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Anonymity effects in computer-mediated communication in the case of minority influence

Félix Moral-Toranzo *, Jesús Canto-Ortiz, Luis Gómez-Jacinto

Departamento de Psicología Social, Facultad de Psicología, Universidad de Málaga, Campus Universitario de Teatinos Málaga 29071, Spain

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Abstract

In an experimental study, we analyzed in-group minority social influence within the context of computer-mediated communication (CMC) based on the perspective of the social identity model of deindividuation effects (SIDE). This model hypothesizes that in a group context, in which social identity is salient, anonymity will facilitate influence among the group members. Using a software application, we simulated the creation of a virtual group and the setting of a computer-mediated communication. The interaction between the members of the group centers on the issue of North African immigration. The results show that the influence of an in-group minority (radical pro-immigration) causes changes of opinion, as demonstrated in the two groups participating in the experimental test (anonymous and identifiable users). However, the differences in such changes between the identifiable and the anonymous groups are not statistically significant, whereas for two dependent variables from the opinion questionnaire, (i.e., "strong" anti-immigration and pro-immigration), they are significant when these two groups are compared to the control group. Therefore, the postulates of the SIDE model are only partially confirmed. We offer some explanations for the results obtained, and outline different aspects involved in the process of social influence via CMC.

Keywords: Anonymity; Communication; Social influences; Social identity

* Corresponding author. Tel.: +34 952133215; fax: +34 952131100.
E-mail address: fmoral@uma.es (F. Moral-Toranzo).

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1. Introduction

The Internet is an increasingly ubiquitous technology. One of its main applications is computer-mediated communication (CMC). This new mode of communication is characterized by features such as: the anonymity of the user, the absence of non-verbal communication, physical separation, and temporal flexibility (McKenna & Bargh, 2000; Moral, 2001a, 2001b). In this study, we analyze the influence of an in-group minority during CMC. This study is set within the framework of the social identity model of deindividuation effects (SIDE) (Reicher, Spears, & Postmes, 1995), and the results show effects of influence on both the anonymous and the identifiable group. However, the effects are greater in the former as predicted by the model.

Among the theories aiming at explaining the development of relationships, we can highlight the following: the media richness theory (Trevino, Daft, & Lengel, 1990); the Social Presence Theory (Short, Williams, & Christie, 1976); the Cuelessness model of Rutter (1987); the Reduced Social Cues model (Sproull & Kiesler, 1986); the ''Normative Influence'' (Deutsch & Gerard, 1955), and other group theories based on interpersonal attraction (Lott & Lott, 1974). Such theories claim that when participants interacting do not know each other, they have fewer channels and codes available for relating. This would make CMC a more impersonal interaction. In addition, the lack of physical interaction and anonymity would translate into a lower degree of influence over the other participants. Therefore, the potential social influence on a CMC group would be weaker than in a face-to-face interaction (McLeod, Baron, Marti, & Yoon, 1997).

Similarly, traditional theories of Deindividuation – both classical (Diener, 1980; Festinger, Pepitone, & Newcomb, 1952; Zimbardo, 1969) and contemporary (Prentice-Dunn & Rogers, 1982, 1989) – claim that factors such as anonymity, group situation, reduction of private self-awareness, and overstimulation could lead people to behave in less inhibited and antinormative ways (Postmes & Spears, 1998). In the same line, initial research comparing CMC and face-to-face communication (Kiesler, Siegel, & McGuire, 1984; Siegel, Dubrovsky, Kiesler, & McGuire, 1986) showed that ''flaming'' and other antisocial interactions were more common in electronic interactions.

However, other theories within social psychology have questioned whether anonymity in the group really involves a decrease in normative behavior (Postmes & Spears, 1998; Reicher, 1984a, 1984b; Reicher et al., 1995). These theories also question whether the presence of such factors (anonymity and a group situation) in CMC cause disinhibited and antinormative behaviors that would diminish the capacity for social influence (Lea, Spears, & De Groot, 2001; Postmes, 1997; Postmes, Spears, & Lea, 1998; Postmes, Spears, Sakhel, & De Groot, 2001; Spears, Lea, & Lee, 1990; Spears, Postmes, Martin, & Watt, 2001).

On the other hand, other works report that flaming behaviors are rare in CMC and always dependent on very specific contexts (Lea, O'Shea, Fung, & Spears, 1992). Some of these works point out that the lack of proximity or of visual information of the participants in CMC is not a problem for social interaction as they are eventually compensated for (Walther, 1992, 1996; Walther & Burgoon, 1992). In more specific terms, the meta-analysis of social and antisocial communication of Walther, Anderson, and Park (1994) asserts that in CMC situations with no restrictions on interactions, there is a greater level of socio-emotional communication and much less antisocial communication, with results very similar to those present in face-to-face communication.

2. The SIDE model

The social identity model of deindividuation effects (SIDE) (Reicher et al., 1995), is presented as an alternative (normative) account of the deindividuation phenomena. This model explains deindividuation effects as the result of specific group norms in crowd situations. Its postulates have been applied to the sphere of CMC. The SIDE model suggests that when social identity is salient – that is, when people define themselves as group members rather than as individuals – the anonymity of the members would decrease attention regarding interpersonal differences and enhance the salience of the group and social identity. Such situations would result in a greater adherence to group norms and greater group influence. However, this model also points out that when personal identity is salient, anonymity would not promote normative responses, but rather it would encourage personal and individual responses (Reicher et al., 1995; Spears & Lea, 1992, 1994).

The SIDE model is based on the Social Identity Theory (Tafjel, 1978, 1982) and the self-categorization theory (Turner, 1987). The Social Identity Theory holds that the self is defined both by personal and social identities. Social identity represents the different groups or categories a person can belong to or identify with. Thus, a person tends to behave in accordance with the salient social identity adopted in a given instance.

Turner (1987) expanded the Social Identity Theory into the Self-categorization Theory. In this new view, the actions of the self are categorized into three inclusive and hierarchical categories(human, social, and personal). These actions are placed in an interpersonal-intergroup spectrum, representing the two extremes of a person's behavior. For example, if social identity is salient, there would be a greater predominance of in-group and out-group aspects (i.e., less differentiation from in-group members and greater differentiation from out-group members). The shift from the personal categorization of self to social categorization is called depersonalization of the self. However, this shift does not involve a loss of individual identity or the development of unconscious or out-of-control behavior, as some more traditional theories attribute to the process of deindividuation. The depersonalization process should be understood as "self-stereotyping". This means that people see themselves as exchangeable representatives of a social identity and not as individuals different from others. The Self-categorization Theory hints at the stereotyping of self as the explanatory basis of social influence processes (Onorato & Turner, 1996, 1997; Spears, Doosje, & Ellemers, 1997; Turner, 1991). David and Turner (2001, p. 295) express it in this way: "...that people expect to agree with others that they categorize as similar to themselves in relevant respects... ('If we are the same and are judging the same thing, then we ought to agree'), and expect to disagree with people they categorize as different from themselves in relevant respects...".

Social influence originates from the need people have to agree with those sharing the same social identity and psychological in-group. Turner (1982) calls this process referent informational influence and it accounts for individuals adopting behavior and opinions derived from the stereotyped norms characteristics of the social identity they belong to. From this perspective, social influence is a process cognitively mediated by the self-categorization of self as a group member (Turner, 1987, 1991). Based on these postulates it is asserted that the source (whether a minority or a majority of the group) will influence the group as a whole as long as this source is categorized as in-group (Abrams & Hogg, 1990; David & Turner, 1996, 1999, 2001). These postulates contradict those formulated by other theories, such as the Conversion Theory of Moscovici (1980) or the Conflict

Elaboration Theory (Pérez & Mugny, 1993). Such theories assert that social influence is the result of socio-cognitive conflicts and discrepancies between the source and the target interacting with each other.

Before the development of the SIDE model, several research works studying deindividuation reported results compatible with this model. The work of Reicher (1984a) on the "St Paul's riots" showed that participants (members of the crowd) behaved as members of a given social identity and not as individuals. Later, Reicher (1984b) demonstrated in an experimental study that participants with a strong group identity or deindividuation conformed more to group norms than those who adhered to their individual identity. Finally, we have to mention the work of Spears et al. (1990) who investigated social influence processes in CMC. Basically, they studied the effects of polarization. Using an experimental test, the salient identity and deindividuation of the participants were manipulated. Their results demonstrated greater polarization (in the sense of group norms) during the conditions of salient social identity and anonymity.

When the SIDE model was formulated, the concepts of anonymity and group situation were applied to the sphere of new information and communication technologies, in particular to some Internet services such as chats, e-mails, newsgroups, etc., where social interaction and communication are the key elements. This has led to great interest in investigating the validity of the SIDE model in CMC; that is, whether the anonymity and group identity of users would give rise to a greater compliance with normative behavior. The most outstanding theoretical study supporting the principles of this model is the meta-analysis on deindividuation and antinormative behavior carried out by Postmes and Spears (1998). These authors reviewed 60 independent studies analyzing deindividuation. These analyses focused on two main aspects: the effects of certain input variables (anonymity and size of the group) on deindividuation, and reviewing those variables able to have a direct effect on deindividuation (such as self-awareness). The results did not support any of the classical or contemporary theories on deindividuation. When individuals within the group were deindividuated there was a greater compliance to the norms of a given situation. These results are coherent with the SIDE model's postulates.

3. Social influence in CMC

Among the most recent empirical work validating the SIDE model, we can highlight the work of Postmes et al. (2001) who investigated social influence in CMC. Two studies were carried out. The first one was a 2X2 experimental study that manipulated anonymity and group norms. Anonymity was manipulated by showing or omitting the photograph of the participant on the computer screen (identifiable or anonymous participation, respectively). The manipulation of group norms was achieved indirectly by priming participants towards efficiency-oriented or pro-social behaviors. The results show that after an online debate, the primed norm had a greater influence on the anonymous group than on the identifiable group. In the second study, only the efficiency-oriented norm was manipulated, having half of the group efficiency primed and the other half neutrally primed. Their results show that there were a greater number of responses with the primed norm in the anonymous group than in the identifiable group. Postmes et al. (2001) concluded that the interaction conveys and preserves the group norm and that anonymity favors social influence. The

results of Postmes et al. support the idea that the group is "cognitive" (i.e., identification with the group is a requirement for building the norm) and "social" (i.e., norms are induced in social interactions). Thus, Postmes et al. (2001, p. 1253) assert that "Paradoxically, reducing the presence of the individuals within the group may actually serve to accentuate the presence of the group within the individual".

The first works on the influence of in-group minorities were carried out by Faucheaux and Moscovici (1967). Our work examines the influence of in-group minorities within CMC using the theoretical framework of the SIDE model which is an innovative line of research regarding the application of this model. In order to carry out such research and validate the SIDE model's predictions, the following conditions have to be fulfilled: (a) group members have to define themselves as belonging to such a group and as sharing the same categorization (i.e., social identity is salient). This would give rise to a process of depersonalization or self-stereotyping (Turner, 1982, 1987); (b) there must be anonymity among the group members. This will enhance the focus on the group and will reinforce even more group salience as well as group-related effects arising from group identification and group influence (Postmes et al., 2001; Reicher et al., 1995); (c) the influence must be in-group influence. Social influence is determined by the idea that in-group members have the need to agree on a given situation (David & Turner, 1996, 1999, 2001).

To this end, we chose a sample of participants with the same categorization (a mild attitude in favor of immigration). The participants were distributed into three groups: anonymous, identifiable, and control group. The anonymous and identifiable groups were involved in a CMC situation where the supposedly six members of the group (i.e., the subject and five simulated people) interacted. In each group two members represent the minority source (radically pro-immigrant). Once the experimental test in CMC concluded, the effects of the minority were analyzed.

4. Purpose of the study

The main purpose of this study was to find out whether the influence of a minority would have effects on the group, and whether the changes observed would be greater in the anonymous group than in the identifiable one, as the SIDE model predicts. In addition, we aimed at finding out whether the influence observed in both groups (identifiable and anonymous) were significantly different from a third control group which did not undergo the test (i.e., this group was not exposed to the source of influence).

The test manipulates the identifiability of the group participants and minority influence. The level of identifiability was manipulated by showing – on the screen – the first name and photograph of the participant (identifiable group) or only the name (anonymous group). In-group minority influence was manipulated via two of the six group members. This minority argued for the most radical views during the debate.

In such a setting the SIDE model predicts that: the most radical opinions of the two minority group members will have an influence on the rest of the group who will shift their view towards the minority view. The influence of the minority will be stronger in the anonymous group, since anonymity will make more salient the social identity of the group. On the other hand, the changes in the control group will be negligible or nil, since they have not been exposed to the influence of the minority.

5. Method

5.1. Participants

A total of 77 participants (60 females and 17 males) with a moderate pro-immigration attitude regarding the issue of North African immigration in Spain were selected. The selection was made using a pretest questionnaire (attitude towards North African immigration). The participants were then randomly distributed into the three experimental groups: identifiable group (26 subjects), anonymous group (26 subjects), and control group (25 subjects).

5.2. Procedure

Before carrying out the experimental test, all participants were asked to provide a photograph of themselves and were informed that they would participate in an online exchange session with other university students from different departments of Malaga University.

The test was carried out in a computer room with PC computers and it lasted around 45 min. The test itself was split into three consecutive stages: introductory stage, group identity stage, and in-group minority influence stage.

Introductory stage: the first screen-shots simulate the creation of and connection to a virtual group through the Malaga University intranet. The group theoretically has six members: the experimental participant and the other five supposed participants (''virtual accomplices''). In the identifiable group, the names and photographs of the six members appeared on the screen, whereas in the anonymous setting only the names of the participants appeared.

The second stage, group identity, is mainly aimed at ensuring that social identity is salient. In order to achieve this, the experimental group members were called from the beginning ''group A'', to convey the idea that other groups were participating in test (Spears et al., 1990). Participants were told that all the members of the group shared the same social identity (i.e., they all were in favor of North African immigration). In addition, they (the in-group) were told that this social identity was the one most common among Malaga University students (90%). However, they were also told that there was a small group of students (more than 9%) belonging to the anti-North African immigration category (the out-group). The introduction of the inter-group context was aimed at increasing the salience of the in-group identity (David & Turner, 1996, 1999; Spears et al., 1990; Turner, 1987). At the end of this stage, and to ensure participants gained a positive group identity, group members did a test called a ''group perceptive speed and performance test''. They were presented with a set of geometrical figures that had to be counted and matched by the whole group. At the end of the test the computer program displayed excellent group scores, thus highlighting the cooperation levels of the group. The design of this test is original, but the idea, objectives, and development were based on similar tests designed for the experimental studies of Doosje, Spears, and Koomen (1995) and Postmes et al. (2001).

The third stage involved the in-group minority influence. Its goal was to expose participants to a source of minority influence within the group. From this point onwards, participants were presented on their screens with statements or assertions referring to North African immigration upon which group members had to comment and give their opinion.

The replies from all the group members were shown on screen at the same time. The response given by the experimental subject always appeared in the fourth place. The first and second place always corresponded to the radical minority. The rest of participants (3rd, 5th and 6th place), gave moderate views on the issue. Except for the response of the experimental participant (4th place), the other responses had been previously recorded. The process of presenting assertions to which they responded was repeated consecutively several times.

Once the experimental test was concluded, participants filled in a questionnaire about North African immigration (post test), which included the same items as the pretest questionnaire.

5.3. Apparatus

The experimental test was done using a CMC simulator called PISCO (Programa Informático de Simulación de la Comunicación mediada por Ordenador) (Moral & Moral, 1999). This software was specifically designed for this research and stored the responses given by the experimental subjects during the test. In this way, it was possible to analyze the content of such replies.

5.4. Manipulations

The main manipulation was done regarding the actual simulation of a virtual group in a CMC setting. The objective was to make each experimental participant believe that the other five participants (virtual accomplices) were ''real participants''. The responses of these five ''virtual'' participants – the 1st, 2nd (radical minority pro-immigration), 3th, 5th and 6th (moderate pro-immigrantion) – had been previously recorded and were shown in the different stages of the test.

Manipulation of identifiability was carried out in the following way: on the left side of the screen, ordered from top to bottom, the first name and photograph of the six group members appeared in the identifiable group. In the anonymous setting, the photographs were discarded and only the name of the participants appeared on the screen.

5.5. Experimental design

This empirical research had a factorial design (3×2).

5.5.1. Independent variables

There were two *independent variables*: an intergroup variable (*identifiability*), with three different values (identifiable, anonymous, and control); and an intragroup (*minority influence*) with two values (absence of influence – Pretest – and presence of influence – Postest).

5.5.2. Dependent variables

There are nine dependent variables grouped into three blocks.

The first block refers to *modality Level* and is made up of four dependent variables. These variables are obtained from the questionnaire regarding attitudes toward North African immigration (i.e., Pretest and Postest). The questionnaire consists of 28 items, with a Likert-like scale providing five alternative answers. Option 1 expresses full disagreement and Option 5 full agreement.

The items of the questionnaire were grouped according to the degree of rejection or acceptance towards the statements expressed regarding North African immigration. Thus, in this modality there were four categories or dependent variables.

- Variable Level (−1) *or anti-North African immigration*, with a scale of nine items ($\alpha = 0.77$), for example : "I don't agree with blending cultures; we must preserve our own national identity."
- Variable Level (+1) *or "light" anti-North African immigration*, with six items ($\alpha = 0.22$), for example: "I don't mind having an immigrant citizen from a North African country as my neighbor."
- Variable Level (+2) *or "moderate" pro-North African immigration*, with seven items ($\alpha = 0.68$), for example: "I wouldn't mind having an immigrant citizen from a North African country as a friend."
- Variable Level (+3) *or "highly" pro-North African immigration* with six items ($\alpha = 0.73$), for example: "The blending and exchange between the North African and the Spanish cultures and their people is always positive and an enriching experience."The second block consists of one dependent variable:
- Variable *comparison of opinions*. Here, the answers from the experimental participant (given as written text) were analyzed and compared to those of the radical minority. In this way, we can check the evolution of the participant's opinion, and thus determine if he/she is shifting closer to or further from the source of influence. The degree of similarity was quantified by two external and trained judges using a 1–5 value scale. Value 1 denoted little similarity between both texts and value 5 great similarity.

The third block comprised four dependent variables which analyzed other factors involved in the experimental test and participants' perceptions. These are:

- Variable *perceived anonymity*. This variable was measured according to Postmes et al.'s scale (2001) consisting of two items and used in a similar experimental study.
- Variable *group identification*. This variable aims at finding out whether the participant identifies herself/himself positively with the group she/he is supposed to belong to. A scale made of three items and adapted from the one used by Postmes et al. was used (2001).
- Variable *private self-awareness*. To measure this we used a scale made of two items and used in previous research (Postmes et al., 2001; Prentice-Dunn & Rogers, 1982). The so-called Contemporary Deindividuation Theory (Prentice-Dunn & Rogers, 1982, 1989) asserts that private self-awareness decreases in situations of group cohesion and physiological excitement. This decrease makes people move their focus of attention away from themselves and their own behavior. This reduction of private self-awareness is ultimately responsible for antinormative and disinhibited behavior in anonymity and crowd situations.
- The last variable from this block is *credibility*. This variable aims at measuring the degree of simulation and "experimental realism" achieved by the test. By means of an open response, the participant is asked to comment on the test and/or the other members of the group. The content of such answers was analyzed by two judges previously trained for the task. The answers were scored according to a 1–10 scale, corresponding to minimum and maximum credibility of the test, respectively.

The three first variables of this third block were also measured according to a 1–10 scale, where 1 represented "none" and 10 "fully".

6. Results

A repeated measurements MANOVA was applied to the three blocks of dependent variables. In addition, an a posteriori comparison statistical analysis (*Scheffé test*) was carried out for the dependent variable block, modality Level. The purpose of this test was to find out the nature of differential effects of minority influence on the three experimental conditions.

As shown in Table 1, the mean values of the Postest increase in all dependent variables (Levels $-1, +1, +2$, and $+3$).

The MANOVA for the four dependent variables of the modality Level yielded the following results:

In the intergroup variable (Identifiability), the comparison of the three experimental groups is statistically significant for the variable Level $(+2)$ $F(2,74) = 9.19$, $p < 0.001$ and for level $(+3)$ $F(2,74) = 4.92$, $p < 0.01$. Similarly, the differences in the intragroup variable (Minority influence) were significant for the four dependent variables of the modality Level: variable Level (-1) $F(1,74) = 32.75$, $p < 0.001$; variable Level $(+1)$ $F(1,74) = 3.50$, $p = 0.065$; variable level $(+2)$ $F(1,74) = 31.21$, $p < 0.001$, and in variable level $(+3)$ $F(1,74) = 78.63$, $p < 0.001$. On the other hand, the interaction between the independent variables (Identifiability and Minority influence) is significant for the variable Level (-1) ($F(2,74) = 6.55$, $p = 0.002$), and variable level $(+3)$ $F(2,74) = 5.82$, $p < 0.005$.

In order to specify the sign of such interactions, the *Scheffé* multiple comparison test was performed. This revealed significant differences in two dependent variables: in variable Level (-1) between the control and the identified groups ($p < 0.005$), and between the control and the anonymous group ($p = 0.052$). And in variable Level $(+3)$ between the control and the identifiable group ($p < 0.05$).

The second block is made up by the variable *comparison of opinions*. Fig. 1 shows the results of comparing the texts reflecting the opinion of the experimental participant and of the in-group minority. In the graph we can see that the values of the means (from the first to the last one) increases except for the 2nd score, whose value declines.

The ANOVA for this variable shows that the differences for the intergroup variable (Identifiability) are not statistically significant. It should be noted that the variable identifiability in this dependent variable is only analyzed between the groups carrying out the experimental test (the identifiable and the anonymous group).

Table 1
Means (and standard deviations) for the modality level

Dependent variable	Group					
	Identifiable		Anonymous		Control	
	Absence MI	Presence MI	Absence MI	Presence MI	Pretest	Postest
Level (-1)	3.37 (0.52)	3.89 (0.49)	3.35 (0.52)	3.73 (0.62)	3.48 (0.34)	3.52 (0.52)
Level $(+1)$	3.28 (0.51)	3.57 (0.55)	2.96 (0.57)	3.51 (0.45)	3.09 (0.42)	3.28 (0.45)
Level $(+2)$	3.80 (0.36)	4.14 (0.38)	3.60 (0.36)	4.00 (0.53)	3.52 (0.32)	3.65 (0.36)
Level $(+3)$	2.78 (0.24)	3.48 (0.42)	2.67 (0.28)	3.15 (0.57)	2.74 (0.25)	2.99 (0.47)

Note. MI, minority influence.

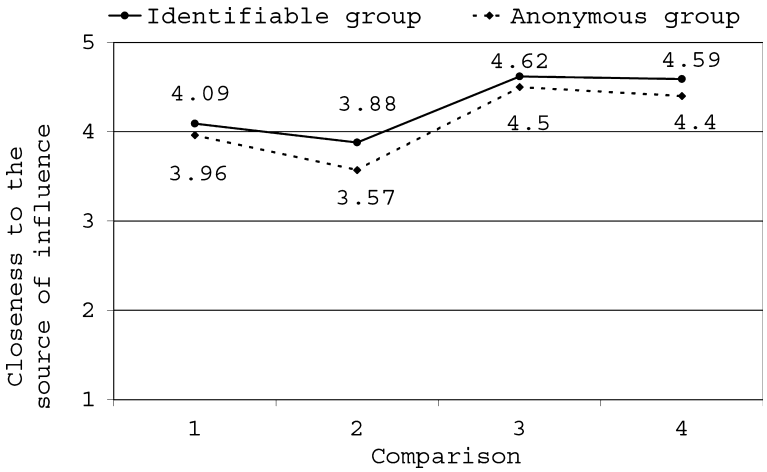

Fig. 1. Means for the dependent variable comparison of opinions.

However, the intragroup variable (similarity of response) presents significant differences $F(1,50) = 30.21$, $p < 0.001$. In other words, the results show that the opinions of the experimental participants are closer to the source of influence at the end of the test than at the beginning.

The results of the four dependent variables comprising the third block are shown in Fig. 2, and are as follows:

In the variable *perceived anonymity*, the values for the means of both groups ($M_{\text{identifiable}} = 5.70$, SD = 1.88; $M_{\text{anonymous}} = 6.30$, SD = 1.69) are above the mean point of the scale.

In the variable *group identification*, the means of the two groups are close to value 7 ($M_{\text{identifiable}} = 7.36$, SD = 1.72; $M_{\text{anonymous}} = 6.66$, SD = 1.42). Thus, during the test this variable has reached a medium-high level.

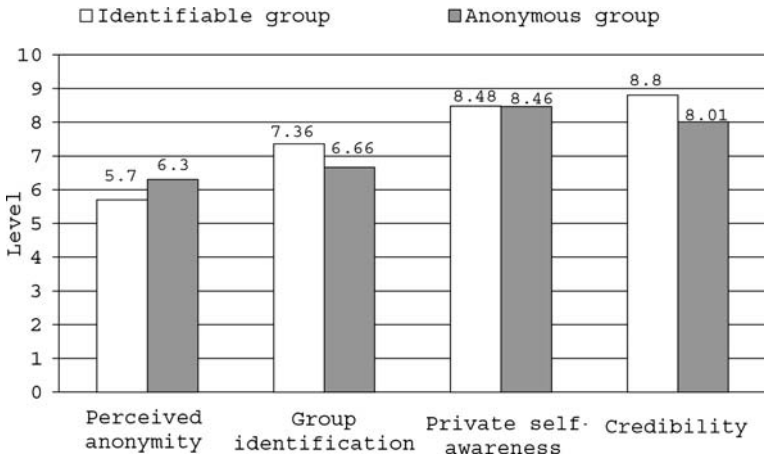

Fig. 2. Means for the dependent variables of block III.

For the variable *private self-awareness*, the means for the two groups are above value 8 ($M_{\text{identifiable}} = 8.48$, SD = 1.36; $M_{\text{anonymous}} = 8.46$, SD = 1.46). Thus, during the test this variable has reached a high level.

The means for the dependent variable *credibility*, for the identifiable and the anonymous groups, are higher than 8 ($M_{\text{identifiable}} = 8.80$, SD = 2.78; $M_{\text{anonymous}} = 8.01$, SD = 2.92). In other words, the level for this variable is high.

In addition, the analysis of variance between the anonymous and the identifiable groups is not significant for any of these four variables.

6.1. Comments on the results

The experimental study reveals that the source of influence (radical minority) has an effect on the anonymous and identifiable groups. This influence has been reflected as a shift of opinion of participants towards a more pro-North African immigration attitude. The effects of minority influence were analyzed in the dependent variables modality Level and comparison of opinions. The results are as follow:

In the modality level, the MANOVA of the variable Minority influence shows statistically significant differences for all of its dependent variables. Similarly, in these four dependent variables, the mean values are higher in the minority influence condition (Postest) than in the absence of minority influence condition (Pretest). It should be noted that the scores of the variable level (−1) were inverted. This is due to the fact that the items on these two subscales were formulated in negative terms regarding the questionnaire issue (North African immigration).

The changes are also apparent in the posteriori multiple comparison test (*Scheffé*). The results from the Scheffé test demonstrate the existence of statistically significant differences between the identifiable experimental and/or anonymous group and the control group in two of the four dependent variables under analysis: level (−1) and level (+3). This changes in the anonymous and identifiable group when compared to the control group, and such changes are explained by the exposure of such groups to the source of influence.

The mean values of the dependent variable comparison of opinion follow a rising and irregular line from the start of the test to its conclusion. This demonstrates the existence of a progressive shift of the experimental participant opinion towards the opinion of the minority.

Regarding the results of the other dependent variables, we can highlight the following:

For the variable *perceived anonymity* the most relevant facts are as follows: first, the values of this variable in the anonymous group are not very high (slightly above the mean of the scale). Second, there are no significant differences between the identifiable group and the anonymous group in this variable.

The results of the variable *group identification* show that the participants reached a medium-to-high level of identification. We recall that reaching a salient group identity during the development of the test was one of the basic requirements of the study.

There were high scores in the variable *private self-awareness*. This brings into question the contemporary theory of deindividuation (Prentice-Dunn & Rogers, 1982, 1989) which predicts a reduction or a loss of private self-awareness in anonymous or group situations such as the one carried out in our experimental study.

The results for the last variable in this block, perceived *credibility* in the experimental test, present high scores. Therefore, the simulation with the PISCO software (Moral &

Moral, 1999) has been very satisfactory and the virtual simulation and interaction of the group in the experiment was perfect.

7. Discussion

This research studied the influence of an in-group minority during CMC. The results partially support the predictions of the SIDE model (Reicher et al., 1995) and demonstrate the existence of an effect of minority influence in both experimental groups (identifiable and anonymous). These results are coherent with two fundamental aspects of the SIDE model. On the one hand, they support the general postulates of the model, which assert that deindividuation phenomena lead to normative behaviors (Postmes & Spears, 1998). On the other, they are consistent with the explanatory validity of the SIDE model in the context of social influence within CMC (Postmes et al., 2001; Spears et al., 1990; Spears et al., 2001).

In this study, the in-group minority caused a positive shift towards the source of influence. In this sense, the opinion of the participants (moderately pro-North African immigration) in both groups (identifiable and anonymous) have come closer to the opinions of the minority (radically pro-North African immigration). Given that the source of influence was an in-group minority, this studies supports the theory of self-categorization (Turner, 1987, 1991; David & Turner, 1996, 1999, 2001), which asserts that for a source of influence to be effective it has to come from within the same group. Social influence is explained by the need of the members of a given group or individuals with a common social identity to comply with prototypical norms. Turner (1982) named this process referent information influence.

On the other hand, some of our results do not support the predictions made by the SIDE model. This model claims that the effects of social influence in a condition of salient social identity will be greater when the members interact anonymously rather than when they are identifiable. Our results present no significant differences between the identifiable group and the anonymous group. Similarly, the results also show that the differences expected from the in-group minority's influence on the anonymous and the identifiable groups in respect to the control group were fulfilled for half of the dependent variables under analysis.

In an attempt to explain the results which contradict the predictions of the SIDE model, we focus our attention on the results obtained for the dependent variable perceived anonymity. This variable does not show statistically significant differences between the anonymous groups and the identifiable groups as predicted by the SIDE model. In other words, only the participants in the anonymous group ought to have had a sense of anonymity but not those in the identifiable group. It is likely that the identifiable participants also perceived themselves as anonymous. Other circumstances could have encouraged this, for example, the participants knowing that this was the one and only time the members of the group would interact with each other. We question whether having the photograph displayed on screen is sufficient for the members of a group to "really" feel identifiable during the interaction. Thus, regarding further research, it would be advisable to improve the condition of the identifiable group by increasing the number of interactions the experimental participant had in the virtual group. This would ensure better operationalization of the identifiable condition and better differentiation from the anonymous condition.

Regarding the variable private self-awareness, participants from the anonymous group presented very high values. These results contradict the postulates of the contemporary theory of deindividuation (Prentice-Dunn & Rogers, 1982, 1989). This theory associates crowd activities and anonymity with low levels of private self-awareness which would lead to antinormative and disinhibited behaviors on the part of individuals.

8. Conclusions

The results of our study call into question the postulates of several theories. Deindividuation theories: both classical (Diener, 1980; Festinger et al., 1952; Zimbardo, 1969) and contemporary (Prentice-Dunn & Rogers, 1982, 1989); theories of Social Presence (Rice, 1992; Rice & Love, 1987; Short et al., 1976); and also some research that highlights greater individual freedom during online interactions (Dubrovsky, Kiesler, & Sethna, 1991; Jessup, Connolly, & Galegher, 1990; Kiesler et al., 1984). These theories predict, on the one hand, that the anonymous interaction of participants within a group mediated by a computer would lead to more flaming, depersonalized, disinhibited, and antinormative behaviors. On the other hand, the reduction of social signals would translate into a reduced influence of people in virtual interactions. None of these predictions has been fulfilled in our study.

On the other hand, our results support the Social Identity Theory (Tafjel, 1978, 1982), the Self-categorization Theory (Turner, 1987), and the SIDE model (Reicher et al., 1995). A group of participants with a salient social identity has behaved according to the group norm during their interaction in a CMC context. Compliance with this norm has taken place in the two groups that participated in the experimental test (anonymous and identifiable users). Both groups show evidence of having being influenced by an in-group minority. These results prove the validity of the SIDE model for the study of group CMC. However, the results did not support one of the most important predictions of the SIDE model, i.e., the anonymity of group members should have increased the effects of minority influence on the anonymous group when compared to the identifiable group. This fact might suggest the need to further explore the study design in future research based on the SIDE model and the manipulation of anonymity and identifiability for group members as well as other variations of minority influence.

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