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# Social Influence in Computer-Mediated Communication: The Effects of Anonymity on Group Behavior

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*Two studies examined hypotheses derived from a Social Identity model of Deindividuation Effects (SIDE) as applied to social influence in computer-mediated communication (CMC) in groups. This model predicts that anonymity can increase social influence if a common group identity is salient. In a first study, group members were primed with a certain type of social behavior (efficiency vs. prosocial norms). Consistent with the model, anonymous groups displayed prime-consistent behavior in their task solutions, whereas identifiable groups did not. This suggests that the primed norm took root in anonymous groups to a greater extent than in identifiable groups. A second study replicated this effect and showed that nonprimed group members conformed to the behavior of primed members, but only when anonymous, suggesting that the primed norm was socially transmitted within the group. Implications for social influence in small groups are discussed.*

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**T**his article is concerned with processes of social influence in groups communicating by means of computers. A common feature of communication via e-mail and the Internet is the relative anonymity of contact with others, especially in initial interactions. In two studies, we investigate the effect of visual anonymity on social influence in computer-mediated communication (CMC). In the process, we address basic issues of general concern to social psychology and examine the effects of this increasingly popular communication medium. Deriving predictions from the Social Identity model of Deindividuation Effects (SIDE) (Reicher, Spears, & Postmes, 1995), we try to show in the first study that anonymity can enhance the influence of a primed norm. The second study investigates evidence for the transmission of this norm

in the interaction between group members who are anonymous.

Although most group theories do not explicitly rule out the possibility of social influence when group members are unknown to each other or do not physically interact, many of these theories would expect social influence to increase as a function of the intensity of social contact. For example, the theory of “normative influence” (Deutsch & Gerard, 1955) argues that group influence depends on social pressure from others and that this pressure can best be exercised when group members are identifiable, under surveillance, and thus accountable to the group for their responses. Social impact theory (Latané, 1981) extends the theory of normative influence and suggests that social influence will increase with the “immediacy” of its members (their proximity in space or time). Short, Williams, and Christie (1976) refer to a closely related concept of “social presence.” Identifiability, as opposed to anonymity, would be expected to enhance immediacy and social presence and thus facilitate social influence. Similarly, theories of social influence based on interpersonal attraction (Lott & Lott, 1965) or interdependence

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(Lewin, 1948/1997) of group members suggest that face-to-face interaction should strengthen the interpersonal bonds that transmit social influence, whereas isolation and anonymity should weaken them. In summary, in all of these cases, the anonymity of group members might be expected, either explicitly or implicitly, to weaken social influence by and within the group.

However, consideration of other theories of the group in social psychology suggests that anonymity might not necessarily undermine social influence. Allport (1985) proposed that social psychology was not just concerned with the effect of the “real presence” of others on behavior but also with the effects of their “imagined or implied presence.” Classic research on the influence of “reference groups” also showed that we can be influenced by social groups or categories that might not necessarily be present in situ and to which we might not even belong (French & Raven, 1959; Hyman, 1942).

More recently, self-categorization theory (Turner, 1987, 1991) has proposed a group-based theory of social influence (originally called “referent informational influence”) that does not relate influence to the identifiability or surveillance of group members. Rather, social influence is an internal and willing process stemming from a social definition of the self and social validation of one’s views in relation to the group (Turner, 1987, 1991). In these terms, social influence is in the first instance cognitively mediated by one’s self-categorization as a group member, rather than by processes involving social contact per se. However, this does not mean that social influence is just a “cognitive” matter; the strength of group self-categorization is closely bound up with the affective and emotional significance attached to this social self-definition, as measured by constructs such as group identification. Self-categorization theory indicates that social influence should generally increase as a function of group identification or of variables that increase it. Although the indicators of group identification can be individually measured, it is not conceptualized as a fixed individual difference variable: It should increase with factors that facilitate a shift in self-definition from the personal to the group level of self-categorization (Turner, 1987).

Although self-categorization theory does not suggest that anonymity in the group should weaken social influence, it does not explicitly state that it should strengthen it, either. In fact, it has been argued by some self-categorization researchers that the very copresence of others can render the group unit salient and thus increase group identification and social influence (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990). As elaborated further below, this article examines the opposite; namely, that anonymity can enhance identification with the group and thereby enhance social influ-

ence. We now address a framework that attempts further specification of the effects of anonymity within the group.

*The SIDE model.* The SIDE model (Reicher, Spears, & Postmes, 1995) builds on self-categorization theory and tries to extend it to provide a more detailed analysis of the effects of situational factors such as anonymity on social influence processes. The SIDE model acknowledges that under certain conditions identifiability can increase accountability and influence behavior. However, this generally concerns compliance to the norms of powerful outgroups to avoid behavior that would otherwise be sanctioned, rather than referring to true influence in the sense of private acceptance (Reicher et al., 1995; Turner, 1991). More generally, in terms of the power of the ingroup to exert true influence, the SIDE model proposes that when a social identity is already salient (i.e., when people define themselves as members of a group rather than as individuals), visual anonymity can actually enhance group salience and its related effects (group identification). Following self-categorization theory, this should then lead to enhanced social influence in line with group norms (Turner, 1987, 1991).

It is argued that visual anonymity obscures personal features and interpersonal differences and thereby diminishes the relative importance of interpersonal concerns in favor of a focus on the known or emergent characteristics of the group as a whole. Provided a common identity is available, anonymity thus increases the salience of group identity and group identification, thereby enhancing the group’s influence. In sum, according to the SIDE model, anonymity should accentuate the effects of the salient social identity and the dominant normative response associated with it (Reicher et al., 1995). One of the main aims of the present research is to investigate whether anonymity can actually enhance group influence in CMC, as predicted by the SIDE model, or whether identifiability enhances influence as suggested by the classical theories of group influence referred to earlier.

It is important to distinguish the SIDE model from deindividuation theory (e.g., Diener, 1980; Zimbardo, 1969). “Classical” deindividuation theory (e.g., Zimbardo, 1969) is most relevant here because, like the SIDE model, it is concerned with the effects of anonymity within the group. It proposes that immersion and anonymity in the group can lead to reduced self-awareness (a state of deindividuation), which results in antinormative behavior. With regard to social influence, deindividuation caused by anonymity would therefore imply reduced self-awareness and reduced influence of social norms and standards. The contemporary version of deindividuation theory (Prentice-Dunn & Rogers, 1989) has moved away from anonymity as the basis for a

deindividuated state and considers deindividuation to be the product of reduced private self-awareness brought about by arousal coupled with immersion in the group. However, in common with the classical theory based on anonymity, this theory also views the deindividuated state as one of reduced self-regulation resulting in unresponsiveness to social norms and standards, leading to antinormative behavior (see Postmes & Spears, 1998).

Unlike the SIDE model, deindividuation theories would therefore seem to predict that anonymity either fosters unresponsiveness to social identities and their associated norms, or behavior that is generally antinormative, or both. The SIDE model was developed as an attempt to provide an alternative (normative) account of the diverse “deindividuation” effects found in the literature. A recent meta-analysis of the deindividuation literature indicates that there is far stronger support for this SIDE analysis, which proposes that anonymity in the group enhances conformity to group norms, than for either classical or contemporary deindividuation theory’s predictions (Postmes & Spears, 1998). The present studies are not intended as direct tests of deindividuation theories versus the SIDE model; however, they may help to shed some light on the deindividuation effects investigated in this literature.

*CMC and deindividuation.* If we now turn to the literature on social influence in CMC we find that theory and research has tended to endorse the interdependence/surveillance conceptualization of the group. The growth of CMC and other forms of mediated communication has raised researchers’ concerns with the relative anonymity of CMC and more recently of the Internet as a whole because it would decrease the “social presence” (Short et al., 1976) or reduce “social cues” (Kiesler, Siegel, & McGuire, 1984; Rutter, 1984) conveyed in interaction. Consistent with deindividuation theory, this reduction of social information is seen as producing negative outcomes: It reduces self-awareness, decreases attraction to the group, stimulates antinormative behavior, and decreases social influence (cf. McLeod, Baron, Marti, & Yoon, 1997). CMC also tends to be viewed as an impersonal medium that, in the terminology of Bales (1950), facilitates task-oriented exchanges as opposed to socioemotional interaction (Daft & Lengel, 1984).

Against this general trend, theorists have more recently proposed that CMC groups are ultimately no less prone to the operation of group-based normative principles than are face-to-face groups (e.g., McKenna & Bargh, 1998; Spears & Lea, 1992). As we have seen, the SIDE model proposes that certain features of CMC, such as relative anonymity, can actually intensify social influence (see Postmes, Spears, & Lea, 1998, for a review). With regard to CMC, the prediction that anonymity can

enhance normative behavior has been investigated in intragroup (e.g., Spears, Lea, & Lee, 1990) and intergroup settings (e.g., Postmes, Spears, & Lea, 1999), as well as indirectly in a meta-analysis (Postmes & Spears, 1998). However, none of these studies have investigated the actual social influence process. Moreover, none of these studies provides a direct experimental manipulation of the central theoretical variable of group norm. With these shortcomings in mind, we set out providing a more direct test of the SIDE model.

For many groups, the norms may be obvious and explicit to group members. This is less often the case for ephemeral groups or collectives such as crowds that meet on an ad hoc basis (Reicher, 1987). The lack of clearly specified norms also might characterize many computerized groups, because the formation of these groups is not always embedded in a predefined social structure. When norms are unknown, groups have to rely on the inductive construction of social norms (Postmes, Spears, & Cihangir, 2001; Postmes, Spears, & Lea, 2000). By this inductive process, we mean that norms are inferred from the common behavior or predominant attributes of typical members (Reicher, 1987; Turner, 1982), somewhat similar to Sherif’s (1935) classic study of norm formation using the autokinetic effect. In practical terms, this feature of computerized groups provides a context in which we can attempt to manipulate norms without having to rely on preexisting group attitudes.

Manipulations of group norms are not easy to achieve in small groups. Mostly, social norms are manipulated by providing group members with (false) feedback concerning the predominant mode of behavior in their group (e.g., Spears et al., 1990). A problem with this kind of feedback manipulation is that demand characteristics may be too apparent and may even evoke reactance or contrast effects (Postmes et al., in press). A more desirable manipulation of group norms would therefore be less obtrusive. If the manipulated behavior were already evident in the in vivo group, members could infer a group norm. One way of achieving this is to use confederates. However, using confederates poses a threat to the ecological validity of group processes. A more elegant approach is to activate behavioral responses in participants by means of preconscious priming manipulations.

The effects of priming on judgment tasks (Srull & Wyer, 1979) and on behavioral measures (Bargh, Chen, & Burrows, 1996) are well-known. For example, Bargh et al. (1996) primed participants with the trait “politeness” and observed that participants were subsequently much more reluctant to interrupt another person than those primed with “rudeness.” Although it is not entirely clear what process is responsible for the effect of primes on behavior, it seems that priming behavioral dimensions can trigger similar behavior. Although effects of such

primes have not yet been demonstrated in the context of small group behavior, if behavior is triggered by a prime in members of the group, a behavioral group norm could be induced by those same members. In the following study, we prime contrasting norms to assess whether group-based CMC is sensitive to variation in the content of the norms induced and whether this is accentuated under conditions of anonymity rather than identifiability.

#### STUDY 1

The purpose of Study 1 is to demonstrate that anonymity can increase the influence of group norms in discussion via CMC. This is achieved by manipulating anonymity and the group norm. Anonymity is manipulated by either individually identifying participants to each other during interaction by means of pictures of each group member displayed on the computer screens. The manipulation of group norms is achieved indirectly by priming participants in a prior, seemingly unrelated, task with instances of two contrasting social norms (stressing either efficiency or prosocial behavior) by means of a scrambled-sentences test (Srull & Wyer, 1979; see below). We assume that participants will induce a group norm from the behavior in the group (cf. Sherif, 1935).

Predictions based on the SIDE model are that the manipulated behaviors will assume normative qualities, particularly in anonymous groups. It is assumed that these norms will embed themselves in the group over the course of the interaction. The expression of an efficiency-oriented or prosocial norm is expected to be reflected by the content of the interaction. Moreover, efficiency-oriented groups are predicted to prefer more business-like "rational" alternatives, whereas prosocially primed groups prefer more socially considerate choices. Once again, these effects are expected to be strongest for anonymous groups.

#### Method

*Participants.* Seventy-five undergraduates, 41 women and 34 men, participated for course credits. Participants were randomly divided into 21 groups of three (9 groups) or four (12 groups). One person did not fill in the questionnaires as instructed and was omitted from the analysis of the questionnaire data. Two groups were run in each session.

*Procedure.* After entering the laboratory, participants were placed in a cubicle isolated from the other participants, where they remained during the whole study. Participants therefore were generally unaware who else participated in the study. Participants were told that the study combined a number of unrelated experiments in

one session. In the identifiable condition, a digitized picture was taken of participants. When all members of the two groups that were run simultaneously were present, instructions were given to commence the scrambled-sentence task. After 10 minutes, the computer signaled with a beep that participants should stop the scrambled-sentence test immediately and proceed to the next task. This was a computer task designed to enhance group cohesiveness and was necessary to ensure that the group developed a common group identity and that this identity was salient throughout the study (see Spears et al., 1990). Participants were allocated to groups identified as Group A or Group B. It was clear to participants that the two groups were present in the laboratory simultaneously, although there was no direct interaction between groups. An intergroup context enhances the salience of group identity (Spears et al., 1990; Turner, 1987). In the task, participants were required to estimate the number of black squares on the screen amid a number of white and gray squares. Participants had to maximize the score of their group, and they got feedback about group choices but not about individual scores. The feedback was manipulated such that groups converged in the final judgments. Previous research indicated that this task enhances self-categorization in terms of the group identity (Doosje, Spears, & Koomen, 1995). Implicit in this test was the competition for the highest group score with the other group, further designed to ensure a degree of identification with the group.

Participants then proceeded to the next task, a group discussion, and were instructed to discuss solutions to a dilemma for 15 minutes via a computer-conferencing system. Groups were not required to reach any decision or consensus. Groups discussed the following scenario:

Problems have arisen in a medium-size hospital. Through an increase in the number of patients, the hospital has problems providing adequate care to all patients in time. The management of the hospital wants to solve the problem by increasing the efficiency in the organization. . . . The doctors and nurses want to secure patient welfare and prevent patients' being treated as numbers. . . . Discuss possible solutions to this problem with your group.

The scenario was kept ambiguous so that there was no one "correct" solution. A prosocial approach to the solution emphasized the importance of patients' feelings, personal contact, quality of treatment, and a patient-centered approach. An efficiency-oriented approach to solutions stressed the importance of the hospital's task, efficiency, costs, speed of work, and a rational approach in general. These suggested approaches were later used in counting elements of the discussion, as described below. After 15 minutes of discussion, participants filled



out a questionnaire and were debriefed about the purpose of the study.

*Apparatus.* Groups communicated via a synchronous computer-conferencing system on Macintosh computers. The system allowed users to send messages within one group by entering text into a small window at the bottom of their screen. After pressing the *return* button, the message was sent to all other members of their group within 0.4 seconds. Each message appeared on the screens of the group in a large scrollable discussion window, in order of sending. Each message was identified with its sender's user name, consisting of a letter, A or B, and a number, 1 through 4. The letter signified the group in which participants were placed and the digit was an individual identifier; thus, the computer software provided a tool to have group discussions that resemble, as it were, transcripts of a face-to-face discussion.

*Manipulations.* Norms were manipulated with a scrambled-sentence task to prime certain kinds of behavior. Scrambled sentences were presented as being selected from conversations of fellow students to ensure relevance of the prime to the group setting. The tasks consisted of 37 scrambled sentences, 7 of which were neutrally phrased. The remaining 30 sentences contained prosocial traits or verbs (e.g., warm, social, sentimental; to help, support, and sympathize) or efficiency-oriented traits or verbs (e.g., efficient, rational; to solve, work, and measure). These words were embedded in sentences that would describe prosocial or efficiency-oriented behaviors or people when placed in correct order. For example, the stimulus sentence, "The efficiently work is in office the remarkably done" is correctly unscrambled by forming the sentence, "The work in the office is done remarkably efficiently." An example of a prosocial priming sentence would be, "Group members support each other all the way." Participants were given 10 minutes to unscramble as many sentences as possible. On average, participants unscrambled 23 sentences. The reason to impose a time constraint was that it has been suggested that unfinished tasks have a stronger priming effect than tasks that are completed (Martin, 1986). The anonymity manipulation was achieved by presenting identifiable participants with pictures of the group members (including themselves) at the top of their screen during discussion. Each picture was identified with the user name. In the anonymous condition, no pictures were shown.

*Dependent variables.* The questionnaire consisted of 7-point rating scales (1 = *not at all*, 7 = *very much*). An anonymity check on the effectiveness of the anonymity manipulation consisted of a two-item scale ( $\alpha = .71$ ); for example, "The people we interacted with were personally identifiable to me." Social identification was

measured with three questions ( $\alpha = .85$ ); for example, "At this moment I identify with group [A or B]." Checks were made of participants' private self-awareness using a two-item scale suggested by Matheson and Zanna (1990); for example, "I was aware of the way my mind worked" ( $\alpha = .78$ ). The reason to include this scale was to check whether the anonymity manipulation would decrease self-awareness, as suggested by deindividuation theory (Diener, 1980).

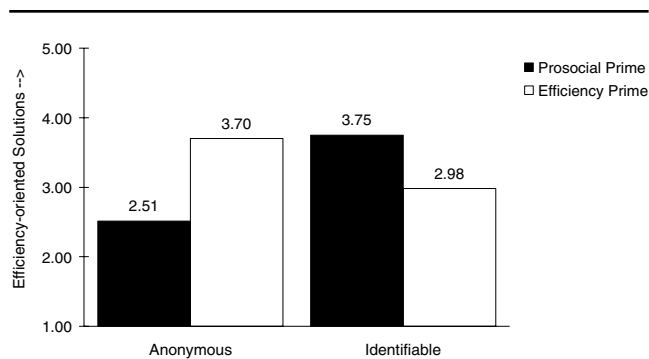
An open-ended question asked participants to indicate what, in their own opinion, would be the best solution to the problem. The answers to this question were coded by two independent raters, blind to treatment conditions, on a 5-point scale from 1 (*a completely efficiency-oriented solution*) (e.g., efficiency increases, management improvements) to 5 (*a completely prosocial solution*) (e.g., focused on patient care). The raters achieved good reliability (intraclass  $r = .87$ ) and resolved the inconsistencies in their judgments. The final question asked participants to indicate whether they thought some parts of the experiment were related to each other and, if so, why.

The content of the discussions was analyzed using a computer program counting the occurrences of words in the text. The number of words and sentences were counted. Counts were made of the number of prosocial relevant words (feeling, personal, treatment, patient, and social) and the number of efficiency-oriented words (task, efficient, costs, quick, and rational). These words were drawn from the scenario text. The number of self-references were counted as an additional self-awareness measure (Davis & Brock, 1975).

## Results

*Questionnaire data.* None of the participants saw a relation between the scrambled-sentence test and the discussion, which confirms that the prime was unobtrusive. Questionnaire data were analyzed at the group level in a 2 (anonymity)  $\times$  2 (prime) between-groups analysis of variance. The manipulation check showed that the anonymity manipulation worked well. Groups in the anonymous condition indicated that their group was more anonymous to them ( $M = 4.04$ ,  $SD = 1.00$ ) compared with identifiable groups ( $M = 3.19$ ,  $SD = 0.69$ ),  $F(1, 17) = 4.87$ ,  $p < .05$ . (Because analyses conducted at the group level decrease the power of these tests, significant effects reveal substantial effect sizes; in this case,  $\eta^2 = .22$ , which corresponds to an  $r$  of .47.) The main effect of prime and the interaction were not significant.

The individual solutions were rated by coders such that higher numbers indicate more perceived efficiency content in the solutions. A 2  $\times$  2 ANOVA showed no reliable main effects, and the predicted interaction was significant,  $F(1, 17) = 11.93$ ,  $p < .01$ . As can be seen in Figure 1, anonymous groups favored solutions that were consis-



**Figure 1** Solutions proposed after discussion, Study 1.

tent with the prime they had received. Anonymous prosocial primed groups suggested more prosocial solutions ( $M = 2.51$ ,  $SD = 0.28$ ) and efficiency-primed groups favored more efficiency-oriented solutions ( $M = 3.70$ ,  $SD = 0.89$ ). Simple effects indicated this was a significant difference,  $F(1, 17) = 9.59$ ,  $p < .01$ . Identifiable groups did not differ significantly. In the identifiable condition, there was a tendency for prosocial-primed groups to favor more efficiency-oriented solutions ( $M = 3.75$ ,  $SD = 0.71$ ) compared with efficiency-primed groups ( $M = 2.98$ ,  $SD = 0.65$ ),  $F(1, 17) = 3.08$ ,  $p < .10$ .

The identification scale did not show the predicted main effect of anonymity,  $F(1, 17) = 2.65$ ,  $p = .12$ , *ns*, although the means differed in the predicted direction ( $M_{\text{anonymous}} = 3.69$ ,  $SD = .58$ ;  $M_{\text{identifiable}} = 3.27$ ,  $SD = 0.68$ ). No other effects were reliable. Also, no significant effects were found on the private self-awareness scale. Most important, anonymity did not reliably affect private self-awareness,  $F(1, 17) = 0.13$ , *ns*.

*Discussion content.* Counts of units of text typed during the discussion were converted to group averages. No significant differences were found across conditions for the number of words, sentences, or characters typed by the groups.<sup>1</sup> No reliable differences were found for the number of self-references, either: Similar to the private-self awareness scale, there was no effect of anonymity on the number of self-references,  $F(1, 17) = 0.63$ , *ns*.

The number of prosocial and efficiency-oriented words used during discussion is displayed in Figure 2. A MANOVA across these two measures indicated that no main effects were reliable, but the Anonymity  $\times$  Priming interaction was significant,  $F(2, 16) = 7.73$ ,  $p < .01$ .<sup>2</sup> Inspection of the univariate effects for efficiency-oriented and prosocial words separately indicated that both interactions were significant:  $F(1, 17) = 7.83$ ,  $p < .02$ , for efficiency-oriented words (Figure 2a) and  $F(1, 17) = 4.90$ ,  $p < .05$ , for prosocial words (Figure 2b). The simple effect for efficiency-oriented groups showed a trend in the pre-

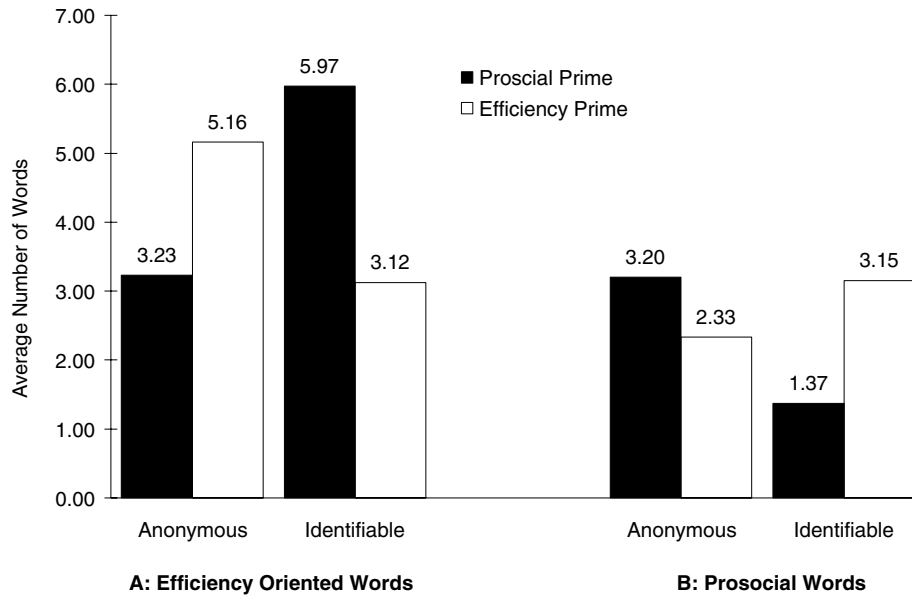
dicted direction: Anonymous groups used more efficiency-oriented words ( $M = 5.16$ ,  $SD = 2.80$ ) compared with identifiable groups ( $M = 3.12$ ,  $SD = 0.92$ ),  $F(1, 17) = 2.73$ ,  $p = .12$ . In prosocial-primed groups, anonymous groups produced more prosocial words ( $M = 3.20$ ,  $SD = 1.65$ ) compared with identifiable groups ( $M = 1.37$ ,  $SD = 1.12$ ),  $F(1, 17) = 4.70$ ,  $p < .05$ .

### Discussion

This study set out to demonstrate that anonymity in a group can promote normative behavior. Results indicate that anonymous group members conform to the standards set by a prime, whereas identifiable group members do not. This effect occurs foremost in the solutions to the problem: These were consistent with the prime only in anonymous groups. This finding is corroborated by the analysis of the use of words during the discussion. The fact that the solutions were given after discussion and in private suggests that public conformity to the perceived norm is not a likely explanation for these findings.<sup>3</sup> Public conformity is an even less likely explanation for these effects because conformity is generally stronger in groups whose members are identifiable.

The finding of increased compliance in anonymous groups is at odds with the suggestions made by classical deindividuation theory (e.g., Zimbardo, 1969). The present results show no evidence that anonymity has any impact on participants' self-awareness, as is predicted by deindividuation theory. It seems unlikely, therefore, that anonymity in these computer-mediated groups induced a state of psychological deindividuation. Although deindividuation theorists have noted the mixed effects produced by anonymity in the group (e.g., Diener, 1980), a suitable explanation for this variability was never found. The SIDE model does offer an alternative explanation, suggesting that anonymity may obscure individual inputs and thereby enhance the salience of the collective and of its norms (Postmes & Spears, 1998). Indeed, the result that social influence was stronger in anonymous groups would seem to support this view. However, identification with the group was not reliably enhanced by anonymity in the group. This failure could be due to a lack of power: Analyses are generally less powerful at the group level than at the individual level. In addition, the failure to find reliable identification effects may be due to suboptimal operationalization. Questions referred to identification "at this moment." This phrasing is problematic to the extent that what is relevant for the conformity to group norms is identification with the group during the discussion. The follow-up study examines this explanation.

Study 1 suggests that greater behavioral conformity to the primed norm can be found in the anonymous group,



**Figure 2** Number of efficiency-oriented and prosocial words by condition corrected for the total number of words per group, Study 1.

but there is no conclusive evidence that active social influence causes the Anonymity  $\times$  Priming interaction. The design of this priming study does not allow us to rule out that influence is a purely intraindividual process derived from the primed norm and that this process does not involve communication between group members. Study 2 is designed to establish that the effect of primed behavior under conditions of anonymity is indeed caused by social influence in the sense that it involves the social transmission of (mutual) influence between individuals. This would allow for more definite inference of social influence as responsible for the increase in primed behavior in anonymous groups.

The method chosen to investigate this question was to prime only two out of four group members with an efficiency prime and the two other group members with a neutral prime. No prosocial primes were used in Study 2 because we had already established the generality of the effect across priming norms in Study 1. The follow-up's main purpose was to investigate whether neutrally primed participants would, over time, come to display similar behavior to participants who were primed with efficiency. Thus, groups consisted of an efficiency-primed and a neutrally primed subgroup. If the alternative interpretation suggested above is true, then the efficiency prime would have an effect on the efficiency-primed subgroup only, not on the neutrally primed subgroups. However, if social transmission of the norm occurs within groups, then neutral subgroups and primed subgroups should, over time, conform in the anonymous condition. Hence, our explanation of effects in Study 1

would be supported if no systematic differences exist between neutrally primed subgroups and efficiency-oriented subgroups. Rather, anonymous groups as a whole are predicted to display more efficiency-oriented behavior compared with identifiable groups. In addition, neutrally primed subgroups should become more efficiency oriented over time in the anonymous condition but not in the identifiable condition.

Another question of interest is whether participants perceive their group to be more or less efficiency oriented in the predicted direction. Although such conscious awareness need not necessarily exist for conformity to a group norm, the SIDE model's predictions would be supported if participants could identify the group atmosphere correctly. Moreover, if participants generalize the efficiency orientedness of group members to a characteristic feature of the group in other contexts (i.e., if they perceive a group norm), this would be a direct indication that norm formation has taken place (Postmes et al., in press). Thus, Study 2 includes measures of the group atmosphere and group norm. Study 2 also controls for the potential effect of taking pictures of identifiable participants by taking pictures of anonymous participants as well. This is to ensure that the factor anonymity is limited to the discussion phase, when it is hypothesized to have its impact, and rules out the possibility that taking photos could itself account for differences between conditions. Study 2 reexamines the proposed mediating role of group identification by asking participants for their retrospective identification with the group during the discussion.

## STUDY 2

*Method*

*Participants and procedure.* After dropping two groups from the analysis who did not discuss the topic, 64 participants, 45 women and 19 men, who were divided across 16 groups of 4, participated in return for course credit. The procedure was similar to the previous study, with the exception that digitized pictures were taken of all participants. Participants entered the cubicle, performed the scrambled-sentence task (an efficiency or neutral prime), performed the ostensibly unrelated group task, and discussed the topic via CMC. After discussion, participants filled out a questionnaire and were debriefed about the purpose of the study.

*Manipulations.* As in Study 1, a scrambled-sentence test was used as a prime. In each group, two out of four members were given efficiency primes (the efficiency subgroup), and two members were given neutral primes (the neutral subgroup). The efficiency prime was identical to Study 1. The neutral prime resembled the efficiency prime in number of words and complexity but did not contain prosocial or efficiency-oriented stimuli. The anonymity manipulation was identical to Study 1.

*Dependent variables.* The questionnaire consisted of 9-point rating scales (1 = *not at all*, 9 = *very much*). The anonymity check was identical to that used in Study 1. Identification was measured with the same three questions as in Study 1, but these questions were rephrased to ask for the degree of retrospective identification during the discussion: "I identified with the group during the discussion" ( $\alpha = .86$ ). Participants were asked to indicate their opinion of the degree of efficiency orientedness of the group atmosphere with two items ( $\alpha = .77$ ): "Our group discussed rationally" and "I think the people in this group were sensitive to each other" (recoded). In addition, a measure was added of the perceived group norm with two items ( $\alpha = .69$ ): "I have the impression this group is generally business-like" and "The people in this group usually make rational choices." As in Study 1, an open-ended question asked participants to indicate what would be the best solution to the problem, and responses were coded (intraclass  $r = .79$ ). The content of the discussions was analyzed similar to Study 1. In addition, we computed the increase (or decrease) of the number of efficiency words over time. This was operationalized as a standardized regression coefficient that was computed for each individual's use of a certain efficiency word during the discussion. For each contribution to the discussion (ranging from one to the total number of contributions made by this individual), we counted the number of times that this word occurred (a

figure that could range from zero to the number of words in a contribution, in practice either zero or one). The word count was then regressed on the statement number, which renders a score ranging from  $-1$  (all efficiency-related words at the beginning of the conversation) to  $1$  (all efficiency words at the end of the conversation). These standardized regression coefficients were then averaged across the five efficiency words for each individual participant and subsequently averaged per subgroup.

*Results*

Results were analyzed at the group level. Because each group consisted of two subgroups (one efficiency primed and one neutrally primed), we had to solve the problem of dependence between measures. Analyses focused on group means and on subgroup difference scores. Group means were analyzed to test for the main effect of the anonymity manipulation. We shall refer to these as the group scores in the Results section. The subgroup difference score is calculated by subtracting the neutral subgroup mean from the efficiency subgroup mean and is an elegant way of correcting for the interdependence among subgroups. If efficiency subgroups have a higher score on a measure than neutral subgroups, this results in a positive subgroup difference score. These scores are used to establish the effect of the priming manipulation and of the Anonymity  $\times$  Prime interaction. A main effect of the priming manipulation exists if the subgroup difference score is greater or smaller than zero across conditions. There is an interaction between anonymity and priming manipulations if the subgroup difference is different for anonymous than for identifiable groups.  $t$  tests were conducted to compare group scores and subgroup difference scores.

*Questionnaire data.* The manipulation check of the anonymity manipulation had the predicted result. Group scores in the anonymous condition indicated group members were more anonymous to each other ( $M = 5.38$ ,  $SD = 0.86$ ) compared to identifiable groups ( $M = 6.34$ ,  $SD = 0.82$ ),  $t(14) = 2.41$ ,  $p < .05$ .<sup>4</sup>

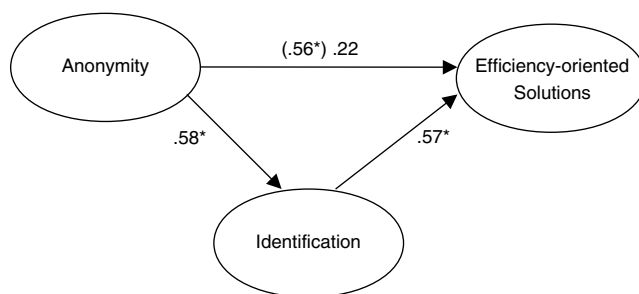
As predicted, the group atmosphere was rated to be more efficiency oriented in the anonymous condition (group score  $M = 5.94$ ,  $SD = 0.98$ ) compared with the identifiable condition ( $M = 5.10$ ,  $SD = 0.87$ ),  $t(14) = 1.79$ ,  $p < .05$ . Of importance, the subgroup difference scores were not significantly different from zero or from each other ( $M_{\text{identifiable}} = -0.25$ ,  $SD = 0.91$ ,  $M_{\text{anonymous}} = -0.04$ ,  $SD = 0.95$ ; negative scores indicate neutral subgroups perceived a more efficiency-oriented atmosphere). This indicates that efficiency subgroups and neutral subgroups did not differ among each other in their perceptions of the group norm. Thus, for both the efficiency and neutrally primed subgroups, anonymous partici-



pants perceived their groups to be more efficiency oriented than identifiable groups. The same pattern was obtained for the group norm measure. Group scores indicated that groups in the anonymous condition perceived a more efficiency-oriented group norm ( $M=5.34$ ,  $SD=0.93$ ) compared with identifiable groups ( $M=4.53$ ,  $SD=0.79$ )  $t(14) = 1.88$ ,  $p < .05$ . Subgroup differences indicated that the priming main effect and the interaction were not significant. Thus, both atmosphere and the group norm were as predicted.

With respect to the coders' ratings of individual solutions, the predicted pattern was found. Solutions in the anonymous condition were more efficiency oriented ( $M=3.43$ ,  $SD=0.72$ ) than solutions in the identifiable condition ( $M=2.56$ ,  $SD=0.66$ ),  $t(14) = 2.50$ ,  $p < .05$ . No significant effects were found for the priming manipulation or for the interaction. Also consistent with the prediction was group identification. In anonymous groups, identification was higher (group  $M=5.05$ ,  $SD=0.85$ ) compared with identifiable groups ( $M=4.11$ ,  $SD=0.53$ ),  $t(14) = 2.65$ ,  $p < .05$ . The subgroup difference scores showed no significant priming main effect or interaction effect.

*Discussion content.* With regard to the counts of the number of sentences, words, and characters, no significant differences were found. The number of self-references did not differ between anonymous ( $M=1.41$ ,  $SD=1.04$ ) and identifiable groups ( $M=1.64$ ,  $SD=0.76$ ),  $t(14) = 0.51$ , *ns*. With regard to the number of efficiency-oriented words used during discussion, and the developments over time, predictions also were confirmed. Anonymous groups used more efficiency-oriented words ( $M=6.53$ ,  $SD=3.13$ ) than did identifiable groups ( $M=3.87$ ,  $SD=2.00$ ),  $t(14) = 2.30$ ,  $p < .05$ . No significant differences were found between subgroups: Neither the priming main effect nor the interaction effect was significant. Regarding the developments over time, reliable effects were obtained for anonymity,  $t(14) = 3.77$ ,  $p < .01$ , and for the interaction between anonymity and priming condition,  $t(14) = 2.46$ ,  $p < .05$ . The development in time of the number of efficiency-oriented words differed reliably from zero in one condition: The neutrally primed subgroups in the anonymous condition showed an increase of efficiency words over time ( $M=0.20$ ,  $SD=0.12$ ),  $t(7) = 4.81$ ,  $p < .01$ . The changes over time in this subgroup condition were reliably greater than the changes over time in the other half of the group, the efficiency primed subgroups in the anonymous condition ( $M=0.06$ ,  $SD=0.12$ ),  $t(7) = 3.32$ ,  $p < .01$ . In contrast, the subgroups in the identifiable condition did not differ reliably from each other (or from zero), the changes over time in the neutrally primed subgroups ( $M=-0.05$ ,  $SD=0.09$ ) being similar to changes over time in the efficiency primed subgroups ( $M=0.00$ ,  $SD=0.12$ ),  $t(7) =$



**Figure 3** Path analysis of the predicted mediation, Study 2. \* $p < .05$ .

0.65, *ns*. Thus, both with regard to average number of efficiency words used and with regard to the changes over time, predictions were confirmed.

*Mediation.* To test the predictions of the SIDE model with respect to the mediating role of group identification, we further examined the causal links between the input variable (anonymity contrast coded such that 1 indicates anonymity and -1 indicates identifiability), the process variable (social identification), and the outcome variable (the coders' ratings of individual solutions to the dilemma). In a series of regression analyses, a path analysis—displayed in Figure 3—was conducted to establish mediation of identification (Baron & Kenny, 1986). Initial regressions established that anonymity has an impact on the solutions ( $\beta = .56$ ,  $p < .05$ ), that anonymity has a significant impact on identification ( $\beta = .58$ ,  $p < .05$ ), and that identification and solutions are reliably related ( $\beta = .70$ ,  $p < .01$ ). A fourth regression analysis showed that when solutions are the dependent measure, and anonymity and identification are entered as predictors, only the effect of identification is reliable ( $\beta = .57$ ,  $p < .05$ ), whereas the effect of anonymity is not ( $\beta = .22$ ,  $p = .35$ , *ns*). Moreover, the percentage of variance explained by the path model with only anonymity as a predictor of solutions (31%) improves reliably when identification is added as a predictor,  $r^2 = 53\%$ ,  $\Delta r^2 = .22$ ,  $F_{\text{change}}(1, 13) = 6.05$ ,  $p < .05$ . If, subsequently, anonymity is dropped from the model as a predictor, the drop in variance explained is nonsignificant,  $r^2 = 49\%$ ,  $\Delta r^2 = -.03$ ,  $F_{\text{change}}(1, 15) = 0.93$ , *ns*. This suggests that identification mediates the effect of anonymity on norm-consistent solutions.

*Discussion*

Results of this study replicate and extend the findings of Study 1 for efficiency-oriented groups. The hypothesis that anonymity in the group can facilitate social influ-

ence was supported. Anonymous groups conformed to the efficiency-oriented behavior that was primed in half of the group. Neutrally primed subgroups displayed normative behavior as well as efficiency-primed subgroups. This was evidenced by the proposed solutions after discussion and by the discussion content. Moreover, neutrally primed subgroups accommodated to the primed subgroup when they were anonymous, such that they used more efficiency words over time. In addition to these behavioral measures, and compared with identifiable participants, anonymous participants perceived a more efficiency-oriented atmosphere and inferred the existence of an efficiency-oriented social norm. Thus, the results suggest that priming led to normative behavior in groups whose members were anonymous to each other but not in groups whose members were identifiable.

The fact that there was no difference between efficiency-primed and neutrally primed group members on any of these measures (except for the changes over time) confirms the assumption that the influence is genuinely social and not an intraindividual process of picking up on previously primed behavior. Thus, the hypothesis was supported that normative processes may shape behavior in anonymous groups, despite the less direct (i.e., visible) social contact of group members with each other. Finally, Study 2 shows some support for the proposed processes underlying these findings, identification mediating the effect. It should be noted, however, that due to the correlational nature of the mediational analyses conducted, these process inferences can never be as strong as when the processes are manipulated directly. In addition, it is possible that identification mediates the effect because it is highly correlated with other variables that are the "true" mediator (group salience would be one likely candidate). Nonetheless, the path analysis fits the predictions well and suggests that anonymity increased social identification, which in turn leads to normative behavior.

#### GENERAL DISCUSSION

Two studies confirm predictions derived from the SIDE model. Anonymous groups displayed primed behavior, whereas identifiable groups did not. That this finding is due to social influence is strengthened by the finding that in anonymous groups a neutrally primed subgroup conforms to the efficiency-oriented behavior primed in fellow group members. Thus, visually anonymous groups appear to be more conducive to social influence in line with a primed group norm than identifiable groups. The underlying process proposed by the SIDE model received some support in Study 2. Results show that the effect of visual anonymity on normative behavior is mediated by identification with the group.

This suggests that visual anonymity increases group members' identification with the group during discussion, which in turn increases the social influence within the group.

These findings extend and develop the empirical base for the assumptions of the SIDE model, particularly in the context of CMC. Earlier research suggested that anonymity could enhance social influence of a group's norm when group identity is salient (Postmes & Spears, 1998; Spears et al., 1990). The current studies provide direct support for this suggestion, in particular because the group norms were manipulated experimentally in a subtle manner between conditions. Thus, we avoid possible demand characteristics, allowing us to place greater faith in the causal inferences that can be drawn about the effects of social norms in combination with anonymity. Moreover, the present study provides insight into the proposed mediating mechanisms in terms of social influence and enhanced identification with the group that take place under conditions of anonymity. Nonetheless, the correlational nature of the mediation effects suggests that further investigation of the process is required.

Further research also should attempt to provide a more refined analysis of anonymity, both in terms of the dimension and degrees of anonymity and in terms of anonymity of others to oneself versus identifiability of oneself to others. As we indicated in the introduction, the SIDE model proposes that the perceived anonymity of group members to oneself is the critical factor predicted to affect group salience, identification, and ingroup influence. Identifiability to others, however, can influence strategic behavior, especially where one feels accountable to a group (Reicher et al., 1995). This route to behavioral influence cannot explain the social influence effects in the present study because it predicts greater "influence" under conditions of identifiability. However, research separating out these aspects of anonymity is an important next step.

These findings cannot be reconciled easily with classical deindividuation theory, or with theoretical approaches to CMC, which are based on deindividuation theory. As indicated earlier, decreased self-awareness is the primary mechanism proposed to be responsible for decreasing attention to social norms and standards according to both theories. However, no evidence was found that anonymity reduces self-awareness and, moreover, anonymous groups evidenced more social influence, not less. Nevertheless, it is important to note that the type of social influence documented in this study does not correspond to the type of social norms implicated in deindividuation theory or those that have been central to CMC theorizing. As outlined by Diener (1980), deindividuation theory postulates transgression of general societal norms as a result of anonymity. These

studies examined local group norms that do not necessarily correspond to those broader societal norms. The present results therefore imply that our understanding of anonymity's effects in groups and collectives (whether in real life or on the Internet) might benefit from distinguishing local and societal norms and making more apparent when each will exert its influence (Postmes & Spears, 1998; Reicher et al., 1995). In sum, the results are more consistent with predictions of the SIDE model than with predictions of deindividuation theory or approaches derived from it and applied to CMC.

We can also make a fundamental point with regard to social influence on the basis of this research. The implication of the findings is that factors such as copresence, interdependence, and identifiability are unlikely to be the only or even the primary factors that determine the influence of the group on its members (cf. Deutsch & Gerard, 1955; Latané, 1981). This is because most influence was found in those groups where these factors could not have played a role for the simple reason that members were anonymous. In contrast, groups whose members were identifiable displayed less influence. The results suggest that social influence at the group level originates not merely from the interpersonal relations within the group but that social influence is also grounded in the relation of group members to the group as a whole, such that greater identification with the group fosters greater social influence.<sup>5</sup> Our results therefore support a "cognitive" redefinition of the group (Turner, 1982).

However, our results also make clear that the group is not just a mere cognitive concept in that social interaction is required for social influence to occur. Interaction and communication between individuals serves to establish and strengthen a local group norm (Haslam, 1997). In this sense, the group is both cognitive and social at the same time. We argue that social norms can be induced from social interaction and that identification with the group is a prerequisite for such norm construction to occur. Furthermore, assuming some level of identification with the group, anonymity can further enhance the salience of the group, and the power of its norms, by making sure that individuals do not get in its way (by either deflecting from its norms or by undermining the group level of categorization). Paradoxically, reducing the presence of the individuals within the group may actually serve to accentuate the presence of the group within the individual.

#### NOTES

1. The counts of units of text reported are corrected for the number of words typed per group to minimize variance. Reported effects are similar for both corrected and uncorrected counts. The correction consisted of division of counts by the number of words and multiplication by 120, the average number of words overall.

2. Although the overall number of efficiency-oriented words appeared larger than the number of socioemotional words, not too much value can be attached to this finding because the normal occurrence of these words is probably not equal.

3. Codings of the solutions proposed during the interaction (i.e., in public) show the exact same pattern of results as the private responses afterward. These are not reported because of the redundancy of the effects.

4. Due to the directional nature of the predictions, one-tailed tests are reported.

5. It is important to note that our procedures were designed to provide a salient group identity. According to the Social Identity model of Deindividuation Effects (SIDE) model, this is required for such a process to occur. Not making the common group identity salient may lead to different anonymity effects (Postmes, Spears, & Lea, 1998; Spears, Lea, & Lee, 1990; Spears & Lea, 1992).

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