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## Increasing perceived variability reduces prejudice and discrimination

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### ABSTRACT

We examined whether increasing individuals' perceived variability of an out-group reduces prejudice and discrimination toward its members. In a series of 4 laboratory and field experiments, we attracted participants' attention to either the homogeneity or the heterogeneity of members of an out-group, and then measured their attitudes or behaviors. Perceived variability was manipulated by making subgroups salient, by portraying the out-group members as having diverse opinions, by making salient that out-group members have different characteristics, or by asking participants to think about differences among out-group members. Prejudice and discrimination were measured in terms of self-reported attitudes, distribution of rewards, helping an out-group confederate, and evaluation of an out-group candidate in a simulated hiring decision. In all experiments, perceived variability decreased prejudice and discrimination. This effect may be due to the fact that perceived variability decreases the role of group membership in the production of attitudes and behaviors toward other individuals.

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Individuals differ in the extent to which they perceive the same social out-group as composed of heterogeneous members. One individual might have the impression that the out-group is composed of members that are rather dissimilar from each other, whereas other individuals think that the out-group members tend to resemble each other quite a bit (Park & Judd, 1990). These impressions can be influenced by situational factors, such that the same individual will perceive a given out-group as more or less variable depending on the concepts that are currently salient (e.g., Haslam, Oakes, & Turner, 1995).

The degree to which individuals perceive a group as heterogeneous has been termed “perceived variability,” and higher perceived variability is considered a valued end state (Jones, Wood, & Quattrone, 1981; Park & Rothbart, 1982; Quattrone & Jones, 1980). Thus, more than 200 empirical studies have been published on the topic, and most of these studies examine the determinants of perceived variability (see Chappe & Brauer, 2008; Lorenzi-Cioldi, 1998; and Voci, 2000, for reviews). Despite its apparent desirability, though, extant research on the positive effect of perceived variability in intergroup relations is largely lacking. The few authors who have examined the social consequences of perceived variability have generally demonstrated its effect on stereotyping (Hewstone & Hamberger, 2000). We argue, however, that any claim of a causal link between perceived variability and stereotyping is tautological: Stereotyping is usually defined as the association of characteristics

with social groups, and perceived variability either involves the measure or the manipulation of this same construct. In the present paper, we examine the relationship between perceived variability on the one hand and prejudice and discrimination on the other hand. More specifically, we demonstrate that attracting individuals' attention to the within-group differences in a minority group causes them to be less prejudiced and to discriminate less toward members of this group. We also examine the effectiveness of different ways to modify individuals' perception of variability outside the laboratory.

### Perceived variability and stereotyping

The constructs of perceived variability and stereotyping are so closely linked to each other that some authors use them interchangeably (Linville, 1998; Richards & Hewstone, 2001). Indeed, the tautological relationship between perceived variability and stereotyping becomes clear under scrutiny: The more an individual perceives members of a given group to be different from each other on a certain characteristic, the less he or she will associate this characteristic with the group. If one were to draw an analogy with data analysis, a stereotype corresponds to a significant *t*-test, in that a target group is seen to differ on a given dimension from a relevant comparison group, regardless of whether the comparison group is specified or not. An increase in the variability in one (or both) of the two groups will lead to a decrease of the value of the *t* statistic, that is, will weaken the belief that the target group possesses the trait to a greater extent than the comparison group. As such, stereotyping is nearly a mathematical consequence of perceived variability, and providing evidence for the relationship between the two constructs is

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somewhat circular in nature. The close relationship between perceived variability and stereotyping has been demonstrated in experimental and correlational studies (Hewstone & Hamberger, 2000; Park & Hastie, 1987; Ryan, Judd, & Park, 1996).

In contrast, stereotypes and prejudice are by no means interchangeable constructs. In a meta-analytic review of the literature, Dovidio, Brigham, Johnson, and Gaertner (1996) found that although individual differences in stereotyping were statistically related to prejudice overall, the effect size was modest and highly variable across studies. Judd, Park, Ryan, Brauer, and Kraus (1995) report non-significant correlations between prejudice and stereotyping in a series of four studies (for White American participants). *Stereotyping* refers to people's tendency to associate certain traits with certain groups or, to be more precise, to believe that a given group possesses a given trait to a greater extent than a relevant comparison group. The stereotype that "old people are slow," for example, actually refers to the comparison "Old people tend to be slower than young people". *Prejudice* is defined as generalized negative affect toward members of an out-group (Devine, 1989; Dovidio et al., 1996). Prejudice frequently manifests itself in form of a general dislike of members of the target group. Interacting with members of the target group, or the mere act of thinking about them, causes a prejudiced individual to experience a variety of negative emotions such as hatred, disdain, and anger. Note that it is possible to possess numerous stereotypes about a target group without being prejudiced toward its members. For example, an individual who thinks that Germans, in comparison to other Europeans, tend to be hard working, well-organized, traditional, blunt, and rigid, may feel no particular positive or negative affect toward Germans. S/he may simply believe that the German culture values certain traits and behaviors differently than other European cultures. Park and Judd (2005) have convincingly argued that categorization and the perception of differences between groups do not necessarily lead to prejudice.

### Perceived variability, prejudice, and discrimination

The link between perceived variability and prejudice is considerably less straightforward. There is no one-to-one correspondence between perceived variability and prejudice, and an increase in one construct does not mathematically lead to a decrease in the other. And yet, we suggest that there are at least three theoretical reasons to predict a causal relationship between perceived variability and prejudice. First, it is safe to assume that an increase in perceived variability leads to a more complex representation of the target group (Ostrom, Carpenter, Sedikides, & Li, 1993), and it has been shown that complexity of a representation is inversely related to the intensity of the affect felt toward the object of the representation. Linville (1985), for example, showed that a complex representation of the self led to less extreme feelings – both positive and negative – about oneself. Just as self-complexity may be a buffer against stress-related illness and depression (Linville, 1987), complexity in the representation of out-groups is likely to be a buffer against prejudice. Second, it is quite difficult to maintain generalized negative affect toward an entire group of people if one is convinced that the group is composed of members that are rather dissimilar to each other. The perception of heterogeneity implies that all members are not equally dislikeable. Whereas it is possible to have generalized negative affect toward a category that consists of similar members ("I don't like red meat"), it is considerably more difficult to have such feelings toward a category that consists of dissimilar members ("I don't like European food"). Third, the greater the perceived within-group variability the less likely that the perceiver will associate (negative) characteristics with the group and maintain his/her generalized negative affect. Before we review the literature on the link between perceived variability and prejudice, we turn to discrimination, the behavioral component of intergroup relations.

*Discrimination* refers to negative behaviors toward members of an out-group, such as lack of friendliness, or the refusal to rent one's apartment or to give a job to a member of the group (Dovidio & Gaertner, 1986). Although discriminatory behavior is associated with generalized negative affect (Allport, 1954; Dovidio, Kawakami, & Gaertner, 2002), the psychological literature on the weak link between attitudes and behaviors (Eagly & Chaiken, 1993) highlights the fact that discrimination and prejudice should be treated as separate constructs. As before, we think that an increase in perceived variability leads to a decrease in discriminatory behaviors. First, once a perceiver realizes that an out-group is heterogeneous, group membership becomes non-diagnostic and can no longer serve as a guide for behavior. Second, in the case in which the discriminatory behavior is based on a generalized negative affect toward the group, perceived variability affects the extent to which prejudice is applied to individual out-group members (Lambert, Payne, Ramsey, & Shaffer, 2005). If someone thinks that the members of a disliked out-group vary in the extent to which they possess common characteristics, s/he may be more hesitant to openly show his/her negative affect when interacting with one of the members (Scott-Chiapputo, 1999).

Despite the previously stated reasons suggesting the existence of a causal effect of perceived variability on prejudice and discrimination, this relationship has not been the object of scientific investigation. We found only two articles that touched upon this issue, but it is unclear to what extent these articles deal with perceived variability (Wilder, 1978; Vanbeselaere, 1991). Wilder (Experiment 1), for example, created artificial groups in the laboratory and gave participants information about a fictitious out-group of four individuals that had a unanimous opinion regarding the recommendation for two civil law suits, or that had one member with a dissenting opinion. The results showed that participants allocated more money to the in-group (and less money to the out-group) in the unanimous condition than in the dissenting condition. Although one might interpret these results in terms of perceived variability, it could also be that the dissenting groups were perceived to have worked harder and therefore to be more deserving of a reward than the unanimous groups. The research of Vanbeselaere (1991) can be similarly criticized.

A precise test of the causal link between perceived variability and prejudice involves (a) a demonstration that the experimental manipulation successfully altered participants' perception of variability and (b) a demonstration that the effect of the experimental manipulation on prejudice is mediated by perceived variability. It would also be desirable to see a demonstration of the causal link between perceived variability and prejudice with natural groups that people identify with and that have a long-standing history of conflict or of competition over limited resources. In Wilder (1978), for example, the out-group was a group that had been created several minutes prior to the discrimination measure, that was rather meaningless, and that participants did not interact with after the creation of the group.

There is some indirect evidence for the link between perceived variability on the one hand and prejudice and discrimination on the other hand. Lambert, Barton, Lickel, and Wells (1998), for example, showed that participants found it easier to make judgments about an artificial group (and made these judgments faster) when they had a relatively simplistic (homogeneous) representation of the group. When they had a complex representation of the group – either because the group was presented as heterogeneous or because the experimental instructions encouraged participants to focus on the similarity or dissimilarity of individual group members' behaviors in relation to those of other group members – participants reported greater difficulty making group judgments and made these judgments more slowly (see also Lambert, 1995).

### Overview of present studies

The present four experiments were designed to examine the causal link between perceived variability on the one hand, and

prejudice and discrimination on the other hand. We tested four different methods for increasing perceived variability: making sub-groups in the out-group salient (Experiment 1), showing that members of the out-group have diverse opinions (Experiment 2), communicating that members of the out-groups have different characteristics (Experiments 3), and having participants think about differences among out-group members (Experiment 4). In Experiments 1 and 2, the primary goal was to show that a modification of participants' perceptions of out-group variability affected their level of prejudice/discrimination. Experiment 3 was designed to test the effectiveness of a manipulation of perceived variability that can be used in naturalistic situations, that is, outside the laboratory. Experiment 4 was conducted to test the effectiveness of our perceived variability manipulation in a simulated hiring situation. Experiments 1 and 2 assessed people's reactions to the out-group in general, whereas Experiments 3 and 4 examined their behaviors toward and judgments of individual out-group members. In all four experiments, the out-group was a natural group defined by its ethnicity, either Moroccans (Experiment 1), Chinese (Experiment 2), or Arabs (Experiments 3 and 4). All groups were relevant and important out-groups for the French individuals who participated in the experiments. We predicted that an increased perception of variability in the out-group would lead to lower prejudice and to less discrimination in the case of a negatively evaluated out-group.

## Experiment 1

Experiment 1 tested our hypothesis in the most straightforward manner. Park, Ryan, and Judd (1992) showed that perceived variability is determined by an individual's perception of the number of sub-groups in the out-group (see also Maurer, Park, & Rothbart, 1995). We therefore attracted participants' attention to either the out-group as a whole or to different sub-groups within the out-group, and then, several weeks later, measured participants' perceived variability and attitudes towards that out-group. We predicted an effect of our experimental manipulation on self-reported prejudice level, and we expected this effect to be mediated by perceived variability. The chosen target group was Moroccans who, together with Algerian and Tunisian immigrants, constitute the largest minority group in France.

### Method

#### Participants

A total of sixty-four first-year psychology students from the Clermont University, France took part in the experiment. One participant was excluded from the analysis because s/he was not French. Approximately 70% of the participants were women.

#### Stimulus material

Participants read one of two texts that were ostensibly excerpts of a travel journal of a person traveling in Morocco. The participants' task was to underline the spelling errors in the text. Each version of the text contained 10 minor spelling errors that did not hamper the comprehension of the text. In the "homogeneous condition," the author described the particularities of the Moroccans referring to them always as a single group (either "the Moroccans" or "they"). For example, the authors mentioned a visit at the market and commented on the Moroccans' habit to talk loudly and to drink mint tea. In the "heterogeneous condition," the author described his experience in Morocco mentioning several different sub-groups, such as farmers, working-women and elder citizens. Both texts were written in order to convey a neutral image of Moroccans, neither very positive nor very negative.

In order to make sure that one of the two texts did not convey a more positive image of Moroccans than the other, both texts were pretested on participants who did not take part in the main experiment. The participants read one of the two texts and then rated the extent to which they thought the author wanted to

communicate a favorable or unfavorable impression of Moroccans, and the extent to which Moroccans came across as positive or negative (on 28-point scales). An independent samples *t*-test revealed that the text in the "homogeneous condition" conveyed an image that was just as positive ( $M = 18.59$ ,  $SD = 4.28$ ) as the text in the "heterogeneous" condition ( $M = 18.53$ ,  $SD = 4.21$ ),  $t(58) = .05$ , *ns*.

Perceived variability was assessed in two ways. First, participants completed the range task that has been widely used to assess perceived dispersion of group members around some central tendency (Judd et al., 1995; Park & Judd, 1990; see Boldry, Gaertner, & Quinn, 2007, for a review on measures of perceived variability). On this task, participants are presented with traits and continuous rating scales with endpoints labeled "very much" and "not at all." They are asked to indicate, for a given target group, the point on the dimension at which they would situate (a) the average group member, (b) the group member who possesses this trait the most, and (c) the group member who possesses this trait the least. Participants in our experiment evaluated both the Moroccans and the French on the same four traits. These traits were chosen based on earlier work by Dambrun and Guimond (2004), so that there was a positive and a negative trait generally associated with Moroccans ("aggressive" and "cheerful") and with the French ("egoistic" and "hardworking, "). The second measure of perceived variability was a one-item question in which participants indicated the extent to which they thought Moroccans [the French] were different from each other (on a continuous rating scale with endpoints labeled "not at all different" and "very different"). The order of the two target groups was counterbalanced, but all participants were told at the beginning of the task that they would evaluate two groups, the Moroccans and the French. The continuous rating scales were later transformed into 28 intervals of equal size, and a score between 1 and 28 was attributed to each of the participants' responses.

Self-reported attitudes toward Moroccans were measured with the *Modern Racism Scale*. This scale was translated into French and validated by Dambrun and Guimond (2001). We adapted the scale to Moroccans as the target group. The scale consists of 15 items such as "The reason that there is so much unemployment in France is because the Moroccans take away the work from the French" and "I think that our society is unfair toward Moroccans" (reverse coded). Participants indicated their agreement or disagreement on continuous ratings scales with endpoints labeled "I disagree entirely" and "I agree entirely." As before, a score between 1 and 28 was later assigned to each response.

#### Procedure

Students were recruited in four methodology classes with 14 to 16 students each to participate in a "psycholinguistic experiment." They were tested in their classroom, and each of the four classes was randomly assigned to one of the two experimental conditions. Students had been randomly assigned to classes at the beginning of the semester. In each session, students first participated in a short experiment and then spent the remainder of the session discussing methodological and experimental design issues related to this experiment.

The ostensible psycholinguistics study consisted of reading the travel journal and circling the spelling errors (the experimental manipulation). The following week, the instructor asked them to participate in another short study that was unrelated to the present research. Two weeks after having read the travel journal, students completed the questionnaire with the perceived variability measure and the Modern Racism Scale. Participants were thanked and debriefed.

#### Results and Discussion

The order in which participants evaluated the two target groups had no effect on the dependent variables, either by itself or in interaction with other variables, and was therefore dropped from the analyses.

Participants' ratings on the range task were first transformed into variability scores by subtracting the lowest rating (the group member that possesses the trait the least) from the highest rating (the group member that possesses the trait the most). The variability scores were then averaged across the four traits to form an overall variability score for each of the two target groups (Cronbach's  $\alpha = .95$  for the Moroccans and  $.87$  for the French). Analyses revealed that the two measures of perceived variability were correlated,  $r(61) = .64$ ,  $p < .001$ . We standardized and averaged the two scores to form an overall perceived variability index for each target group. Participants in the heterogeneous condition perceived Moroccans to be more variable ( $M = .46$ ,  $SD = .83$ ) than participants in the homogeneous condition ( $M = -.49$ ,  $SD = .63$ ),  $t(61) = 5.12$ ,  $p < .001$ , whereas their perception of the French did not differ as a function of experimental condition,  $M's = -.03$  and  $.03$ ,  $t(61) = -.32$ , *ns*. A 2 (experimental condition: homogeneous vs. heterogeneous)  $\times$  2 (target group: Moroccans vs. French) ANOVA with repeated measures on the last factor revealed a reliable interaction of the two factors,  $F(1, 62) = 18.52$ ,  $p < .001$ . These results show that our experimental manipulation was successful in modifying participants' perception of variability of Moroccans.

After reverse-coding the appropriate items, participants' ratings on the prejudice scale were averaged to form an overall prejudice score (Cronbach's  $\alpha = .90$ ). An independent samples *t*-test revealed that, consistent with expectations, participants in the heterogeneous condition reported less prejudice toward Moroccans ( $M = 9.23$ ,  $SD = 3.70$ ) than participants in the homogeneous condition ( $M = 12.95$ ,  $SD = 4.72$ ),  $t(61) = -3.49$ ,  $p < .001$ .

In order to test for mediation, we followed the recommendations of Preacher and Hayes (2004), who suggest using a bootstrapping procedure to compute a confidence interval around the indirect effect (i.e., the path through the mediator). If zero falls outside this interval, mediation can be said to be present. We used the SPSS macros that Preacher and Hayes provide for this procedure. In this analysis, the experimental condition was the independent variable, prejudice was the dependent variable, and perceived variability was the mediator. Results revealed that the indirect effect via perceived variability equaled 2.59, the 95% confidence interval ranging from 1.18 to 4.36. The fact that zero falls outside this interval indicates a significant mediation effect,  $p < .05$  (see also Fig. 1).

Taken together, these results show that attracting individuals' attention to different sub-groups in a target group influences how positively they feel toward the group. More importantly, the demonstration goes beyond prior work by showing that the generating mechanism for the effect is a modification of individuals' perception of variability. Participants who read a text about sub-groups of Moroccans perceived Moroccans to be more variable and, consequently, displayed lower levels of prejudice than participants who read a text about the customs and habits of Moroccans as a whole group. The experiment is also consistent with prior work showing that the number of sub-groups that perceivers are aware of is an important

determinant of how variable they perceive a given group to be (Park et al., 1992; Linville, Fischer, & Yoon, 1996).

## Experiment 2

Experiment 2 was designed to extend the findings of the previous experiment. We wondered whether more positive attitudes toward the out-group that resulted from the increase in perceived variability translate into less discriminatory behaviors when participants interact with real members of the target group. Also, we decided to use an even more elaborate cover story to make sure that participants' reactions were not driven by social desirability concerns.

In Experiment 2, participants formed groups of three members and thought they were exchanging information with a group of foreign students in the adjacent laboratory room. Perceived variability of the out-group was manipulated by the diversity of the self-reported opinions and answers that were exchanged. Discrimination was measured by the distribution of hypothetical resources. As in Experiment 1, we assessed participants' perceptions of the out-group's variability and tested whether the effect of the experimental manipulation on discriminatory behaviors was mediated by these perceptions. This time we chose a different natural out-group, the Chinese, to establish the generalizability of our results. Clermont University, where the experiment was conducted, has about 25000 students and accommodates every year 1700 exchange students from China. In addition, China and its growing economy were frequently discussed in the media at the time of the experiment. The Chinese were thus a highly salient out-group for the French students who participated in our experiment.

## Method

### Participants

One hundred and fourteen female undergraduate students at the Clermont University, France, participated in the experiment in partial fulfillment of an introductory psychology course requirement. A total of 38 groups with 3 participants each were run, but 2 of these groups were dropped from the analysis because participants expressed suspicion during debriefing. Thus, we report data from 36 groups of 3 participants each ( $N = 108$ ). These groups were randomly assigned to one of the two experimental conditions.

### Procedure and stimulus material

Three female participants who did not know each other prior to the experiment were asked to come to the laboratory at the same time. They sat in a waiting area in which a female student of Chinese nationality, a confederate of the experimenter, was already waiting. When all three participants had arrived, a male experimenter, who was Caucasian (French), entered the waiting area and asked the three participants and the Chinese confederate for their names. He mentioned that two students were still missing, and asked the

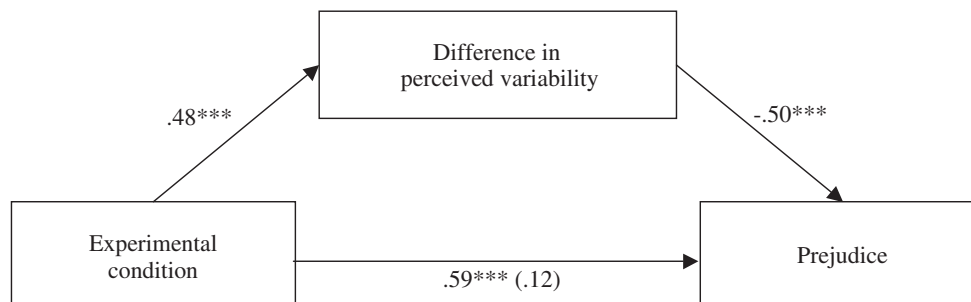


Fig. 1. Results of the regression analysis showing that the effect of experimental condition on prejudice is mediated by perceived variability in Experiment 1. The numbers are standardized regression coefficients. Note: \*\*\*  $p < .001$ ,  $N = 63$ .



Chinese confederate if she knew them, reading out loud two fictitious Chinese names on his sign-up sheet. The confederate said no. The experimenter addressed himself to the three French participants and told them that he would get them settled in the laboratory while he was waiting for the remaining two participants and the second experimenter. He led them to a large room and asked them to take place around the table. He left the room and came back one minute later saying that the remaining two participants and the other experimenter had arrived and that the experiment could now start.

The experimenter explained that he was interested in how individuals in big companies collaborate and more precisely, in understanding how employees from different cultures communicate and exchange information at work. This is why he had recruited the three Chinese students in the adjacent laboratory. The experimenter asked participants to imagine themselves in the position of an employee of a large multi-national company during the entire study. In order to make things easier, he told the participants, he would refer to them as the “French group” and to the group in the other room as the “Chinese group.”

The experimenter then explained that the members of the two groups would get to know each other. He gave each of the participants a copy of the self-disclosure questionnaire and asked them to fill it out. The questionnaire contained 10 questions about participants' attitudes and behaviors at the workplace. Sample items include “How important is it for you to have harmonious relationships with your colleagues?” and “Would you come to work even if you were a little sick?” Participants responded on a scale from  $-6$  (not at all) to  $+6$  (very much so). The experimenter made clear that the participants' responses would be given to the Chinese group and that they would get a chance to see the responses of the Chinese group.

The similarity of the answers among the three members of the Chinese group constituted our experimental manipulation. In the “homogeneous condition,” the three individuals' answers were relatively similar to each other on all of the 10 items (e.g., responses 1, 2, and 3, on the 13-point scale). In the “heterogeneous condition,” the three responses were relatively dissimilar from each other (e.g., responses  $-4$ , 3, and 7, for the same item). The average of the three ratings for the same item was always the same across the two conditions, and the group's average position gave a moderately favorable impression of the group. Each group member's response was in a different color so that participants could form a coherent impression of each of the three group members, i.e., establish a link between each group member's responses across different items.

Participants then completed the Lost-on-the-Moon task that has been used extensively in social psychological group experiments (Cammalleri, Hendrick, Pittman, Blout, & Prather, 1973; Frederickson & Kizziar, 1973). In this task, participants are asked to imagine that their group is lost on the light side of the moon and that they want to get back to their space shuttle that is about 300 km away. The group has ten objects, and the group members' task is to rank these objects in the order of their utility. After two minutes of discussion, the experimenter asked the participants to fill out the individual response sheet silently, without talking to their fellow group members. The variability of the rankings of the Chinese group constituted the reinforcement of the manipulation of perceived variability. In the “homogeneous condition,” the same object was given more or less the same rank by all three group members (e.g., rankings 3, 3, and 4, for the same object), and in the “heterogeneous condition,” the rankings were quite different (e.g., 1, 3, and 6). The rankings on the group response sheet were again in three different colors, one for each member of the Chinese group.

Participants next completed the “range task” used in Experiment 1. They evaluated the members of the Chinese group on the traits “egoistic,” “hard working,” “aggressive,” “cheerful,” “competent,” “threatening,” “unpleasant,” and “trustworthy”. The range task was followed by a question asking about participants' general impression of variability (“According to you, how different are the members of

the 'Chinese group' from each other?”), and five other questions about impressions of and attitudes toward the out-group (e.g., “To what extent are you interested in meeting the members of the 'Chinese group' in a work context?” and “To what extent are you interested in integrating a member of the 'Chinese group' in your work group?”). Participants made their responses on continuous rating scales with endpoints labeled “not at all” and “very interested”.

To measure discrimination, participants were asked to imagine that their group and the “Chinese group” were lost on the moon at the same place. There were enough of the useful objects to be divided generously between the two groups.<sup>1</sup> There were, however, few instances of the six least useful objects, so these could not as easily be shared. The participants were asked to imagine that the groups had drawn straws, that their group had won, and that they, therefore, had the right to decide which group received each of the objects. Participants were told that they were entirely free in their decision: they could give all six objects to their own group, all six objects to the out-group, or any intermediate solution. Participants completed this task individually.

For the second measure of discrimination, participants were asked to imagine that they were in the position to distribute a 100€ monetary reward among their own group and the Chinese out-group. Participants were presented with a modified version of a reward matrix used by Tajfel, Billig, Bundy, and Flament (1971). They were asked to choose one of 11 response options, varying from 0% to the ingroup to 100% to the ingroup, increasing in 10% increments. This task was completed individually.

At the end of the experiment, participants were tested for suspicion, debriefed, thanked, and dismissed.

## Results and Discussion

Because participants were nested within groups, we analyzed the data using hierarchical linear modeling with participant as the level 1 unit and group as the level 2 unit.<sup>2</sup> In all the analyses reported later, there were no level 1 predictors and one level 2 predictor (experimental condition). Our level 1 model was  $DV = \beta_{0j} + \epsilon_{ij}$  and our level 2 model was  $\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{COND}) + u_0$  (where  $DV =$  “dependent variable” and  $\text{COND} =$  “experimental condition”).

With regard to perceived variability, the two measures of perceived differences and perceived dispersion were related,  $t(100) = 2.00$ ,  $p < .05$ .<sup>3</sup> As in Experiment 1, a perceived variability score was calculated by first standardizing the two perceived variability measures and then averaging these scores. Participants in the heterogeneous condition perceived the out-group members to be more variable ( $M = .42$ ,  $SD = .36$ ) than participants in the homogeneous condition ( $M = -.41$ ,  $SD = .34$ ),  $t(33) = 3.20$ ,  $p < .001$ . These findings show that our experimental manipulation was successful.

<sup>1</sup> NASA experts have established a ranking of the usefulness of these objects (<http://laika.ed.csuohio.edu/fall98/edb567/mcmillan/lostMoon.htm>). For example, a box of matches is rather useless because there is not enough oxygen on the moon, whereas a parachute is quite useful because it can be used to protect oneself from the intense sun rays.

<sup>2</sup> Initial analyses revealed that one group in the “heterogeneous condition” was clearly an outlier on the two measures of discrimination. The value of its Studentized Deleted Residual was 3.73 and the value of Cook's  $D$  associated with it was .29. Belsley, Kuh and Welsch (1980) suggested that observations with Studentized Deleted Residual larger than 2 in absolute value need special attention. The suggested cut-off point for COOK'S  $D$  is  $4/pn = .11$  where  $p$  is the number of parameters in the model (here:  $p = 1$ ), and  $n$  is the number of observations used to fit the model (here:  $n = 36$ ). The COVRATIO of group 16 is .55 (considered an outlier if  $|\text{COVRATIO} - 1| \geq 3p/n = .08$ ). Group 16 qualifies as an outlier regardless of the influence diagnostic that is used. We therefore decided to delete this group from the analyses. All effects reported later were in the same direction but somewhat weaker if the outlier group was included in the analyses.

<sup>3</sup> In HLM analyses, associations between variables yield a  $t$ -value, rather than a correlation coefficient (Raudenbush & Bryk, 2002).

We computed two discrimination scores. The first was based on the distribution of the objects in the “Lost-on-the-Moon Task”. Assigning objects to the in-group was associated with a positive score (higher numbers for more useful objects) and assigning objects to the out-group was associated with a negative score (lower numbers for more useful objects). For example, a parachute given to the in-group was a score of +5; a brick of milk given to the out-group was a score of –1. We then averaged across the object scores for each participant. Positive values represent discrimination (more objects or more useful objects to the in-group), negative values reflect reverse discrimination, and values around zero mean that the objects were distributed evenly between the in-group and the out-group. The second discrimination score was based on the money to be distributed. Analyses revealed that the two indicators of discrimination were related to each other,  $t(103) = 2.81, p < .01$ .<sup>3</sup> We standardized and averaged the two indicators to form a single discrimination score. Results indicated that participants in the “heterogeneous condition” discriminated less ( $M = -.26, SD = .55$ ) than participants in the “homogeneous condition” ( $M = .25, SD = .58$ ),  $t(33) = -2.74, p = .01$ .

An important purpose of the present experiment was to test the hypothesis that the effect of the experimental manipulation on discrimination was mediated by participants' perception of variability. This was indeed the case. Results of mediational analyses revealed a 95% confidence interval ranging from  $-.98$  to  $-.05$  for the indirect effect. The fact that zero falls outside this interval indicates a significant mediation effect,  $p < .05$ .

These results support our hypothesis that individuals discriminate against a heterogeneous out-group less than a homogeneous out-group. No significant condition differences emerged on the other items in which participants were asked how interested they were in meeting or working with a member of the out-group.

To summarize, these findings suggest that an out-group with dissimilar group members will be discriminated against less than an out-group with similar group members. Note that the average positions of the members of the out-group were identical in the two experimental conditions. In other words, participants did not get the impression that the out-group possessed more desirable traits in one condition than in the other condition. We show that the effect of dissimilarity on discrimination is actually driven by perceived variability. We also go beyond prior work by showing the effect with an out-group with real-world significance (Chinese) that was likely to be seen as a potential threat to the economy of the participants' home country at the time of the experiment.

### Experiment 3

Experiments 1 and 2 dealt with people's perceptions of and reactions to groups. Are the beneficial effects of perceived variability robust enough to affect the ways in which people interact with members of out-groups? After all, representations about and affect toward a group do not necessarily determine people's reactions to a single group member (LaPiere, 1934). We predicted that perceived variability would influence participants' reactions to individual out-group members, and this for two reasons. First, although individuating information may diminish the impact of group-level representations under certain conditions, this impact is seldom reduced to zero (Fiske & Neuberg, 1990; Lambert, 1995). Second, perceivers may not only be less likely to be prejudiced toward a heterogeneous group, they may also be less likely to apply any residual negative affect to an individual member of an out-group that is seen as heterogeneous. Lambert et al. (2005) showed that implicit and explicit measures of prejudice predict reactions to an individual out-group member to a greater extent when the out-group is seen as homogeneous rather than heterogeneous. Ryan et al. (1996) also showed that people are

more confident in forming impressions of a single group member if the group is homogeneous than if it is heterogeneous.

Experiment 3 was designed to examine discriminatory behavior toward a member of an out-group. In Experiment 3, we attracted participants' attention to either similarities or differences among Arabs and then let them believe that the experiment was over. On their way to another university building they encountered an Arab confederate who pretended to accidentally drop the content of her purse. The dependent variable was participants' willingness to help the Arab confederate. Helping has been considered an unobtrusive measure of discrimination in earlier work (Crosby, Bromley, & Saxe, 1980; Lerner & Frank, 1974).

### Method

#### Participants

A total of forty-eight female undergraduate students at the Clermont University participated in the experiment in partial fulfillment of an introductory psychology course requirement. Five participants were dropped because they were not French. Accordingly, the data from 43 participants were analyzed.

#### Stimulus material

In order to manipulate the perceived variability of Arabs, we used two different posters that were 40 by 60 cm large and printed on glossy paper. In the heterogeneous condition, the poster contained photographs of 12 male and female Arab individuals of different ages, hairstyle and clothing. Next to two thirds of the photographs, there was a small box with the person's first name, his or her age, and a characteristic describing the person (e.g., “Fatima, 49 years, lawyer,” “Mounir, 24 years, loves fast cars”). The characteristics were constructed so that on average, the individuals on the photographs came across as neither very likeable nor very dislikeable. Below the photographs, there was a slogan, printed in large letters: “What makes us the same – is that we are all different”.<sup>4</sup> In the control condition, we used a poster with a similar layout that encouraged people to eat more fruits and vegetables. Perceived variability of French and Arabs was assessed the same way as in Experiment 1 (first the range task and then a one-item question about differences, the order of the two target groups was counterbalanced).

#### Procedure

Upon their arrival at the laboratory, the participants were greeted by a male experimenter who was Caucasian (French). The experimenter explained that he had to prepare the experimental material and asked them to take a place in the waiting room. There were six posters in the room, and the sixth poster either displayed the 12 Arab individuals (heterogeneous condition) or promoted the consumption of fruit (control condition). After a few minutes, the participants were led to the laboratory room and asked to sit down in front of a computer screen. Participants completed a filler task for fifteen minutes. When they finished, participants were asked to complete the measures of perceived variability, which were presented as a pretest for another colleague. The experimenter then announced to the participants that the experiment was over, debriefed them about the filler task and thanked them. He told them that they had to go to an office in another building in order to get their experimental credit validated. He gave them a map, printed on bright green paper so that the confederate could recognize them. In the other building, a female confederate of Arab appearance walked in front of the participants and dropped a big plastic bag so that its contents spilled on the ground. The dependent variable was whether the participant offered her help in the first 20

<sup>4</sup> The exact text in French was “Notre point commun: La diversité.” Readers should be aware that the French “diversité” and the English “diversity” do not have the same meaning.

seconds. The confederate was blind to experimental condition, trained to behave in the same manner and was dressed in the same clothes for every participant. Following this, participants were fully debriefed and dismissed.

## Results

Target group order in the measures of perceived variability did not affect any of the dependent variables and was therefore removed from the analyses. As in Experiments 1 and 2, we transformed participants' ratings on the range task into variability scores. A correlation analysis revealed that the two measures perceived variability and perceived differences were highly correlated with each other,  $r(42) = .60, p < .001$ . Then, these two scores were standardized and averaged. A 2 (experimental condition: heterogeneous vs. control)  $\times$  2 (target group: Arabs vs. French) ANOVA with repeated measures on the last factor and the perceived variability scores as dependent variable revealed a significant interaction,  $F(1,41) = 14.91, p < .001$ . Post-hoc analyses revealed that participants in the heterogeneous condition perceived Arabs to be more variable ( $M = .42, SD = .73$ ) than participants in the control condition ( $M = -.42, SD = .68$ ),  $t(41) = 3.90, p < .01$ , but their perception of the French did not differ as a function of experimental condition,  $M$ 's =  $-.05$  and  $.26, t(41) = -.38, ns$ . One can conclude that our experimental manipulation successfully modified participants' perception of perceived variability.

In the heterogeneous condition, 19 out of 21 participants (91%) offered their help to the Arab confederate when she dropped her plastic bag. Only 13 out of 22 participants (59%) in the control condition offered their help. This difference is statistically significant,  $\chi^2(1, N = 43) = 5.56, p < .02$ . In order to test for mediation, we used the procedure of bootstrapping proposed by Preacher and Hayes (2004). Analyses showed that perceived variability mediated the effect of experimental condition on helping behavior (indirect effect = 2.48, 95% confidence interval: [.27, 4.57]).

These results demonstrate that a modification of people's perception of variability of a minority group can affect their behaviors toward members of this group. Participants who were exposed to a poster highlighting the differences among Arabs were more likely to help an Arab individual than participants who saw a poster promoting the consumption of fruits and vegetables. The mediational analyses suggest that the effect is due to the poster successfully modifying people's perception of Arabs' variability.

## Experiment 4

The primary goal of the next experiment was to extend the analysis of perceived variability to discrimination in other real life situations. In a series of field experiments, Amadieu (2004) showed that a French candidate has a fivefold greater likelihood of being invited to a job interview than an Arab candidate with the same CV. In Experiment 4, we asked participants to evaluate job candidates in a simulated hiring situation after having manipulated their perception of variability of the out-group.

We decided to address two additional issues in Experiment 4. First, we wanted to examine whether it is really an increase perceived variability in the heterogeneity condition that drives the effect. For this purpose, we created three experimental conditions, a heterogeneous condition, a control condition, and a homogeneous condition (see Method for more details). Second, a possible objection to the manipulation of heterogeneity used in Experiment 3 is that participants in the experimental and control conditions were exposed to posters with completely different content. Perhaps seeing depictions of Arabs per se explains the lower level of prejudice of the experimental participants. Although results of the mediational analyses are inconsistent with this alternative explanation, we

wanted to examine it more directly. In Experiment 4, participants in all conditions except the control condition looked at pictures of Arab individuals. We asked participants in the heterogeneous condition to think about differences between these individuals, whereas participants in the homogeneous condition thought about similarities.

We predicted that participants who had just thought about differences among Arab individuals would evaluate the Arab candidate more positively than participants who had thought about similarities among Arab individuals or who were in a control condition. We had no specific predictions regarding the differences between the control condition and the homogeneous condition, because we suspected that many participants' baseline perception of Arabs would be quite homogeneous.

## Method

### Participants

One hundred and twenty-nine students participated in the experiment in partial fulfillment of course credit. They were randomly assigned to one of six experimental conditions that crossed "experimental condition" (heterogeneity vs. control vs. homogeneity) and "target CV" (French vs. Arab).

### Material

In the first phase, participants in the heterogeneity and homogeneity conditions were asked to look at and to memorize the pictures of eight individuals. The pictures were head and shoulder photographs of Arab individuals who differed in gender, age and formality of clothing. The pictures were presented on index cards. Participants in the heterogeneity condition were instructed: "Form several sentences that help you memorize the pictures. The sentences should have the following structure: 'Whereas some individuals ..., other individuals ...'". Participants in the homogeneity condition were instructed to form sentences with the structure "They are all ...". Participants wrote the sentences on an answer sheet. After the pictures with the Arab individuals, participants formed sentences about differences (heterogeneity condition) or similarities (homogeneity condition) among eight abstract paintings. This second task was added to augment the credibility of the cover story. Participants in the control condition did not complete the sentence task. Afterward, participants in all conditions completed five questions about their general impressions of variability such as "I think that Arabs have different hobbies" and "I think that Arabs possess all the same traits" (reverse coded). Participants indicated their agreement or disagreement on continuous ratings scales ranging from "I disagree entirely" to "I agree entirely". As before, a score between 1 and 28 was later assigned to each response.

In the second phase of the experiment, participants evaluated four job candidates. They first received a description of the job to be filled, a sales representative. The one-page description contained a list of tasks that the person would do on a daily basis as well as a description of the ideal candidate's profile. Participants then saw the CVs of four candidates. The CVs had been pretested and progressively modified in a series of pilot experiments in which no names were associated with the CVs. One of the CVs, the so-called "target CV," was clearly better than the other three CVs, two were of intermediate quality, and one was relatively poor. The mean ratings of the four CVs in the last pilot experiment were 23.05, 17.75, 17.55 and 8.02 (on scales ranging from 1 to 28). The ethnicity of the candidate with the target CV was experimentally manipulated: For half of the participants, the candidate had a male French name (François Durand), for the other half a male Arab name (Karim Benlabssir). All other three candidates had French names. One of the CVs of intermediate quality was from a female candidate, the other three from male candidates. After having examined the CVs participants filled out a questionnaire in which they



first evaluated each candidate on two dimensions: “To what extent is candidate X suitable for the job?” and “To what extent do you have a favorable or an unfavorable attitude toward candidate X?”. Participants gave their responses on continuous rating scales that were later transformed in 28 intervals of equal size. Participants then rank ordered the four candidates from the most qualified to the least qualified. Finally, they selected the two candidates they would invite for a job interview.

In the third phase of the experiment, participants in the heterogeneity and in the homogeneity conditions saw 16 Arab individuals (8 “old” individuals and 8 “new” individuals) and were asked to decide for each one whether they had seen him or her in phase 1. Recognition accuracy did not differ between the two experimental conditions and did not influence any of the dependent variables. Participants in the control condition did not complete phase 3.

#### Procedure

Upon arrival at the laboratory, participants were told that they would be participating in two unrelated experiments. The first experiment was on memory, the second on judgment processes in hiring situations. Participants first saw the 8 Arab individuals and were asked to form sentences, and then did the same thing with the 8 abstract paintings. They were told that their memory for these individuals and paintings would be tested later. All participants then answered the five questions about their general impressions of variability of Arabs. In a different experimental room with the “next experimenter,” participants evaluated the four CVs. Back in the first experimental room, they completed the recognition task. At the end of the experiment, participants were tested for suspicion, debriefed, thanked, and dismissed.

#### Results and Discussion

After reverse-coding the appropriate items, participants' general impressions of variability were averaged to form an overall perceived variability score (Cronbach's  $\alpha = .87$ ). We conducted a  $3 \times 2$  between-subjects ANOVA with experimental condition and ethnicity of the target CV as independent variables and the perceived variability of Arabs as the dependent variable. The analyses revealed a non significant effect of the target CV,  $F(1,123) = .44$ ,  $ns$ , but a main effect of the experimental condition,  $F(2,123) = 14.80$ ,  $p < .001$ . Post-hoc analyses showed that participants in the heterogeneous condition perceived Arabs to be more different from each other ( $M = 19.56$ ,  $SD = 5.56$ ) than participants in the homogeneous ( $M = 13.58$ ,  $SD = 6.37$ ) and control condition ( $M = 13.46$ ,  $SD = 5.79$ ),  $t(126) = 5.49$ ,  $p < .001$ . The control condition did not differ from the homogeneous condition,  $t(126) = -.09$ ,  $ns$ . The effect of the experimental condition on perceived variability did not depend on the ethnicity of the target CV,  $F(2,123) = .01$ ,  $ns$ . Thus, our experimental manipulation successfully modified participants' perception of perceived variability.

The two evaluations for each candidate were highly correlated (average  $r = .81$ ) and were thus averaged to form a single evaluation index. The evaluations for the three “other” candidates were also averaged. Each participant thus ended up with two evaluation scores, one for the target CV and one for the other three CVs. These scores were analyzed as a function of experimental condition (heterogeneity vs. control vs. homogeneity), ethnicity of the target CV (French vs. Arab), and target (target CV vs. other CVs) with repeated measures on the last factor. The results revealed the expected three-way interaction,  $F(2,123) = 4.74$ ,  $p < .02$ . As can be seen in Fig. 2, the target CV was evaluated more positively than the other three CVs when the candidate was French (see upper panel). These results replicate the last pilot study. However, when the candidate was Arab, he was evaluated as positively as the other

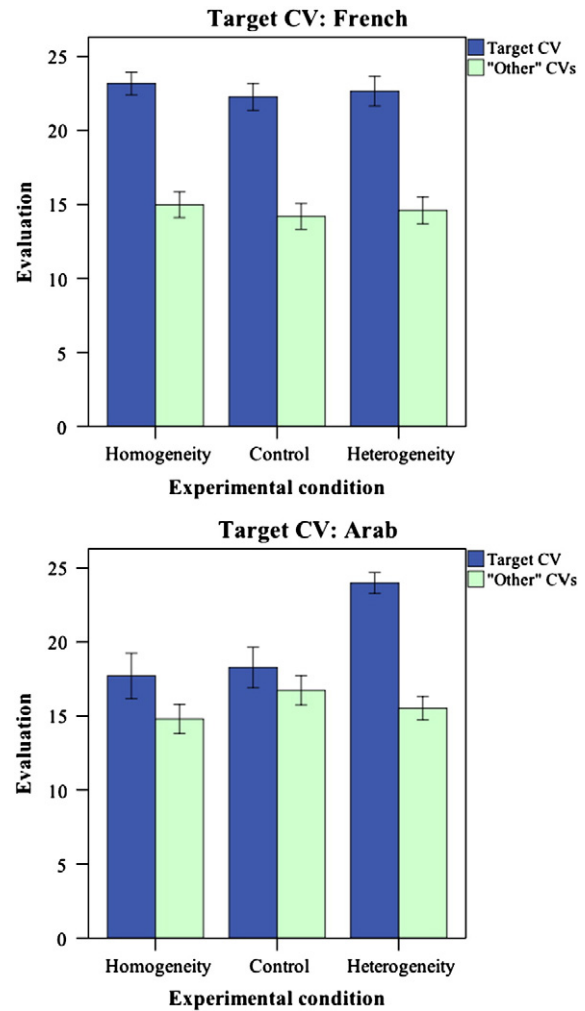


Fig. 2. Evaluation of the target CV and average evaluation of the “other” CVs as a function of experimental condition and target ethnicity in Experiment 4. Error bars represent one standard error above and below the mean.

three candidates in the control condition and in the homogeneity condition (see lower panel). Recall that the target candidate was clearly more qualified, so that similar ratings for him and for the less qualified candidates represent discrimination. Most importantly, this discrimination disappears in the heterogeneity condition. Here, the Arab candidate was evaluated more positively than the other three candidates, just like a French candidate with the same CV. Post-hoc analyses with the participants in the “target CV = Arab” condition showed that the difference between the target CV and the “other” CV was greater in the heterogeneous condition than in the other two conditions,  $t(62) = 3.98$ ,  $p < .001$ , and that there was no difference between the control condition and the homogeneous condition,  $t(62) = -.32$ ,  $ns$ .

Participants' rankings were recoded so that the best-ranked candidate received a score of 4, the second best a score of 3, and so forth. We conducted a  $3 \times 2$  between-subjects ANOVA with experimental condition and ethnicity of the target CV as independent variables and the rank score of the target CV as the dependent variable. The results revealed a reliable interaction,  $F(2,123) = 3.46$ ,  $p < .04$ . The ethnicity of the target CV made no difference in the heterogeneity condition ( $M$ 's = 3.64 and 3.59 for the Arab and the French candidate respectively,  $t(42) = .23$ ,  $ns$ ), but the Arab candidate was ranked lower than the French candidate in the homogeneity

condition ( $M$ 's = 2.95 and 3.50,  $t(42) = -2.47$ ,  $p < .02$ ) and in the control condition ( $M$ 's = 2.86 and 3.60,  $t(39) = -3.07$ ,  $p < .004$ ).

Participants' selection of the two candidates to be invited for a job interview was recoded so that each participant received either a score of 1 (the candidate of the target CV was invited for a job interview) or 0 (the candidate was not invited). The Arab candidate was treated less favorably (64%) than the French candidate (96%) in the homogeneity condition,  $\chi^2(1, N = 44) = 6.88$ ,  $p = .009$ . The same was true in the control condition,  $\chi^2(1, N = 41) = 5.34$ ,  $p < .03$  (67% and 95% of the participants invited the Arab and the French candidate for a job interview). Ethnicity played no role, however, in the heterogeneity condition,  $\chi^2(1, N = 44) = .00$ ,  $ns$  (96% and 96% for the Arab and the French candidate, respectively).

We also examined whether the effect of the experimental manipulation on the dependent variables for the Arab candidate was mediated via changes in perceived variability. A bootstrapped estimate (Preacher & Hayes, 2004) revealed an indirect effect of  $-1.24$  (95% confidence interval:  $[-2.28, -.19]$ ) and confirmed that perceived variability mediated the relationship between experimental condition and evaluations of the Arab candidate.

Taken together, these results suggest that it is not merely the act of looking at pictures of Arab individuals, but the manipulation of the target group's perceived variability that drives the effect. The findings of the present experiment rule out a potential alternative explanation for Experiment 3. The present results also show that the effects of modifying someone's perceived variability of a target group go well beyond self-ratings on a prejudice scale. Encouraging participants to think about the heterogeneity of Arabs eliminated the discrimination of an Arab job candidate in a simulated hiring situation. The decrease in discrimination is such that a qualified Arab candidate is seen as positively and is invited for a job interview as often as a French candidate with the same CV. This latter finding is important because Amadiou (2004) showed that discrimination occurred mostly during the initial phases of the selection process. Although an Arab candidate is five times less likely to be invited for a job interview than a French candidate with the same CV, both candidates are equally likely to be offered the job if they are interviewed. We observed no difference between the control condition and the homogeneity condition. We interpret this null effect as an indication that participants perceived Arabs as being quite homogeneous and that thinking about similarities did not change participants' perceptions.

## General discussion

We had several goals at the outset of the experiments reported in this article. Our main goal was to provide unambiguous empirical evidence for the idea that modifying people's perceptions of variability of a target group causes them to hold less prejudiced attitudes toward the group as a whole and to discriminate less against members of this group. We did so by manipulating perceived variability directly (i.e., without confounds), by including a measurement of perceived variability as a manipulation check, and by showing that the effect of the experimental manipulation on prejudice/discrimination was mediated by perceived variability.

Another goal was to show the effect with real world groups that had a history of intergroup conflict and with whom participants felt identified, rather than artificial groups that were created during the experiment and that participants had never met before or during the experiment. We showed the effect of perceived variability on prejudice/discrimination for Moroccans (Experiment 1), Chinese (Experiment 2), and Arabs (Experiments 3 and 4).

Yet another goal was to demonstrate the effect with a variety of manipulations of perceived variability. In Experiment 1, we focused participants' attention on subgroups rather than the group as a whole. In Experiment 2, we led participants believe that the members of the out-group held dissimilar rather than similar attitudes. In

Experiment 3, participants were exposed to a poster that insisted on the heterogeneity of the target group. In Experiment 4, participants were asked to look at pictures of members of the target group and were asked to think about either differences or similarities. In all cases, the manipulation of perceived variability produced the hypothesized effect.

A final goal was to measure prejudice and discrimination in a variety of ecologically valid ways. In Experiment 1, we used an adapted version of the Modern Racism Scale. In Experiment 2, we used Tajfel's reward matrices to measure discrimination. In Experiment 3, our indicator of discrimination was helping behavior, whereas discrimination was measured in Experiment 4 by asking participants to evaluate French and Arab candidates with equivalent CVs. Experiment 3 was a field experiment, the other three were laboratory experiments. In all experiments, we made a great effort to create a credible cover story in order to reduce experimenter demand effects (e.g., Chinese confederate sitting in the waiting area, separate experimenters for the two presumably unrelated experiments). In general, participants reported little suspicion.

In the course of our research we developed manipulations of perceived variability that can be used by decision makers who want to fight discrimination and prejudice. Fundamental research in social psychology contains numerous examples of experiments in which the researchers showed the effect of an experimentally manipulated variable that causally affects prejudice and/or discrimination. However, many of these methods do not translate well in the field (Paluck & Green, 2009). For example, in some studies prejudice reduction, participants receive a boost in self esteem (Fein & Spencer, 1997), but it may be difficult to change the self-esteem of a person in the real world both for ethical and logistical reasons. The poster we used in Experiment 3 was developed in a series of pilot experiments such as to maximize its capacity to modify people's perceptions of variability. It was developed in collaboration with an advertisement firm that is specialized in societal campaigns, and it is "ready to be used".

Future research should provide further insight in the underlying psychological process that creates the observed effect. In the introduction, we suggested that it is difficult to maintain generalized negative affect toward a group that is seen as heterogeneous. If members are seen as being rather dissimilar to each other, then it is nearly impossible to feel toward all of them alike as if they were interchangeable. The notion of group membership loses part of its meaning if the group is heterogeneous. The fact that members are different from each other implies, nearly by definition, that some have less negative characteristics than others. A similar reasoning applies to discriminatory behavior. Someone's group membership can be used as a guide for behaviors only if the group is homogeneous. Group membership is no longer diagnostic if the group heterogeneous. The implication of this reasoning is that we should be able to reduce perceivers' generalized positive affect toward a positively estimated and highly estimated group (e.g., doctors, fire fighters) by increasing the perceived variability of the group. Further research is necessary to identify exactly the process by which perceived variability reduces prejudice and discrimination.

A recent paper by Deffenbacher, Park, Judd, and Correll (2009) is relevant to the findings reported in this article. These authors made category boundaries salient (or not) and subsequently asked participants to make judgments about an in-group (non sorority members) and an out-group (sorority members). They found evidence for the out-group homogeneity bias – the out-group is seen as more homogeneous than the in-group – and the intergroup bias – more positive evaluations of the in-group than of the out-group. They further showed that the out-group homogeneity bias, but not the intergroup bias, is moderated by the salience of category boundaries. The difference in perceived similarity between in-group and out-group was greater when the category boundaries were made

salient than when they were not. The authors propose that certain situational factors, such as the salience of category boundaries, may increase perceived within-group similarity without necessarily leading to a parallel increase in intergroup bias. This research builds on earlier work showing that categorization – a multi-cultural approach to intergroup relations – does not inevitably lead to intergroup bias (Park & Judd, 2005).

It is possible that a modification of the out-group's perceived variability plays a crucial role in other methods that have been suggested to reduce prejudice and discrimination. The beneficial effect of *intergroup contact* may be due to the fact that contact increases the complexity of the perception of the out-group, thus overriding the use of stereotypes to categorize and evaluate individual out-group members (Hewstone, 2003; Turner, Hewstone, & Voci, 2007; Voci & Hewstone, 2003). For example, a cross-sectional survey on White elementary and high school students revealed that cross-group friendship increased the perceived differences among South Asian fellow students (Kenworthy, Turner, Hewstone, & Voci, 2005). Similarly, modification of the perceived variability of the out-group could explain the effect of *decategorization* on prejudice reduction. This model proposed minimizing the use of category labels altogether, and instead interacting with others on an individual basis (Brewer & Miller, 1984). It has been shown that individuating members of the outgroup or personalizing interactions de-homogenizes the perception of the out-group (Brewer & Miller, 1984; Miller, Brewer, & Edwards, 1985). In a similar vein, modification of the perceived variability of the out-group may be the crucial element in the *recategorization* approach (e.g., Gaertner, Mann, Murrell, & Dovidio, 1989). This approach encourages perceivers to reject the use of “us” and “them” in favor of a more inclusive, superordinate category that includes both the in-group and the out-group. A given group may be seen as more heterogeneous when it is considered to be a subgroup of the superordinate category than when it is defined as an out-group (Hornsey & Hogg, 2000).

Although most methods to reduce prejudice and discrimination may involve increase in perceived variability, our method is particularly easy to implement. Intergroup contact has a positive effect on prejudice reduction, especially if certain conditions are met (equal status, lack of competition, institutional support, Allport, 1954; Pettigrew & Tropp, 2006). However, these conditions rarely exist in the field (Park & Judd, 2005; Stephan, 1987). Decategorization and recategorization may work only if individuals are willing to give up their group identity, which is unlikely if they are identified with, or invested in, their social groups (Paluck & Green, 2009). Encouraging people to imagine interacting with a member of the out-group (Turner, Crisp, & Lambert, 2007) or to imagine the feelings of out-group members (Stephan & Finlay, 1999) may be effective only if they are willing and motivated to engage in the mental effort. In comparison, highlighting the variability of the members of an ethnic minority group does not require any of these conditions to be satisfied. An increase in perceived variability can be achieved in many different ways, through posters such as the one we used in our experiments, by showing members of the minority group in different roles in soap operas on the radio and on television (Paluck, 2009), or by diversity training in schools, administrations, and businesses.

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