

# Group heterogeneity and social validation of everyday knowledge: The mediating role of perceived group participation

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## Abstract

Studies presented in this article show that participants attribute greater validity to opinions supported by heterogeneous groups than by homogeneous ones, that this effect occurs whether participants anticipate group belonging or not and that the relationship between heterogeneity and the attribution of validity to opinions is mediated by the perception of participation within heterogeneous groups. More specifically, an experimental scenario was tested in a pilot study (N = 299): group heterogeneity was manipulated and perceived group participation as well as perceived validity of group opinions was measured. Results show the expected effect of heterogeneity on the validation of opinions and also a mediating effect of perceived participation. The main study (N = 336) shows that the effect of heterogeneity occurs not only when participants are mere observers of groups but also when they anticipate group belonging. Furthermore, this study shows that whereas the effect of group heterogeneity was mediated by perceived participation, the effect of group belonging on perceived validity of group opinions was mediated by trust.

## Keywords

social validation, everyday knowledge, heterogeneity, social comparison, group belonging, lay epistemology, social identity

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In everyday life people create and share knowledge about objects, individuals and situations from which they acquire new knowledge and programme behaviour. Individuals, however, do not only share knowledge (Hardin & Higgins, 1996; Levine & Higgins, 2001; Moscovici, 1976a), they are also concerned with the reliability or validity of the knowledge they share; and the ways through which they experience the feeling of truth might be considered one of the fundamental dimensions of cultural life (Kluckhohn, 1951) and can be associated with epistemic needs

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(Fiske, 2004; Kruglanski, 1989, 2004). According to Festinger (1954), the perception of knowledge validity appears to be a basic human motivation.

Most knowledge and decisions are produced within groups and, consequently, information concerning group composition might work as a cue that allows inferences about the epistemic validity of everyday group knowledge. The studies presented in this article confront and distinguish the impact of perceived heterogeneity and of group belonging on the validation of everyday knowledge, emphasizing that perceived group heterogeneity is a principle of knowledge validation based on the association between group heterogeneity and perceived participation within groups. In other words, the research presented in this article builds on previous theoretical contributions (e.g., Goethals & Klein, 2000) and research (Lopes, Vala, & Garcia-Marques, 2007) showing the effects of perceived heterogeneity on knowledge validation, and extends it to the analysis of the psychological mechanism that might underlie such an effect. Accordingly, we are proposing that the relationship between perception of group heterogeneity and the attribution of validity to group opinions is mediated by the perception of group members' participation: perception of group heterogeneity generates the idea of group participation, which in turn induces the perception of group-opinion validity. This hypothesis is derived from the relevance attributed to participation in early studies on group dynamics (e.g., Lewin, Lippitt, & White, 1939), and from the genetic model of social influence (Moscovici, 1976b; Nemeth, 1986).

Besides the mediation test of group participation in the effect of perceived group heterogeneity on group knowledge validation, this study tests the hypothesis that the effect of perceived heterogeneity on knowledge validation also occurs when participants expect to be members of the group whose knowledge is under evaluation. In fact, one might argue that heterogeneity is only relevant when individuals are mere observers and evaluators of group knowledge. On the contrary, we are proposing that heterogeneity is indeed relevant in these conditions (as shown by

Lopes et al., 2007), but also in situations where individuals expect to be members of a group.

Therefore, this research looks at contributing to the analysis of the psychological mechanisms underlying the effect of perceived group heterogeneity on group knowledge validation; to extend the effect of heterogeneity to social contexts where individuals are group members; and to articulate the social validation of knowledge based on group heterogeneity (Goethals & Klein, 2000) with that based on group belonging (Abrams, Wetherell, Cochrane, Hogg, & Turner, 1990).

### **Heterogeneity and knowledge validation**

The best known contribution to the understanding of the social validation of knowledge is Festinger's (1954) social comparison theory. As Festinger pointed out, individuals are motivated to validate knowledge about themselves and about their environment, and they do it by comparing their own with other people's opinions. Within this framework, consensus appears as a main source of validation of everyday knowledge. In fact, Festinger, Gerard, Hymovitch, Kelley, and Raven (1952) found that when individuals were informed that the majority of the members of their group disagreed with them, they were less confident about the validity of their opinions.

However, based on a diffuse feeling of the possible perverse effects of validation based uniquely on consensus, as illustrated by the groupthink phenomenon (Janis, 1972), people might also use other informational cues for knowledge validation. Goethals and Darley (1977), as well as Goethals and Klein (2000), in their attributional reformulation of social comparison theory, recognize that consensus allows a belief to be attributed to external factors. But consensus might not be enough, since it can be "person-caused" and not "entity-caused." In fact, consensus might simply reflect a bias derived from the personal characteristics of those who establish the consensus itself. In this sense, and at least under certain conditions, we could expect that individuals attribute more accuracy to a given knowledge if this knowledge is

shared by dissimilar or heterogeneous individuals. In this last case, the attribution of validity to everyday knowledge would be perceived as more entity-based than person-based, since dissimilar individuals share the same view of reality (Goethals, 1976).

Indeed, Goethals et al. (Goethals & Darley, 1977; Goethals & Klein, 2000) proposed that individuals, by means of “real” or “constructed” social comparisons (Krueger, 2000), not only use consensus as a criterion to attribute correctness to their opinions, beliefs and decisions (i.e., the magnitude effect; Goethals, Allison, & Frost, 1979) but, more importantly, see those supporting their opinion as diverse and heterogeneous (i.e., the diversity effect; Goethals et al., 1979). However, only few correlational (Goethals et al., 1979; Vala, Garcia-Marques, Gouveia-Pereira, & Lopes, 1998) as well as experimental studies supported this hypothesis (Augustinova, Drozda-Senkowska, & Lasticova, 2004, experiments 1 and 2; Goethals & Nelson, 1973; Reckman & Goethals, 1973), and discrepant results regarding the diversity effect were found (e.g., Manstead, 1982; Gorenflo & Crano, 1989). Moreover, most of these studies did not use a direct measure of perceived validity attributed to a given opinion in function of perceived consensus and diversity, and consequently their contribution to the examination of the plausibility of the Goethals et al.'s (1979) hypothesis is reduced.

Solving these limitations, the experimental research by Lopes et al. (2007) showed that not only consensus but also heterogeneity are used as cues to infer and attribute validity to a given opinion or decision. Authors manipulated consensus and group variability and measured their impact on the attribution of validity to opinions or decisions made by two groups. In three experiments, they found the traditional consensus effect (an opinion resulting from a more consensual group is invested with greater validity than one from a less consensual one); but more importantly, a main effect of diversity or group heterogeneity (e.g., heterogeneity in terms of the sociological: members following different majors; or psychological characteristics of group members: members with dissimilar personality traits) was also observed (a heterogeneous

group is perceived as producing more valid knowledge than a homogeneous group). Finally, an interaction effect showed that when two groups are described as equally consensual, greater validity is attributed to the more heterogeneous group; whereas when one group is described as more consensual than the other, the heterogeneity effect loses its power. Once experimentally demonstrated that the effect of group heterogeneity is not confounded with the effect of consensus on knowledge validation, the question now rests on the psychological mechanism that underlies the effect of group heterogeneity on opinion validation, that is, what leads individuals to attribute greater validity to opinions of a heterogeneous group than those of a homogeneous one.

## **Heterogeneity, participation and knowledge validation**

Goethals et al. (Goethals, 1976; Goethals & Darley, 1977; Goethals & Klein, 2000) propose an intraindividual explanation for the role of heterogeneity in the process of validation of everyday knowledge, assuming that the psychological mechanism sustaining the attribution of validity based on perceived diversity is the same as the ones involved in causal attribution processes. More specifically, perceived group heterogeneity might facilitate the attribution of group knowledge to an external cause, since the perception that different others share this same knowledge can dismiss the fact that it reflects a shared bias (Goethals & Klein, 2000; Wells & Harvey, 1977).

In this article, we test a new and complementary group-based explanation to this same phenomenon. Specifically, we hypothesize that individuals will perceive more participation and debate in a heterogeneous group than in a homogeneous one, and that the perceived participation and debate leads them to attribute greater validity to heterogeneous group opinions and decisions. In fact, and as can be inferred from the experiments by Lewin et al. (Lewin et al., 1939), in Western societies the procedures that legitimate power and decisions made in groups and that give

them confidence correspond to the principles of democratic discussion, participation and involvement. By the same token, our hypothesis states that the value attributed to the heterogeneity of those that share a given knowledge and its effects on knowledge validity rests on the implicit association between heterogeneity, group discussion and individual participation. In reality, and in order to construct valid knowledge, members of a heterogeneous group should discuss and compare different or alternative positions and debate their pros and cons. This assumption follows the results of previous studies showing an association between group heterogeneity and discussion, debate, and controversy (Oberlé, 2005).

Besides being supported by the Lewinian model, this hypothesis can also be supported by the genetic model of social influence proposed by Moscovici (1976b; Nemeth, 1986). Whereas in the functionalist models of social influence the group is perceived as an entity based on group cohesion, conformism and exclusion of deviant group members (Schachter, 1951); in the genetic model, the group is conceived as an entity based on the participation of all members. Consequently, in this model the value and validity attributed to group decisions rests on the participative style of group functioning (Drozda-Senkowska & Oberlé, 2000; Moscovici & Doise, 1992).

### **Heterogeneity, group belonging and knowledge validation**

It can be argued, however, that individuals attribute value to heterogeneity only when they are not or they do not expect to be members of a group. Indeed, in the empirical evidence supporting heterogeneity (e.g., Augustinova et al., 2004, experiments 1 and 2; Goethlas & Nelson, 1973) and specifically in our previous research (Lopes et al., 2007), participants did not belong to the groups they were evaluating; in fact, they were external observers. It can be sustained that when individuals are group members or expect to be group members, the knowledge produced by the group is judged valid independently of group

composition, that is, group members' homogeneity or heterogeneity does not matter anymore. The effect of heterogeneity, therefore, could be overruled by the effect of group belonging. The rationale for this position can be traced in the uncertainty-reduction model (e.g., Hogg, 2007; Hogg & Abrams, 1993; see also Abrams et al., 1990). In fact, and according to this model, and via the processes of self-categorization, people make use of their own group as a source of information leading them to validate their knowledge. Thus, this model stresses the epistemic functions of group belonging. When people have the opportunity to self-categorize as members of a group, this group becomes an "informational referent" (Abrams et al., 1990; Turner, 1991) and its members raise their identification especially when their uncertainty is high. This hypothesis has received empirical support in previous research on this topic (e.g., Hogg, 2000; Mullin & Hogg, 1998; Shah, Kruglanski, & Thompson, 1998).

In the present article, we propose that the validation of opinions based on group belonging can go hand in hand with the validation based on group members' heterogeneity, and that these processes can be seen as independent and complementary of one another, since they are based on different psychological mechanisms. Indeed, and according to our argument, the psychological mechanism that legitimates the effect of group belonging on the validity of group opinions is not similar to the process that legitimates the effect of group perceived heterogeneity. In this latter case, participation and discussion are the key mechanisms. In the former, it is trust in the group (e.g., Kramer, Brewer & Hanna, 1996; Sniezek, 1992) that fosters the attribution of validity of group opinions. According to Kramer et al. (1996), group belonging and group identification generate trust in group members and, consequently, willingness to attribute value to group opinions. In fact, the association between trust and group belonging is not only theoretically argued (Brewer & Chen, 2007), but also empirically tested (e.g., Kenworthy & Jones, 2009). Moreover, the idea that trust generates a feeling of knowledge validity has been supported

in the field of common sense epistemology (Hardwig, 1991).

## Summary of present studies

In this article, we present one pilot study and a main study aiming at: (a) testing the hypothesis that opinions expressed by a heterogeneous group are perceived as more valid than those held by a homogeneous one (pilot study and main study); (b) examining the hypothesis that the perception of participation and debate within groups mediates the effect of group heterogeneity on perceived validity of group opinions (pilot and main study); (c) showing that the mediation by participation and the effect of heterogeneity on validation of group opinions occur independently of group belonging (main study); (d) analysing the hypothesis that whereas the effect of heterogeneity derives from the association between heterogeneity and participation, the effect of group belonging on group opinion validation derives from trust in the group (main study).

In a pilot study, we tested the success of the experimental scenario, namely the manipulation of heterogeneity, the measures of the mediator and dependent variables. Thus, participants received information concerning the composition of a group regarding its members' personal positions on major contemporary issues (homogeneous vs. heterogeneous group). Participants were asked to evaluate the validity of a document containing group members' opinions regarding university reform. In the main study, and apart from the information concerning group composition (homogeneous vs. heterogeneous group), participants were made to believe that they were or were not going to be part of the group (anticipation of group belonging vs. nonanticipation). In this study, trust in the group was also measured in order to test its mediating role in the effect of group belonging on the validity attributed to group opinions.

## Pilot study

In this pilot study, we tested the success of our experimental scenario. Additionally, the

following hypotheses were tested: (a) greater validity will be attributed to a group presented as heterogeneous in its internal composition than to a homogeneous one; (b) perceived within-group participation mediates the effect of heterogeneity on perception of validity (Drozda-Senkowska & Oberlé, 2000; Moscovici & Doise, 1992).

## Method

**Participants and design** Two hundred and ninety-nine undergraduate students from the University of Paris Ouest participated in this study. Participants' mean age was 24.54 years ( $SD = 7.38$ ) and 88.5% were female. Participants were randomly assigned to a single-factor (group variability: homogeneous vs. heterogeneous) between-subjects design.

**Procedure** During a class, participants were invited to take part in a study concerning the reform of universities opened by the "European Union Bologna Agreement." An envelope with a questionnaire and instructions was distributed to each participant. Participants were informed that groups had been formed to discuss the problems that the Bologna reform was raising, and to produce a position document to be distributed to other students. Participants were also told that in this study the researchers were interested in their opinions regarding these groups. Therefore, one specific group composed of four members was presented to participants ("randomly" selected from a pool of groups and presented as group "G11") and some information obtained about the personal characteristics of its members was presented. After reading this information, participants were asked to give their opinions about the group, namely concerning its functioning, and were also asked to judge the validity of the document that the group was going to produce. At the end of the questionnaire, participants were asked to answer some control and demographic questions. At the end of the session, participants were thanked and debriefed.



### Independent variable

*Group heterogeneity* The homogeneous or heterogeneous composition of groups (i.e., group members' variability) was manipulated by presenting group members as holding similar (homogeneous) versus dissimilar (heterogeneous) positions or opinions regarding major contemporary issues. In this sense, and in the homogeneous group condition participants read that "Observations made during previous group meetings showed that the 4 members of this group hold the same positions and opinions regarding major contemporary issues. Therefore, and regarding their positions and opinions, they form a homogeneous group (i.e., they do not differ from each other)." In the heterogeneous group condition participants read that "Observations made during previous group meetings showed that the 4 members of this group do not hold the same positions and opinions regarding major contemporary issues. Therefore, and regarding their positions and opinions, they form a heterogeneous group (i.e., they differ from each other)."

### Dependent variables

*Perceived validity* Participants evaluated the quality and validity of the document that was going to be produced by the group concerning university reform, using a 5-item scale (answers ranging from 1 = not at all; to 6 = completely; "This group will be able to identify the major problems underlying the Bologna reform"; "This group will be able to reduce the uncertainties of the other students"; "This group will produce a good document for diffusion regarding the Bologna reform"; "The opinions of this group can be invested of high certainty"; "The final opinions of this group can be easily supported.") A principal components analysis (PCA) extracted one factor containing all the items and explaining 59.23% of the total variance (Kaiser–Meyer–Olkin Measure of Sample Adequacy [KMO] = 0.81). These five items were combined to form an index of perceived validity ( $\alpha = 0.82$ ).

*Group participation* The perception of group participation was assessed with a 6-item scale (answers ranging from 1 = total agreement; to 6 = total disagreement). A PCA extracted one factor with the six items loading highly in this factor and explaining 42.59% of the total variance (KMO = 0.85). This first factor clearly measures a participative style of group decision-making ("The composition of this group will allow a good debate of ideas"; "The composition of this group could raise interpersonal conflicts"; "The composition of this group will facilitate the participation of each one"; "The composition of this group will facilitate the expression of different opinions"; "The composition of this group will guarantee the autonomy of thought of each one"; "The composition of this group could open the path for endless discussions.") An index was computed combining the items loading in this factor ( $\alpha = 0.81$ ).

### Results and discussion

**Manipulation check** At the end of the questionnaire, participants answered one item measuring the perception of similarity between group members on a 6-point scale (answers ranging from 1 = not similar at all; to 6 = very similar). An analysis of variance revealed a significant effect of group variability,  $F(1, 295) = 259.91, p < 0.001, \eta^2 = 0.468$ , showing that participants in the homogeneous-group condition perceived group members as more similar ( $M = 4.65, SD = 1.36$ ) than those in the heterogeneous group condition ( $M = 2.20, SD = 1.26$ ). These results testify to the success of our group-variability manipulation.

**Impact of group heterogeneity on group perceived validity** In order to test the effect of group heterogeneity on opinion validation, this variable was contrast-recoded (-1 for the homogeneity condition and 1 for the heterogeneity condition) and the results of a regression analysis showed that group validity was predicted by group heterogeneity ( $\beta = 0.21, t(287) = 3.63, p < 0.0001$ ); meaning that participants in the heterogeneous group condition conferred greater

validity to group opinions ( $M = 4.10$ ,  $SD = 0.90$ ) than participants in the homogeneous group condition ( $M = 3.71$ ,  $SD = 0.95$ ).

### Perceived participation as a mediator of the effect of group heterogeneity on perceived validity

According to our hypothesis, the effects of group variability on the perceived validity of group opinions are mediated by the inferences regarding group participation (more debate and participation vs. less debate and participation) that participants infer from group variability information. To test this hypothesis, and following Baron and Kenny (1986), a series of regression analyses were run. As shown above, group variability significantly predicted perceived group validity. Group variability also predicted perceived group functioning, ( $\beta = 0.54$ ,  $t(290) = 11.04$ ,  $p < 0.0001$ ). When group variability and group participation were simultaneously entered in the regression analysis as predictors of perceived group validity, the effect of group variability was significantly reduced, ( $\beta = -0.08$ ,  $t(284) = -1.271$ , *ns* (Sobel test:  $z = 6.574$ ,  $p < 0.0001$ ), but the effect of group participation remained significant, ( $\beta = 0.51$ ,  $t(284) = 8.249$ ,  $p < 0.0001$ ).

These results strongly support our hypotheses and our previous research (Lopes et al., 2007) and testify to the success of our experimental scenario. In fact, presenting participants with information regarding the heterogeneous composition of a group leads them to attribute greater validity to this group's opinion than to a homogeneous group's opinion.

Moreover, these results also allow us to complement the hypothesis proposed by Goethals and Darley (1977), presented in their attributional reformulation of social comparison theory; according to which, diversity of those that share an opinion is a guarantee against a biased opinion. In fact, the results of the present research showed that diversity is associated with participation and debate, which may be a necessary condition to attribute validity to everyday knowledge produced collectively by a heterogeneous group. Indeed, results showed that the effect of heterogeneity on

perceived knowledge validity is fully mediated by perceived within-group participation.

## Main study

This study aims at testing our argumentation that heterogeneity functions as a principle of everyday knowledge validation, even when participants are made to believe that they are going to be members of a group. Furthermore, this study goes one step further in the understanding of the role of group heterogeneity in validation of opinions, since it analyses the psychological mechanism that is supposed to underlie this effect. Specifically, in this study we tested three hypotheses. The first hypothesis predicts that people will attribute greater validity to the opinions of a heterogeneous rather than a homogeneous group (Goethals & Darley, 1977; Goethals & Klein, 2000).

The second hypothesis predicts that greater validity will be conferred to groups that participants expect to be members of, than when no such expectation is created (Hogg, 2000; Hogg & Abrams, 1993). Indeed, based on the literature about anticipated group membership (e.g., Levine, Bogart, & Zdaniuk, 1996; Mojsisch, Schulz-Hardt, Kerschreiter, & Frey, 2008; Roch, 2006), we propose that anticipation of group belonging is sufficient to trigger the processes proposed by the *uncertainty-reduction* model (Hogg & Abrams, 1993). In reality, Levine et al. (1996) assume that people make efforts to raise the advantages and to reduce the costs of anticipated interaction. To achieve this, they submit themselves to the influence of group members' opinions (Kerr, MacCoun, Hansen, & Hymes, 1987) and raise their conformity to the group's positions (Lewis, Langan, & Hollander, 1972; Tetlock, 1983; Tetlock & Boettger, 1989; Tetlock, McGuire, Peterson, Feld, & Chang, 1992). In agreement with Tetlock et al. (1992), these can be viewed as adaptation strategies that protect people's self and social image, as well as people's motivation to attain valid knowledge.

The third hypothesis states that whereas the effect of heterogeneity on group opinions' validation is based on participation (Moscovici & Doise,

1992), the effects of group belonging on group opinions validation is based on trust (Brewer & Chen, 2007; Kramer et al., 1996). Indeed, we argue that group heterogeneity and group belonging are two independent informational cues that help to confer validity on everyday group knowledge and that the effects of these two validation principles are based on different psychological mechanisms. In this sense, the effect of group heterogeneity on the perceived validity of group opinions is expected to be mediated by the perception of participation induced by group heterogeneity (Moscovici & Doise, 1992); while the effect of group belonging on knowledge validation should be mediated by trust in the group. This last hypothesis is based on the literature on trust: group belonging and group identification generate trust in group members, and trust opens the path to the attribution of epistemic value for opinions and decisions produced within the group (Brewer & Chen, 2007; Kramer et al., 1996).

### Method

**Participants and design** Three hundred and thirty-six undergraduates of the University of Paris V-Paris Descartes participated in this study. Participants had a mean age of 21.41 years ( $SD = 5.59$ ) and 90.4% were female. Participants were randomly assigned to a 2 (group variability: homogeneous vs. heterogeneous)  $\times$  2 (anticipation of group belonging: anticipation vs. nonanticipation) between-subjects factorial design.

### Procedure

The procedure and the experimental scenario of the present study were identical to those tested in the pilot study. However, a new experimental manipulation was introduced: group belonging.

### Independent variables

**Group belonging** In order to manipulate the sense of belonging to the group, participants in the group-belonging condition read one further instruction: "In the following lines, you will find the description of one of the previously formed

groups in which, if you accept, you will participate after the spring break. This group has been given the number 11 and we will refer to it as G11." Additionally, and in order to emphasize our manipulation, on the top of each page of the questionnaire participants were told to remember that they were going to be part of that group. Participants in the condition where no group belonging was anticipated just read: "In the following lines, you will find the description of one of the previously formed groups. It has been given the number 11 and we will refer to it as group G11."

**Group heterogeneity** This manipulation was identical to the one used in the pilot study.

### Dependent variables

**Perceived validity** In order to evaluate the validity attributed to the document regarding the university reform produced by the group, the same scale of the previous study was used. As in the pilot study, a PCA extracted one factor comprising the five items of this validity scale (explained variance = 60.82%;  $KMO = 0.83$ ). Again, the reliability of this scale proved to be high ( $\alpha = 0.84$ ).

**Group participation** The scale comprising six items ( $\alpha = 0.83$ ) used in the pilot study was also used in the present study. As in the pilot study, a PCA extracted one factor where all these six items loaded consistently (explained variance = 54.75%;  $KMO = 0.85$ ). The reliability of this scale proved to be high ( $\alpha = 0.83$ ).

**Group trust** An 8-item scale was used to measure trust in the group ("From my point of view, the people in this group are reliable"; "I think that in this group people are honest"; "I think that I can trust the people in this group"; "The people in this group respect others"; "I think that in this group people are fair"; "I think that in this group people keep their word"; "I think that in this group people honour their compromises with other people"; "I think that in this group people say what they think.") These items were adapted from Cummings and Bromiley's Organizational



Trust Inventory (1996). Answers were given using a 6-point scale (1 = total agreement; 6 = total disagreement). The eight items scored highly in a sole factor extracted by the PCA (explained variance = 60.75%; KMO = 0.90). An index was computed combining these items ( $\alpha = 0.90$ ).

### Results

**Manipulation checks** Similarly to the pilot study, participants answered two questions regarding their perception of similarity between group members. A composite index was computed since these two items were highly correlated ( $r = .95$ ,  $p = .001$ ). We ran an ANOVA using as independent measures, the manipulations of group heterogeneity and group belonging; and as the dependent measure, the index of group members' similarity. This analysis revealed a main effect of group heterogeneity,  $F(1, 330) = 371.19$ ,  $p < 0.000$ ,  $\eta^2 = 0.529$ , showing, as expected, that group members were seen as more similar in the homogeneous condition ( $M = 4.53$ ) than in the heterogeneous condition ( $M = 2.09$ ). This analysis also showed a marginally significant group heterogeneity by group-belonging interaction effect,  $F(1, 330) = 3.36$ ,  $p < 0.07$ ,  $\eta^2 = 0.01$ . Note, however, that this interaction effect does not question the independence of the manipulated variables, since group homogeneity manipulation was successful under group anticipation ( $M = 4.68$ ) or nonanticipation ( $M = 4.39$ ), with a similar pattern of means occurring for the group heterogeneity manipulation ( $M_{\text{anticipation}} = 2.00$ ;  $M_{\text{non-anticipation}} = 2.20$ ). The remaining main effect of group anticipation was nonsignificant,  $F(1, 330) < 1.00$ .

Turning now to the manipulation check of group-belonging anticipation, we asked participants to state how they preferred to address group "G11" – "We," "They" or "I cannot answer." In order to analyse participants' answers, we ran a logistic regression entering as predictors the manipulations of group belonging (contrast-coded:  $-1 = \text{nonanticipation}$ ;  $1 = \text{anticipation}$ ) and of group heterogeneity (contrast-coded:  $-1 = \text{homogeneous group}$ ;  $1 = \text{heterogeneous group}$ ), as well as the interaction between these

predictors, and as dependent variable the manipulation check measure ( $0 = \text{"they"}$ ;  $1 = \text{"we."}$ )<sup>1</sup> The results of the logistic regression showed, as expected, that only group anticipation significantly predicted the manipulation check measure, Exp.  $\beta = 0.60$ ,  $p < 0.000$ . Thus, the odds of participants in the anticipation condition referring to the group as "we" are higher than the odds of participants in the nonanticipation condition. The remaining predictors were nonsignificant.

**Impact of group heterogeneity and group belonging on group perceived validity** As in the pilot study, group heterogeneity (recoded  $-1$  for the homogeneity condition and  $1$  for the heterogeneity condition) significantly predicted group validity,  $\beta = 0.16$ ,  $t(331) = 3.084$ ,  $p < 0.05$ , showing that participants perceived greater validity in the document produced by the heterogeneous group ( $M = 4.11$ ,  $SD = 0.95$ ) when compared to the one produced by the homogeneous group ( $M = 3.80$ ,  $SD = 0.95$ ). Furthermore, group belonging (recoded  $-1$  for the nonbelonging and  $1$  for the belonging condition) significantly predicted group validity,  $\beta = 0.24$ ,  $t(331) = 4.622$ ,  $p < 0.0001$ , showing that participants anticipating group membership attributed greater validity to the document ( $M = 4.19$ ,  $SD = 0.92$ ) than participants in the nonanticipation condition ( $M = 3.72$ ,  $SD = 0.95$ ). No interactions significantly predicted group validity.

**Testing the mediators of the effect of group variability and group belonging on group perceived validity** A mediation analysis (Baron & Kenny, 1986) was run including both group heterogeneity and group belonging as independent variables and group participation and group trust as mediators. The dependent variable was perceived validity. The regression models computed are presented in Table 1, and in each of these models the interaction between the two independent variables was considered; as well as the interaction between the independent variables and the mediators (see Muller, Yzerbyt, & Judd, 2008). None of the interactions were significant, and beta values varied between .00 and .08.

In a first stage, perception of group validity was regressed on group heterogeneity and group belonging. As already shown, these variables significantly and positively predicted attributed validity (see Table 1, Model 1). In a second stage, the mediator variables were introduced in the analyses (see Table 1, Models 2 and 3). As predicted, results show that group heterogeneity positively predicted group participation when controlling for group trust and for group belonging (Model 2),  $\beta = 0.56$ ,  $t(330) = 12.867$ ,  $p < 0.0001$ . However, group heterogeneity did not predict trust when controlling for participation and for group belonging (Model 3). Regarding group belonging, results showed that this variable positively predicted trust,  $\beta = 0.30$ ,  $t(330) = 6.017$ ,  $p < 0.0001$ , but not group participation when controlling for the other mediator. Briefly, these results show that whereas heterogeneity raised inferences regarding group participation, group belonging elicited trust in the group.

In a third stage, the effects of the mediators on group validity were assessed controlling for the independent variables and the interactions between them and the mediators. Results showed that the effect of the mediators on the dependent variable was still found.

Comparing the first regression model with the last one, results suggest that the effect of group heterogeneity on validity is mediated by perceived group participation (see Figure 1, upper panel) and

that the effect of group belonging is partially mediated by trust in the group (see Figure 1, lower panel). Sobel tests showed that the effect of heterogeneity was mediated by group participation ( $z = 3.193$ ,  $p < .001$ ), and that the effect of group belonging was mediated by trust ( $z = 4.418$ ,  $p < .0001$ ).

### Discussion

The results of this study reinforce the ones obtained in the pilot study and extend them to situations where anticipation of group belonging is manipulated. Following our hypotheses, the present study showed that the use of heterogeneity information in everyday knowledge validation is independent of group belonging, and that both the perception of group heterogeneity and the anticipation of group belonging are effective in producing a sense of validity and credibility regarding group knowledge and group outputs. Indeed, the sense of epistemic validity derived from group belonging (Abrams et al., 1990) is based on group trust, whereas validation of knowledge through the perception of heterogeneity is based on the idea of participation and debate induced by heterogeneity itself.

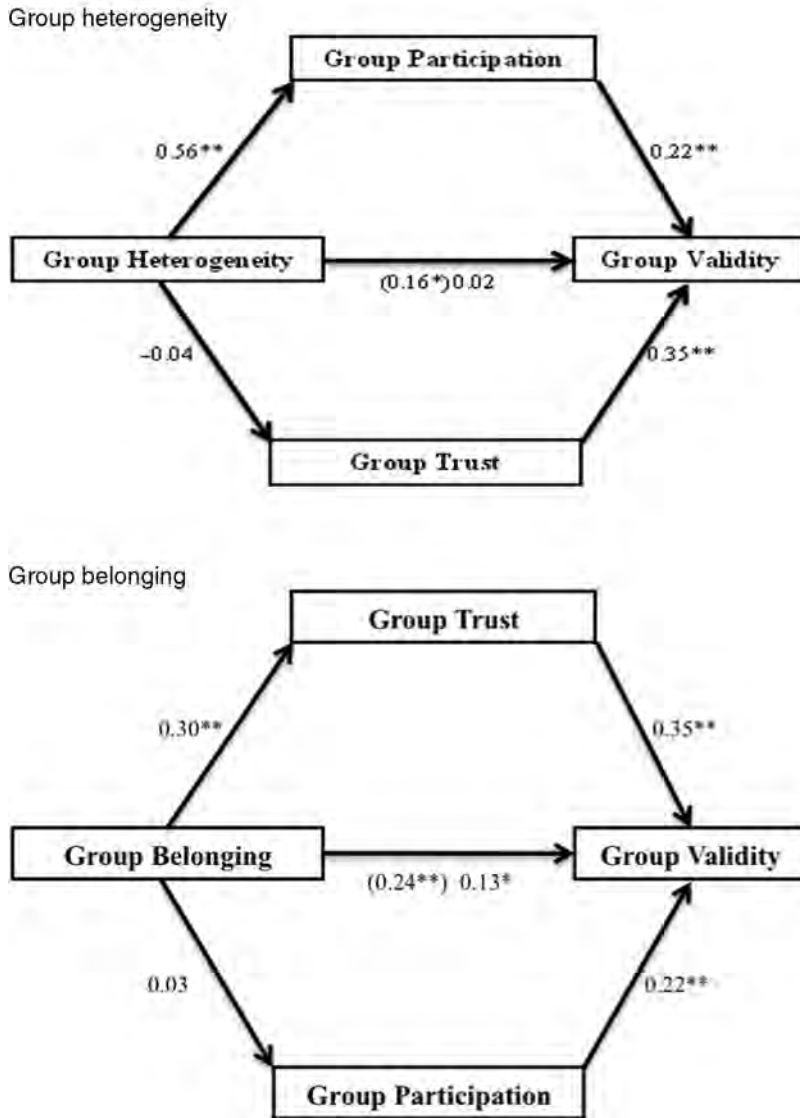
### General discussion

This article has aimed at providing empirical support for the use of group heterogeneity information

**Table 1.** Mediation analysis: perceived group participation and group trust as mediators of the effect of group heterogeneity and group belonging on attribution of validity to group knowledge

Predictors	Stage 1	Stage 2		Stage 3
	Model 1 Criterion: Validity	Model 2 Criterion: Participation	Model 3 Criterion: Trust	Model 4 Criterion: Validity
Heterog.	0.16*	0.56**	-0.04	0.02
Belonging	0.24**	0.03	0.30**	0.13*
Trust	-	0.22**	-	0.35**
Participation	-	-	0.29**	0.22**

Note: Values presented in the table are standardized regression coefficients; \*  $p < 0.05$ ; \*\*  $p < 0.001$ .



**Figure 1.** Group participation and group belonging as mediators of the effect of group perceived heterogeneity on attribution of validity to group knowledge.

Note: Figures in parenthesis represent partial effects when predictor and mediator are both entered in the equation; \*  $p < 0.05$ , \*\*  $p < 0.001$ .

in the process of attributing validity to collective knowledge or group opinions and decisions. Specifically, it has sought to contribute to the understanding of the psychological mechanisms that explain why the perception of group heterogeneity leads people to infer that this group's outputs have

higher epistemic validity; and to distinguish and articulate group heterogeneity and group belonging as two independent psychological principles implicated in the search for group epistemic validity.

The main as well as the pilot study demonstrated that a heterogeneous group is perceived as

more valid than a homogeneous one, a result in line with previous correlational (Goethals et al., 1979; Vala et al., 1998), as well as experimental research (Augustinova et al., 2004, experiments 1 and 2; Goethals & Nelson, 1973; Reckman & Goethals, 1973). Moreover, results showed that the effect of group heterogeneity on the validation of group knowledge was mediated by the perception of participation, discussion and debate.

Results also showed that the effect of heterogeneity on group validation occurs not only when participants do not anticipate group belonging, but also in conditions where such anticipation is induced (i.e., a first step in group integration; Levine et al., 1996). In agreement with these results, and in terms of common sense epistemology, group heterogeneity is not incompatible with the group role as a referent to establish what is right and what is wrong, and to bolster confidence regarding beliefs, opinions, and decisions. However, the psychological meanings associated with the effect of group heterogeneity on group knowledge validity are to be distinguished from the effects of group belonging on this same aspect. Indeed, our studies show that while the effect of heterogeneity was mediated by the perception of participation and debate, the effect of anticipation of group belonging was mediated by trust in the group. More specifically, whereas group heterogeneity induced the perception of participation and debate between group members, which in turn raised the perception of validity of group opinions, anticipation of group belonging induced trust in the group and trust in turn raised the perception of the validity of group opinions.

The mediating effect of perceived participation supports the theoretical assumptions of Moscovici's genetic model of social influence (Moscovici, 1976b; Nemeth, 1986) and contributes to the understanding of the effects of heterogeneity on knowledge validation hypothesized by Goethals (Goethals & Klein, 2000). The mediating effect of trust raises the hypothesis that trust in the group is the mechanism through which group belonging reduces uncertainty and bolsters epistemic certainty in group opinions and decisions, as predicted by the uncertainty group model (e.g., Abrams et al., 1990; Hogg & Abrams, 1993).

Future research should go one step further by analysing under which conditions heterogeneity works in combined ways with other validation mechanisms of everyday knowledge, such as group consensus information. For instance, we can assume that in conditions of high need for closure (Kruglanski, 2004) an individual might make more use of group consensus information as a compromise rule and attribute less importance to group diversity in establishing group knowledge validity. Contrastingly, in conditions where low need for closure is salient, diversity will probably be more used as a rule of validation of group knowledge. In the same vein, Lopes (2007) has already shown that when groups are structured by high independence among their members (individualism), group members use the rule of heterogeneity and the rule of consensus to attribute validity to an opinion; whereas in high interdependence (collectivism), they use the rule of consensus rather than that of heterogeneity.

According to Wilder (1990), it is possible to conceive that a homogeneous group might be seen as less independent than an aggregate of individuals, that is, a heterogeneous group. Also, according to Asch (1952) and Harkins and Petty (1981, 1987), it is possible that the key process sustaining the psychological efficacy of perceived diversity on knowledge validation is the perceived independence between sources conveying a specific message. However, until now independence was not empirically studied as a mediator of the effect of heterogeneity on knowledge validation. Consequently, a new agenda of research in this domain should examine the role of perceived independence and new studies should examine in what measure independence and participation are or are not two related mediators.

Future research should also analyse the relationship between people's perceptions about the principles that confer group knowledge validity and the way groups actually function, meaning that research should question whether people are or are not accurate in their expectations about diversity in groups. For instance, research by Schulz-Hardt, Brodbeck, Mojzisch, Kerschreiter, and Frey (2006) suggests that actual opinion diversity within groups

promotes effective group outcomes. However literature on work-group diversity shows that diversity may affect group process and performance positively as well as negatively (e.g., Kerr & Tindale, 2004; van Knippenberg & Schippers, 2007). Indeed, all in all, it is possible to conclude that homogeneity produces more positive results when a group task is an “exploitation” task (Mannix & Neale, 2005). However when the group task is an “exploration” one, heterogeneity produces better results (Brown & Eisenhardt, 1998; Mannix & Neale, 2005). We can consider that the group task that our participants judged is more “explorative” than “exploitative” and, if it is the case, participants correctly valued heterogeneity instead of homogeneity when validating group knowledge. Thus, future researches should study the possible moderating role of the type of task in the heterogeneity effect on the social validation of group opinions, decisions and judgements.

More importantly, literature reviews on group processes and performance claim more complex conceptualizations of diversity and its multidimensional character (Mannix & Neale, 2005; van Knippenberg & Schippers, 2007). Despite the fact that previous studies on the effect of group heterogeneity on group opinion validation were carried out with different types of diversity (Augustinova et al., 2004; Goethals & Nelson, 1973; Lopes et al., 2007), future research should articulate the type of task and the dimensions of diversity in the perceived role of heterogeneity in group output validation.

In conclusion, our research supported the fundamental statement of Goethals and Darley (1977) concerning the importance of group diversity or heterogeneity in the process of opinion validation. But our present studies go one step further. They show that the heterogeneity principle works not only when participants are external observers, but also when their participation in the group is anticipated (a first step in group membership). These studies also showed that not only do attributional principles underlie the use of heterogeneity, but also social beliefs associated with the functions of group discussion and participation. As proposed in the genetic model of social influence (Moscovici, 1976b;

Moscovici & Doise, 1992), group diversity means group discussion and group discussion is a principle that individuals use to verify and control the quality of the procedures by which a given knowledge or a given decision is made. Following Jost, Kruglanski, and Nelson (1998) or Moscovici's (1976a) arguments, heterogeneity can be seen as a metacognitive rule that illustrates “how the mind should work.” We have now further support for the hypothesis that group perceived heterogeneity may function as a cue to confer validity on the knowledge produced by a group. We also have support for the idea that, besides consensus, people use different principles to attribute validity to an opinion, that is, heterogeneity and group belonging, and that these different principles are based on different psychological mechanisms.

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### Note

1. The “I cannot answer” responses were removed from the analysis (corresponding to 106 participants, i.e., 31.7% from the total sample). These answers appeared, in our sample, equally distributed by the conditions of the independent variables, i.e., regarding group heterogeneity 48 participants stating that they were not able to answer were in the heterogeneous group condition and 58 in the homogeneous group condition ( $z = 1.17$ , ns.); by the same token, 56 participants expressing “I cannot answer” positions were in the anticipation condition, and 50 participants in the non-anticipation condition ( $z = 0.59$ , ns.).

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