychological Bulletin*, *99*, 422–431.
- Kenny, D. A., Kashy, D. A., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology* (pp. 233–265). New York: McGraw-Hill.
- Kenny, D. A., Mannetti, L., Pierro, A., Livi, S., & Kashy, D. A. (2002). Statistical analysis of data from small group. *Journal of Personality and Social Psychology*, *83*, 126–137.

- Kruglanski, A. W. (1989). *Lay epistemic and human knowledge: Cognitive and motivational bases*. New York: Plenum.
- Kruglanski, A. W. (1996). Motivated gatekeeper of our minds: Need for closure effects on interpersonal phenomena. In E. T. Higgins, & R. M. Sorrentino (Eds.), *The handbook of motivation and cognition* (Vol. 3, pp. 465–496). New York: Guilford Press.
- Kruglanski, A. W., & Freund, T. (1983). The freezing and un-freezing of lay inferences: Effects on impression primacy, ethnic stereotyping and numerical anchoring. *Journal of Experimental Social Psychology*, *19*, 448–468.
- Kruglanski, A. W., & Webster, D. (1991). Group members' reactions to opinion deviates and conformists at varying degrees of proximity to decision deadline and of environmental noise. *Journal of Personality and Social Psychology*, *61*, 212–225.
- Kruglanski, A. W., & Webster, D. (1996). Motivated closing of the mind: Seizing and freezing. *Psychological Review*, *103*, 263–283.
- Kruglanski, A. W., Webster, D., & Klem, A. (1993). Motivated resistance and openness to persuasion in the presence or absence of prior information. *Journal of Personality and Social Psychology*, *65*, 861–876.
- Levine, J. M., Resnick, L., & Higgins, E. T. (1993). Social cognition in groups. *Annual Review of Psychology*, *44*, 585–612.
- Mannetti, L., & Pierro, A. (1998). Le tecniche di raccolta dei dati [Techniques of data collection]. In L. Mannetti (Ed.), *Strategie di ricerca in psicologia sociale [Research strategies in social psychology]* (pp. 49–105). Rome: Carocci Editore.
- Mannetti, L., Pierro, A., Kruglanski, A. W., Taris, T., & Bezinovic, P. (2002). A cross cultural study of the need for cognitive closure scale: Comparing its structure in Croatia, Italy, USA and The Netherlands. *British Journal of Social Psychology*, *41*, 139–156.
- Mayseless, O., & Kruglanski, A. W. (1987). What makes you so sure? Effects of epistemic motivations on judgmental confidence. *Organizational Behavior and Human Decision Process*, *39*, 162–183.
- McGrath, J. E. (1991). Time, interaction and performance (TIP). A theory of groups. *Small Group Research*, *22*, 147–174.
- McGrath, M. E., & Kelly, J. R. (1986). *Time and human interaction: Toward a social psychology of time*. New York: Guilford.
- Milliken, J. F., Bartel, C. A., & Kurtzberg, T. R. (2003). Diversity and creativity in work groups: A dynamic perspective on the affective and cognitive processes that link diversity and performance. In P. B. Paulus, & B. A. Nijstad (Eds.), *Group creativity. Innovation through collaboration* (pp. 32–62). New York: Oxford University Press.
- Nemeth, C. (1995). Dissent as driving cognition, attitudes, and judgments. *Social Cognition*, *13*, 273–291.
- Nemeth, C., & Nemeth-Brown, B. (2003). Better than individuals? The potential benefit of dissent and diversity for group creativity. In P. B. Paulus, & B. A. Nijstad (Eds.), *Group creativity. Innovation through collaboration* (pp. 63–84). New York: Oxford University Press.
- Nijstad, B. A., & Paulus, P. B. (2003). Group creativity: Common themes and future directions. In P. B. Paulus, & B. A. Nijstad (Eds.), *Group creativity. Innovation through collaboration* (pp. 326–339). New York: Oxford University Press.
- Paulus, P. B. (1998). Developing consensus about groupthink after all these years. *Organizational Behavior and Human Decision Processes*, *73*, 362–374.
- Paulus, P. B., Leggett Dugosh, K., Dzindolet, M. T., Coskun, H., & Putman, V. L. (2002). Social and cognitive influences in group brainstorming: Predicting production gains and losses. In W. Stroebe, & M. Hewstone (Eds.), *European review of social psychology* (Vol. 12, pp. 299–325). Chichester: Wiley.
- Paulus, P. B., & Nijstad, B. A. (Eds.). (2003). *Group creativity. Innovation through collaboration*. New York: Oxford University Press.
- Pierro, A., & Livi, S. (2001). Tecniche di osservazione sistematica dei processi di gruppo: Attendibilità e validità della *Interaction Process Analysis* (IPA) e della *Systematic Multiple Level Observation of Groups* (SYMLOG) [Techniques of systematic observation of group processes: Reliability and validity of IPA and SYMLOG]. *Psychofenia*, *6*, 79–100.
- Pierro, A., Mannetti, L., Converso, D., Tarsia, V., Maglietta, A., Ravenna, M., & Rubini, M. (1995). Caratteristiche strutturali della versione italiana della scala di bisogno di chiusura cognitiva

- (di Webster e Kruglanski) [Structural characteristics of the Italian version of the Need for Cognitive Closure scale]. *Testing, Psicometria, Metodologia*, 2, 125–142.
- Pierro, A., Mannetti, L., De Grada, E., Livi, S., & Kruglanski, A. W. (2003). Autocracy bias in informal groups under Need for Closure. *Personality and Social Psychology Bulletin*, 29, 405–417.
- Rocchi, P. (1998). Il bisogno di chiusura cognitiva e la creatività [The need for cognitive closure and creativity]. *Giornale Italiano di Psicologia*, 25, 153–190.
- Rosenthal, R. (1987). *Judgment studies: Design, analysis, and meta-analysis*. Cambridge: Cambridge University Press.
- Shah, J. Y., Kruglanski, A. W., & Thompson, E. P. (1998). Membership has its (epistemic) rewards: Need for Closure effects on in-group bias. *Journal of Personality and Social Psychology*, 75, 383–393.
- Van Dyne, L., & Saavedra, R. (1996). A naturalistic minority influence experiment: Effects on divergent thinking, conflict and originality in work-groups. *British Journal of Social Psychology*, 35, 151–167.
- Webster, D., & Kruglanski, A. W. (1994). Individual differences in Need for Cognitive Closure. *Journal of Personality and Social Psychology*, 67(6), 1049–1062.
- Webster, D., & Kruglanski, A. W. (1998). Cognitive and social consequences of the Need for Cognitive Closure. In W. Stroebe, & M. Hewstone (Eds.), *European review of social psychology* (Vol. 8, pp. 133–173). Chichester: Wiley.
- Webster, D., Richter, L., & Kruglanski, A. W. (1996). On leaping to conclusions when feeling tired: Mental fatigue effects on impressionary primacy. *Journal of Experimental Social Psychology*, 32, 181–195.

Copyright of European Journal of Personality is the property of John Wiley & Sons Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.

Copyright of European Journal of Personality is the property of John Wiley & Sons, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.