

Modifying perceived variability: four laboratory and field experiments show the effectiveness of a ready-to-be-used prejudice intervention

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We wish to thank Paula Niedenthal, Nadine Chaurand and Mike Friedman for helpful feedback on earlier versions of this article.

This research was supported in part by grants from "l'Agence Nationale pour la Cohésion Sociale et pour l'Égalité des Chances" (Haciba Chaib and Mustapha Boutalouss).

doi: 10.1111/jasp.12010

Most of us are aware of incidences of prejudice and discrimination toward different minority groups in housing, education, and in the workplace. Reskin (1998) reported that in the United States in 1996 about 30% of White workers held professional and managerial jobs, while the comparable percentage was about 20% for Black workers, and 14% for Latinos. At the other end of the job spectrum, in 1990, about 6% of White men held service jobs, compared with about 14% of African American men and 25% of African American women. In a recent inquiry conducted in France, the HALDE (la Haute Autorité de Lutte contre les Discriminations et pour l'Égalité, 2008) estimated that with the same financial resources, an Arab candidate is three times less likely than a French candidate to get an appointment for visiting a rental apartment, and at the end of the appointment, again three times less likely to sign a lease. A recent annual report of the German Home Office (2006) indicates that right-wing violence increased in 2005. This violence is directed against various groups, in particular foreigners, homeless people, homosexuals, and left-wing activists. Soccer fans in Europe convey racist, anti-Semitic, and sexist messages by banners and songs that denigrate and offend Black players (Dembowski & Scheidle, 2002). These statistics highlight the necessity to find effective ways to improve attitudes toward minority groups

Abstract

We examined whether increasing individuals' perceived variability of an out-group reduces prejudice and discrimination toward members of this group. In a series of four laboratory and field experiments, we attracted participants' attention to the heterogeneity of members of an out-group (or not), and then measured their attitudes or behaviors. Perceived variability was manipulated by portraying the out-group members as having diverse socio-demographic characteristics and different personality traits and preferences. Prejudice and discrimination were measured in terms of self-reported prejudice, stereotyping, in-group bias, social distance, and willingness to do something for the minority group under consideration. In all experiments, perceived variability decreased prejudice and discrimination.

living in our societies. The aim of the present article was to propose and to evaluate the effectiveness of a new method of prejudice reduction based on an increase in "perceived variability."

Over the past few decades, practitioners and scholars have developed several interventions aimed at fighting prejudice and discrimination. Classic interventions include promoting contact among members of minority and majority groups under certain optimal conditions (i.e., the *contact hypothesis*; Allport, 1954), minimizing the use of category labels altogether, and instead interacting with others on an individual basis (i.e., *deategorization*, Brewer & Miller, 1984), encouraging perceivers to reject the use of "us" and "them" in favor of a more inclusive, super-ordinate category that includes both the in-group and the out-group (i.e., *recategorization*; Gaertner, Mann, Murrell, & Dovidio, 1989), and promoting cognitive consistency between general egalitarian values and attitudes toward specific groups (Katz, Wackenhut, & Hass, 1986). Contemporary approaches focus on the motivated suppression of negative stereotypes (Macrae, Bodenhausen, Milne, & Wheeler, 1996) and the replacement of automatic responses based on culturally shared stereotypes with effortful responses based on personal beliefs (Kawakami, Dovidio, Moll, Hermsen, & Russin, 2000).

However, most of the interventions described earlier have practical problems (Paluck & Green, 2009). First, some of them were developed with artificial groups that did not have a long-standing history of conflict. It is possible that an intervention that has been tested with artificial groups is not effective with real-world groups or in the field (Miller & Harrington, 1990). Second, the effectiveness of these interventions was typically tested after a short duration but the researchers rarely examined whether the changes lasted longer than the study period. Third, many of these interventions were not concrete and used manipulations that cannot be implemented in schools, at the work place, or in other natural settings (see Aboud & Levy, 2000; Paluck & Green, 2009). Finally, government institutions spend billions of dollars annually on interventions aimed at reducing prejudice, but the effectiveness of most of these interventions is never evaluated. For example, Oskamp and Jones (2000) identified 350 multicultural education programs in the United States. Only 124 programs were judged by the authors as programs including evaluations of their impact on attitudes' change. Taken together, these criticisms lead to the conclusion that it is necessary to develop an intervention (a) the effectiveness of which is evaluated both with laboratory and field experiments and (b) that is ready to be used by decision makers who want to fight discrimination and prejudice in the real world.

The research proposed here is an attempt to fill this gap, at least in part, by examining a new method, which we believe might be especially effective: The modification of the perceived variability. This method is based on recent theoretical developments in the social psychological literature. The concept of perceived variability refers to the fact that individuals perceive a given out-group as more or less heterogeneous or homogeneous (Jones, Wood, & Quattrone, 1981; Park & Rothbart, 1982; Quattrone & Jones, 1980). The same individual may have the impression that a given out-group is composed of members that are rather dissimilar from each other, or that resemble each other quite a bit. Perceived variability of a social group is thought to be important because it affects an individual's attitude toward that group. Like other attitudes, an individual's attitude toward a group can be conceptualized as having cognitive (stereotypes), affective (prejudice), and behavioral (discrimination) components (Breckler, 1984; Leyens, Yzerbyt, & Schadronek, 1994), and we suggest that all three components are affected by perceived variability. *Stereotypes* refer to perceivers' tendencies to associate certain characteristics with certain groups (Leyens et al., 1994). *Prejudice* is defined as generalized negative affect toward members of an out-group (Devine, 1989; Dovidio, Brigham, Johnson, & Gaertner, 1996). And, *discrimination* refers to negative behaviors toward members of an out-group, such as the refusal to rent one's apartment or to give a job to a member of the group (Dovidio & Gaertner, 1986). The psychological literature suggests that stereotypes, prejudice, and discrimination should be

treated as separate constructs. One can associate certain characteristics with a group without necessarily having a negative affect toward that group (Dovidio et al., 1996).

Perceived variability has been the focus of a great deal of research, largely because of its potential for helping us understand the process of stereotyping (Lorenzi-Cioldi, 1998). The more an individual perceives members of a given group to be different from each other (a) the less he/she uses a group stereotype to judge an individual member (Ryan, Judd, & Park, 1996); and (b) the less he/she tends to generalize a typical characteristic from an individual member to the group as a whole (Park & Hastie, 1987). In other words, the more an individual perceives members of a given group as variable the less he or she tends to apply his/her stereotypes to the members of that group (Brauer, 2001; Hewstone & Hamberger, 2000; Park & Judd, 2005).

Recent research also suggests that there is also a causal link between perceived variability on the one hand and prejudice and discrimination on the other hand (Dasgupta, Banaji, & Abelson, 1999; Er-rafiy, Brauer, & Musca, 2010). Brauer and Er-rafiy (2011) showed that increasing people's perceptions of variability of a target group—e.g., making subgroups salient, showing that its members have diverse opinions, and encouraging participants to think about differences among group members—causes them to feel less prejudiced toward the group as a whole and to discriminate less against members of this group. In one study (Brauer & Er-rafiy, 2011, Study 2), three participants who did not know each other prior to the experiment were invited to the laboratory at the same time. With the help of a Chinese confederate, the experimenter led them to believe that, in the adjacent room, three other students of Chinese nationality were also participating in the experiment. The ostensible purpose of the study was to examine how individuals from different cultures working in the same company communicate and exchange information. Participants completed a questionnaire about their attitudes and behaviors at the workplace (e.g., "How important is it for you to have harmonious relationships with your colleagues?"). Then, the experimenter copied the three individual answers on a "collective answer sheet" and led participants to believe that these answers would be given to the Chinese group and that they would see the responses of the Chinese group. The similarity of the answers of the three Chinese individuals constituted their experimental manipulation. In the "homogeneous condition," the answers of the Chinese individuals were similar to each other on most items of the questionnaire (e.g., responses 1, 2, and 3, on the 13-point scale going from -6 to +6). In the "heterogeneous condition," the three responses were dissimilar from each other (e.g., responses -4, 3, and 7, for the same question). The average of the three ratings for the same item was always the same across the two conditions. When participants were later asked to distribute a monetary reward to their own group and

the Chinese out-group, they allocated less money to the out-group in the “homogeneous” condition than in the “heterogeneous” condition. In other words, they discriminated less against the Chinese out-group when they believed that the group was composed of dissimilar rather than similar members. Although this finding demonstrates that a modification of people’s perception of variability of an out-group can reduce their discriminatory behaviors toward members of this group, the manipulation of the perceived variability cannot be implemented in the field.

How could one modify individuals’ perceptions of variability of a meaningful out-group in daily life and thereby improve intergroup relations? One way would be to make salient the group’s heterogeneity in terms of characteristics that have been shown to be important in person perception, most of which can be represented by perceptual characteristics. These include gender, age, social status, preferences, and personality traits (Brewer & Gardner, 1996). Such a message can easily be communicated with a poster that can be used in public intervention campaigns. In the present experiments, we designed such a poster, improved it in a series of pilot studies, and finally tested its effectiveness in a series of four laboratory and field experiments. In all four experiments, we attracted (or not) participants’ attention to the dissimilarity of members of an out-group and then measured their attitudes and/or behaviors toward this out-group. The out-group was a natural group who is defined by its ethnicity (Arabs) and who constitutes an important out-group for the French individuals who participated in our experiments. We predicted that an increased perception of variability in the out-group would lead to less prejudice and to less discrimination.

Experiment 1

In Experiment 1, we examined in a laboratory setting whether the exposure to a poster highlighting differences among members of an out-group reliably influenced participants’ level of prejudice and discrimination.

Method

Participants

A total of 49 female undergraduate students at the University of Clermont-Ferrand, France, participated in the experiment in partial fulfillment of an introductory psychology course requirement. Six participants were not included in the analyses (one participant was not French, three participants knew the experimenter personally and were familiar with her research interests, and two participants expressed suspicion about the experimental manipulation). Accordingly, the data from 43 participants were analyzed.

Stimulus material

To manipulate the perceived variability of Arabs, we used two different 40 × 60 cm posters printed on glossy paper. In the heterogeneous condition, the poster contained photographs of 12 male and female Arab individuals of different ages, hair styles, and clothing (see Figure 1). 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., “Yamina, 59 years, optimistic,” “Aïcha, 30 years, stingy”). 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 was a slogan, printed in large letters: “What makes us the same—is that we are all different.”¹ In the control condition, we used a poster with a similar layout that encouraged people to eat more fruits and vegetables.

Dependent measures

Participants completed a *stereotypicality* measure developed by Dambrun and Guimond (2004), consisting of five positive (e.g., cheerful, original) and five negative (e.g., aggressive, insolent) attributes that, based on elaborate pretesting, are all seen as stereotypic of Arabs in France. Participants judged the extent to which each attribute was descriptive of a typical Arab individual on continuous rating scales with endpoints labeled “*is not at all descriptive*” and “*is very descriptive*.” Responses were later transformed into a score from 1 to 28. Cronbach’s alpha was .83 for the negative stereotypic traits, and .62 for the positive stereotypic traits.

Prejudice toward Arabs was measured with the Modern Racism Scale (McConahay, 1986), translated to French and validated by Dambrun and Guimond (2001). The scale consists of 15 items such as “The reason that there is so much unemployment in France is because the Arabs take away the work from the French” and “I think that our society is unfair toward Arabs” (reverse coded). Participants indicated their agreement or disagreement on continuous ratings scales with endpoints labeled “*I disagree entirely*” and “*I agree entirely*.” As before, we later assigned a score from 1 to 28 to each response. The scale had a satisfactory internal consistency (Cronbach’s alpha = .91). Higher scores indicate greater levels of prejudice.

Participants also filled out a 6-item version of Adorno, Frenkel-Brunswik, Levinson, and Sanford (1950) *ethnocentrism* scale, translated into French and validated by Berry, Kalin, and Taylor (1977). The scale contains items such as “Those who do not believe that we have the greatest government in the world should leave the country” and “It is only natural and right for people to think their family is better than any other.” As with the previous measures, participants

¹The exact text in French was: “Notre point commun: La diversité.”



Figure 1 Poster that was used to modify participants' perceived variability of Arabs in Experiments 1, 2, and 4.

responded on continuous rating scales. The internal consistency was satisfactory (Cronbach's $\alpha = .71$). Higher scores indicate greater ethnocentrism.

Discrimination was measured by asking participants whether they would be willing to spend time with members of the out-group (Talaska, Fiske, & Chaiken, 2008). More specifically, participants were informed that an Arab interest group in town was looking for volunteers and were asked whether they would be willing to participate in meetings during which Arab and French individuals talk to each other. Participants indicated whether they agreed to volunteer for this association. If they agreed, they were asked how much time they would be willing to devote to the planned meetings. Participants had 12 response options, varying from 5 to 60 minutes, increasing in 5 minute intervals.

Procedure

Participants were run individually. Upon their arrival at the laboratory, they were greeted by a female experimenter who explained that the previous participant was still working in the experimental room, and that they would have to sit for a few minutes in a waiting room. Six posters (40 × 60 cm) were displayed on the walls of the waiting room. Five of these posters encouraged people to modify their behavior (e.g., to stop smoking, not to drive under the influence of alcohol, recycle more). The sixth poster varied according to experimental condition. In the heterogeneous condition, participants were exposed to the poster "What makes us the same—is that we are all different" whereas in the control condition, they saw a poster encouraging people to eat more

fruits and vegetables. After a few minutes, the experimenter returned to the waiting room and explained that the experiment was about measuring participants' attention and speed. She then suggested that participants complete the first task in the waiting room in order to save time. This task was in fact a distracter task included to make the cover story more credible. Participants completed Zazzo's (1972) "Cancellation Task," which consists of locating and crossing off all instances of two target signs that were presented among a large number of distracter signs in a given amount of time. Several minutes later, the experimenter returned and announced that the previous participant was done and that they could now start the next part of the experiment. Participants then filled out the stereotyping scale, the prejudice scale, and the ethnocentrism scale. Finally, participants completed the task measuring discrimination against Arabs (willingness to volunteer for an Arab interest group). Participants completed all tasks in the same order. At the end of the experiment, they were tested for suspicion and fully debriefed.

Results and discussion

With regard to the stereotyping measure, results revealed that participants who had been exposed to the poster about differences among Arabs had fewer negative stereotypes about Arabs ($M = 10.05$, standard deviation [SD] = 4.50) than participants in the control condition ($M = 13.88$, $SD = 5.11$), $t(41) = 2.61$, $p < .02$. There were no reliable condition differences with regard to positive stereotypes, $t(41) = .51$, not significant (ns), which may be due to the relatively low internal reliability of this scale. Participants who had been exposed to the poster about differences among Arabs were also less prejudiced ($M = 8.28$, $SD = 3.82$) and less ethnocentric ($M = 7.33$, $SD = 4.12$) than participants who had seen a poster about fruits and vegetables ($M = 12.15$, $SD = 4.05$, and $M = 10.05$, $SD = 3.46$). These differences were statistically significant, $t(41) = 3.22$, $p < .005$ (prejudice) and $t(41) = 2.34$, $p < .03$ (ethnocentrism).

Participants' willingness to volunteer for an Arab society was quite high in both the heterogeneous condition (95%) and in the control condition (86%). This difference was not statistically significant, $\chi^2(1) = .27$, ns , which may be due to a ceiling effect. There was, however, a significant condition difference with regard to the time that participants were willing to devote to the society's meetings, $t(41) = 2.10$, $p < .05$. Participants in the heterogeneous condition were willing to devote more time ($M = 9.38$, $SD = 2.84$; about 47 minutes.) than participants in the control condition ($M = 7.33$, $SD = 3.25$; about 37 minutes.).

Taken together, these results show that a manipulation of people's variability perceptions through a poster can have important effects on intergroup attitudes and behavioral intentions. Participants who were exposed to a poster high-

lighting the differences among Arabs reported fewer negative stereotypes, less prejudice, and less ethnocentrism, and were willing to devote more time to an Arab interest group than participants who had not been exposed to this poster. These findings suggest that a public advertisement campaign with posters similar to the one we have designed would be quite effective in reducing prejudice and discrimination against minority groups.

Experiment 2

The purpose of Experiment 2 was to extend the findings of the previous experiment to a field setting in which participants' exposure to the poster was even more unobtrusive than in Experiment 1. We also measured perceived variability in order to assess its mediating role in any observed changes in prejudice and discrimination.

Method

Participants

Participants were 50 undergraduate students at the University of Clermont-Ferrand, France, including 7 men and 43 women. The average age was $M = 19.52$, $SD = 2.10$. All participants were volunteers who were approached in a university building.

Stimulus material

Perceived variability was manipulated with the same poster used in Experiment 1. Half of the participants were exposed to the poster with 12 Arab individuals (heterogeneous condition) whereas the other half of the participants saw no poster (control condition).

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, Park, Ryan, Brauer, & Kraus, 1995; Park & Judd, 1990). On this task, participants are presented with personality traits and continuous rating scales with endpoints labeled "very much" and "not at all." They 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 Arabs and the French on four traits. These traits were chosen based on earlier work by Dambrun and Guimond (2004), so that there were two stereotypically Arab traits ("aggressive" and "cheerful") and two stereotypically French traits ("egoistic" and "hardworking"). The second measure of perceived variability was a one-item question on which participants indicated the

extent to which they thought Arabs [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 Arabs 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.

Participants’ attitudes toward Arabs were measured with the French version of the Modern Racism Scale, adapted to Arabs as the target group (as in Experiment 1).

Procedure

Participants in the control condition were recruited as they left a modern languages library. A female experimenter who did not appear to belong to an ethnic minority group approached potential participants and asked whether they would volunteer to participate in a short experiment. If the individuals agreed, she gave them first the questionnaire with the perceived variability measures and then, once they had handed back the filled-in questionnaire, she gave them a second questionnaire that contained the 15 items of the Modern Racism Scale. The procedure for participants in the heterogeneous condition was the same, with the only difference that the poster attracting the viewers’ attention on the diversity of Arabs had been put on the inside of the library door. The fact that there was a poster on the library door was not unusual. Indeed, the librarian assured us that library door was covered all year round with different posters promoting language schools abroad or health-conscious behaviors among students. Participants in the control condition were recruited on one weekday, and participants in the heterogeneous condition were recruited on a weekday 3 days later, with no special historical or local events intervening.

Results

Target group order did not affect any of the dependent variables and was therefore not included as an independent variable in 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 $\alpha = .97$ for the Arabs and $.77$ for the French). The analyses revealed that participants in the heterogeneous condition perceived Arabs to be more dispersed ($M = 19.48$, $SD = 4.75$) than participants in the control condition ($M = 10.55$, $SD = 4.97$), $t(48) = 6.49$, $p < .001$, whereas their perception of the French did not differ

as a function of experimental condition, $M's = 15.00$ and 15.56 , $t(48) = .90$, *ns*. The experimental condition by target group interaction was significant, $F(1, 48) = 53.41$, $p < .001$. Participants in the heterogeneous condition also thought that Arabs were more different from each other ($M = 23.88$, $SD = 4.35$) than participants in the control condition ($M = 14.60$, $SD = 5.69$), $t(48) = 6.47$, $p < .001$. Once again, participants’ perceptions of the French were not affected by whether they had been exposed to the poster or not, $M's = 20.04$ and 21.08 , $t(48) = 1.20$, *ns*, and the experimental condition by target group interaction was significant, $F(1, 48) = 36.65$, $p < .001$. These results show that our experimental manipulation was successful in modifying participants’ perception of perceived variability.

We reverse-coded the appropriate items on the Modern Racism Scale and computed an overall prejudice score from the participants’ ratings (Cronbach’s $\alpha = .87$). An independent samples *t*-test revealed that participants in the heterogeneous condition reported less prejudice toward Arabs ($M = 7.15$, $SD = 3.56$) than participants in the control condition ($M = 10.95$, $SD = 3.67$), $t(48) = 3.72$, $p < .001$. This result shows that participants express less prejudice toward Arabs after having been exposed to a poster that made the variability among Arabs salient.

In order to test for mediation, we performed two regression analyses in which we regressed participants’ prejudice level on experimental condition and perceived variability (difference in perceived dispersion in analysis 1 and difference in perceived differences in analysis 2). In both analyses, the effect of experimental condition was not significant, $F(1,47) = 3.03$, $p = .09$, and $F(1, 47) = .22$, *ns*, whereas the effect of perceived variability remained significant, $F(1, 47) = 57.84$, $p < .001$, and $F(1, 47) = 42.66$, $p < .001$ (see Figure 2). According to two Sobel tests, the path from the experimental condition to prejudice becomes significantly smaller when perceived variability is added to the regression model (Sobel $z = -5.27$, $p < .001$ and Sobel $z = -4.45$, $p < .001$). These analyses suggest that the effect of experimental condition on prejudiced is mediated by perceived variability.

Taken together, our results provide convergent evidence for the idea that a poster highlighting the differences among Arab individuals can reduce prejudice toward Arabs, at least when prejudice is measured with a self-report scale. Experiment 2 goes beyond Experiment 1 for four reasons: (a) the sample included students who were not used to participating in psychology experiments; (b) the poster showing the heterogeneity of Arab group was displayed in a more unobtrusive manner; (c) we tested the effectiveness of that poster in the field; and (d) we demonstrated the mediating role of perceived variability. A shortcoming of Experiment 2 is that there was nonrandom assignment and that a relatively small number of participants took part in the study. Also,

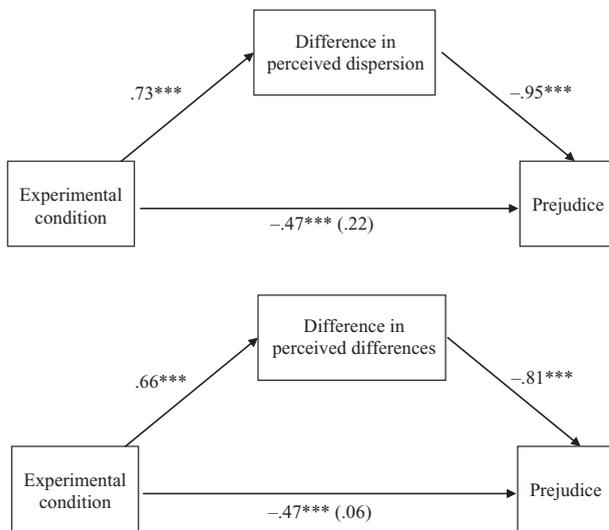


Figure 2 Results of the regression analyses showing that the effect of experimental condition on prejudice is mediated by perceived dispersion (top panel) and by perceived differences (bottom panel) in Experiment 2. The numbers are standardized regression coefficients. Note. $n = 50$. *** $p < .001$.

generalizability could be limited by the fact that the experiment took place in a setting where there is relatively little intergroup conflict compared with schools, neighborhoods, and work environments (Cameron & Rutland, 2006; Paluck, 2006). We conducted two additional experiments to further establish the external validity of our findings.

Experiment 3

As evidenced by media accounts, study commission reports, and teachers' forums, schools are marked by violence and intergroup conflict and constitute a one of the most conflictual environments (Bègue, 2004; Guimond, 2004). In Experiment 3, we examined the attitudes of French high school students toward Arab people. Unlike the two previous experiments, Experiment 3 was a large-scale field experiment in which the beneficial effects of our variability poster were examined several weeks after exposure. Students in eight schools participated in the study. Schools were randomly assigned to experimental condition. As in Experiment 2, we examined whether the beneficial effect of the poster was due to a change in students' perception of variability of Arabs (mediation).

Method

Participants

One thousand twelve students (485 boys and 527 girls) from eight high schools were tested. Their mean age was 16 years

and 9 months ($SD = 1.29$ year). The total number of participating classes was 48. The average number of classes that were tested in each school was 6. Schools were contacted to take part in the project and school principals and teachers were briefed on the aims and purpose of the research project. Permission was requested and obtained from participants' parents or guardians.

Experimental design

We implemented a matched randomized experimental design. After we had the final list of schools agreeing to participate in the experiment, we formed pairs of schools so that the two schools in the same pair were as similar as possible on a number of sociological dimensions. These dimensions included the size of the student body, the social status of the students, the ethnic composition of the school, and the environment in which the school was located (rural versus urban). Once schools were grouped into pairs, we randomly assigned one school in each pair to the treatment condition (poster) and other to the control condition.

Procedure

The study took place over a period of 5 weeks. In the first week, posters attracting the viewers' attention to the diversity of Arabs were put on the classroom walls in the treatment schools. Another poster was put on the door outside of the school principal's office. The poster was identical to that used in Experiments 1 and 2, except that it contained only pictures of young Arab individuals and not, as the previous version, pictures of Arabs of all ages. Two weeks later, the posters were taken down. Posters were put up and removed outside of class hours. During the fifth week, a female experimenter visited the participating classroom and asked students to participate in a short study. Students completed a questionnaire measuring perceived variability and attitudes toward Arabs. At the end of the questionnaire, participants indicated if they recalled having seen the poster or not.

The students in the control schools were not exposed to the poster. They completed the perceived variability and attitudes questionnaire at the same time as the students in the treatment condition. After completion of the questionnaires, all participants were probed for suspicion, fully debriefed, and thanked for their contribution to the research.

Dependent measures

Participants made their responses on continuous rating scales, and a score from 1 to 28 was attributed to each of the participants' responses. The questionnaire included measures of perceived variability, in-group bias, social distance, prejudice, and discrimination (see later). The order of the two target groups (i.e., French and Arab) was counterbalanced for the measures of perceived variability and in-group bias.

Perceived variability

This construct was measured by two questions (Quattrone & Jones, 1980). Participants indicated the extent to which they thought Arabs [the French] (a) were different from each other (on a scale with endpoints labeled “not at all different” and “very different”), and (b) were similar to each other (on a scale labeled “not at all similar” and “very similar”). After reverse-coding the similarity item, we averaged each participant’s two responses to form an overall variability score.

In-group bias (Aboud, 2003; Doyle & Aboud, 1995)

The in-group bias measure consisted of having participants rate the extent to which the French and the Arabs possessed four traits (egoistic, aggressive, hardworking, and cheerful). A liking score was computed by subtracting the average rating of the negative traits from the average rating of the positive traits for each target group. Then, we obtained an in-group bias score by subtracting the liking score for Arabs from the liking score for French. Higher scores mean greater in-group bias.

Social distance

The social distance measure was based on previous research (e.g., Bogardus, 1925; Green & Wong, 2001) and contained one positive item (“If an Arab person were put in charge of me, I would not mind taking advice and direction from him or her”) and two negative items (“I would probably feel a little self-conscious dancing with an Arab individual in a public place” and “I wouldn’t want to be around a teenager who is Arab”). After reverse-coding the positive item, participants’ ratings on the three items were averaged to form an overall social distance score (Cronbach’s $\alpha = .83$).

Prejudice

Participants’ prejudice level was evaluated by the Modern Racism Scale (see Experiments 1 and 2). The difference with our previous experiments is that we selected the eight items that correlate the most with the two factors from the original scale (nationalism and intolerance; see Dambrun & Guimond, 2001, for the choice of the items). Four items were positive and the four items were negative. After reverse-coding the appropriate items, a prejudice score was computed by averaging the eight items comprising the prejudice scale ($\alpha = .93$).

Discrimination

In order to assess discrimination, participants were asked whether they wanted their name to appear on a web petition in support of reduction of discrimination against Arabs in France (Paluck, 2005). If participants agreed, they indicated their first and last names and their hometown on the last page of the questionnaire. In order to make the measure of discrimination more engaging, the experimenter always

brought a box with her when she entered the classroom. Participants were asked to tear out the last page of the questionnaire, to fold it in half and to put it in the box regardless of whether they had indicated their name or not.

Socio-demographic information

Participants provided information on age, gender, their nationality, and the nationality of their parents.

Results and discussion

Main results

Because participants were nested within classes, we analyzed the data using hierarchical linear modeling (HLM) with participant as level-1 units and classes as level-2 units. Gender, age, and self-reported awareness of the poster had no effect on the dependent variables, so these variables are not included in the analyses reported later. Our level-1 model was $DV = \beta_{0j} + \varepsilon_{ij}$ and our level-2 model was $\beta_{0j} = \gamma_{00} + \gamma_{01}(COND) + \mu_{0j}$ (where $DV =$ “dependent variable” and $COND =$ “experimental condition”). The dependent variables in HLM can be either continuous or categorical (Raudenbush & Bryk, 2002).

The analyses revealed that participants in the “treatment” classes perceived the out-group to be more variable ($M = 19.80$, $SD = 8.15$) than participants in the “control” classes ($M = 12.90$, $SD = 8.83$), $t(46) = 9.07$, $p < .001$, while their perceived variability of French people, as expected, did not differ as a function of the experimental condition, ($M = 23.00$, $SD = 4.92$) and ($M = 22.62$, $SD = 4.95$), $t(46) = .55$, *ns*. These results show that our experimental manipulation was successful.

With regard to the in-group bias, the analyses showed that participants in the “treatment” classes displayed less in-group bias ($M = 1.40$, $SD = 10.76$) than participants who were in the “control” classes ($M = 7.34$, $SD = 12.74$), $t(46) = 5.79$, $p < .001$. The analyses also revealed that participants who had been exposed to the poster about differences among Arabs reported less social distance ($M = 6.10$, $SD = 5.53$) and were less prejudiced ($M = 9.37$, $SD = 6.42$) than participants in the “control” classes ($M = 10.72$, $SD = 8.00$, and $M = 15.71$, $SD = 7.51$, for social distance and prejudice, respectively). These differences were statistically significant, $t(46) = 4.81$, $p < .001$ (social distance) and $t(46) = 10.27$, $p < .001$ (prejudice)². Finally, students in the “treatment” classes were

²Additional analyses showed that there was a significant main effect of gender on social distance measure. Men ($M = 9.65$, $SD = 8.14$) reported feeling greater social distance than women ($M = 7.03$, $SD = 5.92$), $t(1008) = 2.82$, $p < .001$. This main effect interacted with experimental condition, $t(1008) = 2.56$, $p < .02$. The beneficial effect of the heterogeneity poster was stronger for men than for women.

significantly more likely to give their names for the web site petition in support of the reduction of discrimination against Arabs (64.1%), compared with the students in the “control” classes (31.3%), $t(46) = 8.62, p < .001$.

Mediation

The other purpose of the present experiment was to show that the effect of the experimental manipulation on the dependant variables was mediated by participants' perception of variability. As described in the previous paragraphs, the experimental manipulation affected both the mediator (perceived variability) and the outcome measures (in-group bias, social distance, prejudice and discrimination). We ran four analyses in which we regressed one of the outcome measures on experimental condition and perceived variability. Our level-1 models were $DV = \beta_{01j} + \varepsilon_{ij}$ and $PV = \beta_{02j} + \varepsilon_{ij}$. Our level-2 model was $\beta_{01j} = \gamma_{00} + \gamma_{01}(\beta_{02j}) + \gamma_{02}(COND) + \mu_{0j}$ (where DV = “dependent variable,” PV = “perceived variability,” and COND = “experimental condition”). For each of the four outcome measures, the data were consistent with the hypothesized mediational model. For the measure of in-group bias, the analysis revealed a significant effect of perceived variability, $t(45) = 5.79, p < .001$, but a nonsignificant effect of experimental condition, $t(45) = .97, ns$. A similar result emerged for the social distance measure in that the effect of “perceived variability” was significant, $t(45) = 6.22, p < .001$, whereas the effect of the “experimental condition” was not, $t(45) = .05$. With respect to the measure of prejudice, the effects of “experimental condition” and “perceived variability” were both significant, $t(45) = 4.59, p < .001$, and $t(45) = 7.23, p < .001$, respectively. The same was true when the discrimination measure was the dependent variable: The effects of both experimental condition and perceived variability were significant, $t(45) = -3.86, p < .001$, and $t(45) = -2.25, p < .03$, respectively. Four Sobel tests revealed that the path from the experimental condition to participants' (1) in-group bias; (2) social distance; (3) prejudice; and (4) discrimination becomes significantly smaller when perceived variability is added to the model (Sobel $z = 4.50, p < .001$; Sobel $z = 4.70, p < .001$; Sobel $z = 5.08, p < .001$ and Sobel $z = 2.13, p < .04$, respectively).

To summarize, these results demonstrate that a modification of students' perception of variability of a minority group in a context marked by intergroup conflict (i.e., schools) can affect their attitudes toward members of this group. Students who had been exposed to the poster highlighting the differences among Arabs evaluated Arabs more positively, felt closer to them, were less prejudiced and discriminated less against them than students who had not been exposed to this poster. The present results show also that the effects of modifying someone's perceived variability of a target group go well

beyond self-ratings on a prejudice scale. Exposing participants with the poster highlighting the differences among Arabs caused them to sign more often a web site petition in support of the reduction of discrimination against Arabs. Finally, the mediational analyses suggest that the effect is due to the poster's capacity to successfully modify people's perception of variability.

Experiment 4

Although the poster we created seems to be quite effective in reducing negative attitudes toward Arabs, Experiments 1–3 nevertheless contain a possible confound. In the heterogeneous condition, participants were exposed to a poster that contained pictures of individuals, whereas in the control condition, they were exposed to a poster that contained drawings of fruits (Experiment 1), or were not exposed to any poster (Experiments 2 and 3). There are two viable alternative explanations for the results we obtained. First, it could be that the beneficial effect of the poster may be due to the fact that the poster reminds viewers of the social norm that it is unacceptable to discriminate against Arabs (Falomir, Muñoz-Rojas, Invernizzi, & Mugny, 2004). Second, it could be that the simple fact of looking at pictures of Arab individuals causes participants to hold less negative attitudes toward Arabs (Moskowitz & Li, 2011; Zebrowitz, White, & Wieneke, 2008). Although these alternative explanations do not invalidate the conclusion that the poster effectively reduces prejudice and discrimination, their existence is unsatisfactory from a scientific standpoint because we do not know why exactly the poster is effective. We conducted Experiment 4 to examine these alternative explanations.

In Experiment 4, we included the heterogeneous and control conditions from Experiment 1, but we added two new conditions. In the “social norm condition,” we used a poster that was used by the French government in a public advertisement campaign 5 years prior to our experiment. The poster displays a single Arab individual and encourages viewers to stop discriminating against Arabs. In the “faces condition,” we used the same poster as in the heterogeneous condition, but we removed all information related to the heterogeneity of Arabs and replaced the slogan by a general appeal to stop discrimination. This experimental procedure allowed us to examine what exactly drove the effect in the previous experiments. The poster in the social norm condition only contained the appeal to stop discrimination. The poster in the faces condition contained the appeal to stop discrimination and the faces of Arab individuals. The poster in the heterogeneity condition contained the appeal to stop discrimination, the faces of Arab individuals, and information relevant to the heterogeneity of Arabs. Given our hypothesis outlined in the introduction, we predicted that only participants in



Figure 3 Posters that were used in Experiment 4.

the heterogeneity condition would display a significant reduction in prejudice.

Method

Participants

Participants were enrolled in 24 classes at Clermont University, France. There were 486 undergraduate students (163 male and 323 female). Participants' ages ranged from 17 to 33 years, with an average of $M = 19.90$ years ($SD = 2.03$ years). Both the intervention and the measure of dependent variables took place in the classroom. Each classroom was randomly assigned to one of the four experimental conditions "control," "social norm," "faces," and "heterogeneous."

Procedure and stimulus material

The experiment ran over a course of 2 weeks. During the first week, before the beginning of the class, one of the four posters was displayed on the classroom walls. The posters in the control condition and in the heterogeneous condition were identical to those used in Experiment 1. The posters used in the two other conditions are shown in Figure 3. As can be seen, the poster in the "social norms condition" contained the picture of a young Arab in casual clothing above a text with the following words: "This young person defies stereotypes. You see a slacker, but he is putting in hours of training. You assume he is incapable, while in fact he is building his expertise. You imagine him stealing a car, whereas from his employers he commands respect. Judge not by appearance, judge by competence." The poster in the "faces condition" was identical to that in the heterogeneous condition, but the names of and the personal information about the individuals had been

removed. Also, the slogan "What makes us the same—is that we are all different" has been replaced by "Discrimination . . . STOP!!!" After the class ended, the experimenter removed the poster. The following week, participants completed the questionnaire measuring their attitudes toward Arabs. After completion of the questionnaires, all participants were debriefed and thanked for their collaboration.

Dependent measures

Participants completed a variety of dependent measures all of which were described in detail in Experiments 1–3. We used a single item to measure participants' *perceived variability* ("To what extent are Arabs [French] different from each other?"; Park & Judd, 1990). The order in which the two target groups were presented was counterbalanced. *Prejudice* was assessed with the Modern Racism Scale ($\alpha = .92$) (McConahay, 1986). For our measure of *stereotypicality*, participants indicated the extent to which they thought Arabs possessed five stereotypical positive ($\alpha = .58$) and five stereotypical negative traits ($\alpha = .83$). As before, participants made their responses on continuous rating scales, and a score between 1 and 28 was later attributed to each response. Finally, in order to obtain a behavioral indicator of participants' attitudes toward Arabs, we asked participants whether they would agree to volunteer some of their time for an Arab interest group in town and how much time they would be willing to devote to the planned meetings (*discrimination*).

Results

All measures were analyzed using HLM with participant as level-1 units and classes as level-2 units. Preliminary analyses

Table 1 Perceived Variability, Stereotypes, Prejudice, and Discrimination as a Function of Experimental Condition in Experiment 4

	Experimental condition			
	Heterogeneous <i>M (SD)</i>	Faces <i>M (SD)</i>	Social norm <i>M (SD)</i>	Control <i>M (SD)</i>
Variability				
Arabs	18.22 (6.38)	13.18 (2.83)	11.29 (2.43)	12.19 (2.77)
French	19.76 (2.93)	22.57 (2.12)	21.16 (2.35)	20.58 (2.79)
Stereotypes				
Positive	13.93 (.43)	13.73 (1.16)	13.68 (.94)	13.35 (.88)
Negative	14.18 (1.54)	17.09 (1.47)	16.78 (2.17)	17.50 (1.53)
Prejudice	13.32 (2.33)	18.23 (1.43)	19.07 (1.45)	18.50 (1.90)
Discrimination				
Willing to help	58.8%	24.8%	26.8%	34.7%
Devoted time	37.31 (15.60)	22.50 (14.12)	19.85 (12.02)	20.00 (9.75)

Note. Higher scores represent higher levels of perceived variability, greater stereotypic beliefs, higher prejudice, greater willingness to help, and more time volunteered.

showed that gender, age, and question order had no influence on the results, so these variables were not included in the analyses reported below.

We analyzed the data using Helmert contrasts. The first contrast opposed the heterogeneity condition to all other conditions (−3, 1, 1, 1). The second contrast opposed the faces condition to the two remaining conditions (0, −2, 1, 1). The third contrast opposed the social norm condition to the control condition (0, 0, −1, 1). The analyses revealed that participants in the heterogeneous condition perceived Arabs to be more variable than participants in the other three conditions, $t(20) = -2.32, p = .03$ (see Table 1). The other two contrasts were not significant, p 's > .31. The perceived variability of the French did not vary as a function of experimental condition, all p 's > .14. Participants in the heterogeneous condition had lower scores on the Modern Racism Scale, $t(20) = 5.88, p < .001$, and endorsed fewer negative stereotypes, $t(20) = 4.12, p < .001$, than participants in the other three conditions. The other two contrasts were nonsignificant, neither for prejudice, p 's > .35, nor for negative stereotypes, p 's > .50. There were no condition differences for positive stereotypes, p 's > .20. Finally, participants who were exposed to the heterogeneity poster were significantly more willing to help an Arab interest group, $t(20) = -5.64, p < .001$, and were willing to devote more time, $t(20) = -9.28, p < .001$, than participants in the other three conditions. The remaining two contrasts were not significant, neither for general willingness to help (p 's > .11) nor for the amount of time they were willing to devote (p 's > .45).

We conducted mediational analyses using the same data analysis strategy as that described in Experiment 3. These analyses revealed that the effect of experimental condition (Helmert contrast #1) on negative stereotypes, prejudice, and discrimination (willingness to help and devoted time) was either partially or fully mediated by perceived variability

(Sobel $z = 2.02, p < .05$; Sobel $z = 2.31, p < .02$, Sobel $z = 2.73, p < .01$, and Sobel $z = 2.36, p < .02$, respectively).

These results suggest, consistent with our expectation, that participants who had been exposed to the poster highlighting differences among Arabs perceived them to be more heterogeneous, had fewer negative stereotypes, were less prejudiced, and were more willing to give some of their time to an Arab interest group than participants who were exposed to any of the three other posters. Posters appealing to the social norm of antidiscrimination and/or displayed faces of Arab individuals appeared to be ineffective.

General discussion

The purpose of the four experiments reported in this paper was to demonstrate the effectiveness of modifying the perceived variability of an out-group as an intervention to change peoples' out-group attitudes toward that group. The results of Experiment 1 showed that exposing participants to a poster increasing the perception of variability of Arabs affects positively their attitudes toward that group in the laboratory. Participants in the "heterogeneous condition" judged the Arab group as less stereotypical, reported less prejudice, were less ethnocentric, and were willing to devote more time to an Arab interest group compared with participants in the "control condition." In Experiment 2, we found a similar effect in the field. Participants in the "heterogeneous condition" expressed less prejudice toward out-group members than those in the "control condition." In Experiment 3, the intervention took place in schools, and a modification of students' perception of variability of Arabs group promoted again positive attitudes toward that group. Specifically, students who were exposed to the poster about the heterogeneity of Arabs viewed them more positively, felt less distant, were less prejudiced, and discriminated less against them than

students who had not been exposed to the poster. Experiment 4 showed that the beneficial effect of our heterogeneity poster was not driven by the fact that participants were reminded of the antidiscrimination norm or looked at faces of Arab individuals. There was a significant decrease in prejudice and discrimination only when the poster modified people's perceived variability of Arabs. In Experiments 2–4, the effects of the experimental condition on the dependent variables was mediated by the modification of perceived variability, lending further credence to the claim that the modification of perceived variability is the aspect that makes our poster particularly effective.

The current research has at least three strong points. First, we used a variety of attitude measures. These measures include stereotypicality (Experiments 1 and 4), prejudice (Experiments 1–4), ethnocentrism (Experiment 1), in-group bias (Experiment 3), and social distance (Experiment 3). We also measured participants' behavioral intentions, such as their willingness to volunteer for an Arab interest group (Experiments 1 and 4) and their willingness to sign a web petition against the discrimination of Arabs (Experiment 3). The second strong point is the non-immediacy of the measures. Participants' attitudes were measured either directly following the experimental manipulation (Experiments 1 and 2) or several days later (Experiments 3 and 4). Our research thus shows that the effects of our variability poster are both immediate and long-lasting. The third strong point is that we tested the effectiveness of our intervention both in a controlled laboratory setting and in real-world social settings.

Our method involves reducing prejudice and discrimination against an out-group by reminding viewers of the fact that its members are heterogeneous, that is, that these members possess diverse negative and positive characteristics. The poster that was used in our experiments reminds viewers that some Arabs are polite, some are impolite, and some Arabs are interesting and some are boring. In contrast, some attempts to fighting prejudice and discrimination involve showing members of an out-group with only positive characteristics (e.g., Arabs are all polite or interesting; Karpinski & Hilton, 2001; Kawakami et al., 2000). Imagine a poster trying to convince viewers that all Arabs possess

positive characteristics. Such a claim communicates implicitly that the social group in question consists of "homogeneous members" and as a consequence, we would argue, would be ineffective in changing prejudice and discrimination (Er-rafiy & Brauer, 2010; Paolini, Hewstone, Rubin, & Pay, 2004). Moreover, most viewers would likely feel reactance toward such a poster because they would consider it blatantly manipulative and even false. One advantage of an intervention campaign that focuses perceivers' attention on the heterogeneity of a discriminated group is its social acceptability.

In terms of practical implications, these findings have implications for social policy. Our research introduces an effective tool for use by policy makers interested in fighting prejudice and discrimination in the society. Compared with existing techniques for discrimination and prejudice reduction, our method is particularly easy to implement. For instance, intergroups contact reduces prejudice and discrimination, especially if certain conditions are met (equal status, lack of competition, institutional support, Allport, 1954; Pettigrew & Tropp, 2006). However, in the field, these conditions may not characterize many informal contact opportunities among members from different groups (Powers & Ellison, 1995). Recategorization may work only if individuals are willing to give up their group identity, which is unlikely if they are strongly identified with their social groups (Bourhis & Leyens, 1999). Compared with other approaches, modifying people's perceived variability is relatively easy to implement and causes less reactance. Using a poster to make the heterogeneity of a minority group salient is just one possibility among many others. The media (e.g., television, radio) could also contribute to the reduction of the prejudice by showing members of minority groups in more variables roles. Diversity trainings in schools and companies could aim to modify perceived variability through specific exercises. To conclude, it does not matter if it happens through a poster, the media, or diversity training, the objective was the same: increase perceived variability by showing that members of a minority group are different from each other. Once people have a relatively heterogeneous perception of an out-group, they will tend to hold a more positive attitude toward it and they will discriminate less toward its members.

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