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Abstract

Past research on member-to-group generalization has failed to distinguish the effect of member descriptive deviance from the effect of member evaluative deviance. In addition, researchers have used group judgments that confound stereotypicality with prejudice. Three experiments resolved these methodological problems and provided the first systematic test of Hamburger's (1994) model of stereotype change. In Experiment 1 ($N = 60$), consistent with Hamburger's predictions, exposure to one deviant group member increased the perceived group dispersion, but did not affect judgments of group stereotypicality and prejudice. Experiment 2 ($N = 120$) replicated these results in an interpersonal setting, but not in an intergroup setting. Experiment 3 ($N = 125$) replicated the results of Experiment 1 when the member's profile conveyed information about eight stereotype-relevant dimensions, but not when it conveyed information about only four stereotype-relevant dimensions. We discuss the results in the light of past evidence and future strategies for stereotype change.

Key words: stereotype change, group variability, generalization, stereotype deviance, group perception.

Increased Group Dispersion After Exposure to One Deviant Group Member: Testing Hamburger's Model of Member-to-Group Generalization

In April of 1998, Bishop Desmond Tutu, the first black Anglican Dean of Johannesburg, was among the first to pay tribute to Bishop Trevor Huddleston on his death. Father Huddleston was a courageous white Anglican clergyman who devoted much of his life to the struggle against apartheid. Tutu told the media the story of his first meeting with Father Huddleston at a hostel for blind black women, where Tutu's mother was a cook. Tutu was astonished at the sight of a tall white man in a flowing cassock who came into the hostel and raised his hat to the women. Because of this unexpected expression of deference, Tutu said that he realized, for the first time, that all whites were not the same (Brittain, 1998, April 21; "Corrections," 1998).

Bishop Tutu's story shows that his limited experience with just 'one deferential white' was sufficient to make him see white people as a less homogeneous group. The story suggests that exposure to one deviant group member may not necessarily affect perceived group stereotypicality, but it can still have a potent and beneficial influence on the perceived heterogeneity of a group. This idea is at the core of Hamburger's (1994) model of stereotype change, which extends previous frequency distribution models of social category representation (Kraus, Ryan, Judd, Hastie, & Park, 1993) in order to encompass a mechanism for subcategorization. In so doing, the model generates novel predictions about stereotype change and has the potential to enrich an ongoing debate about how stereotypes develop to reflect increased experience with a group (Linville, Fischer, & Salovey, 1989; Park, Judd, & Ryan, 1991).

The experiments reported in this article test Hamburger's (1994) model. Specifically, they explore the extent to which people will treat one group member as a sufficient basis for inferring group qualities (Kunda & Oleson, 1997; cf. Wilder, 1984). Following Hamburger, our main argument is that this member-to-group generalization will occur for some aspects of the group representation, but not for others.

The Differential Sensitivity to Generalization of Group Measures

People modify their representation of a group in order to reflect whatever information is available about individual group members (Hewstone, 1996; Rothbart, 2001; Rothbart & John, 1985). Hamburger (1994) proposed that exposure to *one* disconfirming group member affects group *dispersion*, but not group *stereotypicality*, whereas exposure to several disconfirming group members affects *both* dispersion and stereotypicality (see also Wilder, 1984, p. 191). Group dispersion refers to the variability of group members around the central tendency of the group (Ford & Stangor, 1992; Linville, Brewer, & Mackie, 1998; Quattrone, 1986; Ryan, Judd, & Park, 1996). It is often measured by asking people to indicate where the two most extreme group members would fall along stereotype-relevant attribute dimensions (Park & Judd, 1990). Stereotypicality refers to the perceived association between a set of attributes and a social category or group (Ashmore & Del Boca, 1981). It is often measured by asking people to indicate where the average group member falls along stereotype-relevant attribute dimensions (Park & Judd, 1990).

Hamburger's (1994) model is based on frequency distribution analyses of categorization (Kraus et al., 1993; see also Park et al., 1991). Consistent with these analyses, Hamburger's model assumes that people use summary frequency distributions to remember and organize information about group members that they have encountered. People mentally locate group members along attribute dimensions on the basis of the degree of attribute-member association and they record the frequency with which each attribute value has occurred. People develop a sense of the distribution's central tendency and dispersion through this frequency-based compiling process (see also Park et al., 1991; cf. Linville et al., 1989).

Notably, central tendency changes *less* than dispersion because members who disconfirm the group stereotype are treated as outliers and thus are located at the tails of the mental frequency distribution. Hence, disconfirming members stretch the distribution's dispersion, but have a relatively small impact on its central tendency.

Hamburger's (1994) model is unusual, however, because it also predicts a *discontinuity* in the development of central tendency and dispersion. This allows Hamburger to explain cases in which change occurs in dispersion but remains 'latent' for central tendency, until several disconfirming members are encountered (see Pettigrew, 1986, for a discussion of unexplained latent effects in contact research). Hamburger expects disconfirming members to affect the distribution's central tendency only when they overcome a 'minimal frequency threshold'. To put this differently, a subcategory of similar disconfirming group members must develop within the broader group representation. No minimal frequency threshold is proposed for the detection of change in dispersion. So, a unique prediction from Hamburger's model is that *one* deviant group member will change a distribution's dispersion, but *not* its central tendency.

Previous One-Member Generalization Experiments

Hamburger's (1994) prediction seems inconsistent with the work of many researchers who exposed participants to one disconfirming group member and found generalization using measures of group stereotypicality (see Garcia-Marques & Mackie, 1999, Experiment 2; Johnston, Bristow, & Love, 2000, Experiments 2 & 3; Kunda & Oleson, 1997; Nisbett, Kranz, Jepson, & Kunda, 1983, Experiment 2; Park & Hastie, 1987; Quattrone & Jones, 1980; Rothbart & Lewis, 1988, Experiment 3; Stapel & Koomen, 1998, Experiment 1; Wilder, Simon, & Faith, 1996; Yzerbyt, Coull, & Rocher, 1999, Experiments 1 & 3). We believe, however, that this inconsistency is more apparent than real. Previous research provided an inadequate test of Hamburger's prediction because researchers manipulated a type of deviance and measured a type of stereotype change that he did not consider in his model.

The Dual Nature of Member Deviance

Researchers in the area of stereotype change have often failed to distinguish *descriptive deviance* from *evaluative deviance*. Descriptive deviance refers to cases in which the target member possesses characteristics that are *descriptively* inconsistent with the characteristics attributed to the group as a whole. Evaluative deviance is conceptually distinct from descriptive deviance (see also Dijksterhuis & van Knippenberg, 1996; Jackson & Sullivan, 1988; Schneider, 1973, as cited in Snodgrass, 1977). It refers to cases in which the target member is *evaluatively* inconsistent with the valence of the group, without necessarily violating specific beliefs about the group's characteristics.¹ The failure to recognize conceptually distinct forms of deviance has prevented researchers from identifying potential confounds in their manipulations.

Two studies provide exceptions to this problem. First, Quattrone and Jones (1980) found that the effect of a member's descriptive deviance on group stereotypicality was unrelated to the effect of that member's valence, but this may have been due to their use of a confounded measure of group stereotypicality (see below for a discussion of this confound). Second, Wilder et al. (1996, Experiments 1 & 2) succeeded in manipulating descriptive deviance while controlling for evaluative deviance, but only in some conditions. All the other researchers in this area have failed to keep one type of deviance constant while manipulating the other type. As a consequence, disconfirming member information has not only been mismatched with group attributes, but *also* with group valence.

In most research in this area, descriptive deviance was conveyed either by member profiles that were more positive than the average or expected person (Garcia-Marques, 1999,

Experiment 2; Johnston et al., 2000, Experiment 2; Nisbett et al., 1983, Experiment 2; Stapel & Koomen, 1998, Experiment 1; Yzerbyt et al., 1999, Experiments 1 & 3), or by profiles that were more negative than the average or expected person (Garcia-Marques & Mackie, 1999, Experiment 2; Johnston et al., 2000, Experiment 2; Kunda & Oleson, 1997; Nisbett et al., 1983, Experiment 2; Park & Hastie, 1987; Rothbart & Lewis, 1988, Experiment 3; Stapel & Koomen, 1998, Experiment 1; Wilder et al., 1996, Experiment 3). Consequently, the generalization effects found in these studies cannot be interpreted clearly. These effects may have been due to exposure to a *descriptively* deviant group member, and/or to an *evaluatively* deviant group member.

The Dual Nature of Stereotypicality Measures

Past research has also suffered from a confound between measures of group stereotypicality and prejudice towards the group. The term ‘prejudice’ describes an overall evaluation of a group or its members. It thus encompasses how positive or negative that person’s view is of the group (Petty & Wegener, 1998). Group stereotypicality co-varies perfectly with prejudice when it is assessed using either (1) attributes that are all positive; (2) attributes that are all negative; (3) stereotypical attributes that are positive and counterstereotypical attributes that are negative; (4) stereotypical attributes that are negative and counterstereotypical attributes that are positive.² Under these four conditions, changes in stereotypicality are *not* distinguishable from changes in prejudice towards a group. An increase in stereotypicality can reflect either an increase or decrease in prejudice, depending on which of the four conditions is operating.

In previous research, stereotypicality was always measured in one of these four ways, and there was no independent measurement of prejudice (for an exception, see Wilder et al., 1996, Experiments 1 & 2). This means that effects interpreted as reductions in group stereotypicality might actually have involved a reduction in prejudice (Garcia-Marques & Mackie, 1999, Experiment 2; Johnston et al., 2000, Experiment 2; Nisbett et al., 1983, Experiment 2; Stapel & Koomen, 1998, Experiment 1; Yzerbyt et al., 1999, Experiments 1 & 3) or even an increase in prejudice (Garcia-Marques & Mackie, 1999, Experiment 2; Johnston et al., 2000, Experiment 3; Kunda & Oleson, 1997; Nisbett et al., 1983, Experiment 2; Park & Hastie, 1987, Experiments 1 & 2; Rothbart & Lewis, 1988, Experiment 3; Stapel & Koomen, 1998, Experiment 1; Wilder et al., 1996, Experiment 3).

Past generalization evidence may reflect changes in prejudice due to member evaluative deviance. This idea is indirectly supported by the results from two experiments by Wilder and his colleagues (1996, Experiments 1 & 2). These are the only researchers who used an unconfounded measure of stereotypicality and (in some conditions) an unconfounded manipulation of descriptive deviance. Consistent with Hamburger’s (1994) model, the researchers found no evidence of generalization when the target member was a descriptive deviant, but not an evaluative deviant, and when stereotypicality was measured using both positive and negative attributes. Unfortunately, Wilder and his colleagues did not measure group dispersion, and so their research cannot provide a complete test of Hamburger’s model.

Our One-Member Generalization Experiments

In the present research, we aimed to provide the first systematic test of Hamburger’s (1994) model by exploring the moderating role of group measures in the process of member-to-group generalization. We avoided the confounds just described in two ways. First, we manipulated a group member’s descriptive deviance while controlling for that person’s valence or evaluative deviance. So, although our materials varied the match between the deviant’s attributes and the group stereotype, they did so without altering their valence or evaluative deviance from the group stereotype. Second, we either measured stereotypicality and prejudice separately or we measured stereotypicality in a way that did not co-vary with

prejudice. This eliminated any confound between stereotypicality and prejudice.

Some researchers have found a generalization advantage for moderate member deviance over high member deviance along group stereotypicality (Kunda & Oleson, 1997, Experiments 1, 2, & 3; Rothbart & Lewis, 1988, Experiment 3; Wilder et al., 1996). However, this work suffers from the same methodological weaknesses as other one-member experiments. For experiments such as ours, Hamburger's (1994) model predicts no moderating effect of member's descriptive deviance on stereotypicality. However, null effects in controlled experiments can reflect inappropriate "sampling of the levels for the independent variable", rather than a genuine lack of effects (Wells & Windschtl, 1999). We included moderately and highly deviant conditions in order to determine whether null effects on stereotypicality held at different levels of member's deviance. Hence, we provided a more stringent test of Hamburger's prediction.

Experiment 1

In our first experiment, participants read about the behaviors and personal qualities of an accountant whose descriptive deviance was either moderate or high (impression phase). Participants then completed several measures tapping their judgments of accountants (judgment phase). Participants first indicated the degree to which positive stereotype-relevant attributes characterized their view of accountants (*stereotypicality*). Then, along each attribute dimension, they indicated the position of the two most extreme group members that they could imagine (*dispersion*; Jones, Wood, & Quattrone, 1981). Finally, participants rated how they felt about the group on purely evaluative dimensions (*prejudice*; Osgood, Suci, & Tannenbaum, 1957). In a control condition, participants were not given any stimulus materials. These participants provided baseline measures of group judgments. So, we used a mixed-model design that crossed the between-subjects factor of member's deviance (no information control vs. moderate vs. high) with the within-subjects factor of measure type (stereotypicality vs. dispersion vs. prejudice).

If group measures differ in their sensitivity to member-to-group generalization, then there should be a significant two-way interaction between member's deviance and measure type. According to Hamburger (1994), this interaction should involve differences between the deviant and control conditions along group dispersion and no difference between conditions along stereotypicality and prejudice.

However, if past generalization effects were not due to confounded manipulations and measurement, then there should be an effect of deviance on stereotypicality. A prototype model of change has been supported in both one-member experiments (Kunda & Oleson, 1997, Experiments 1, 2, & 3; Rothbart & Lewis, 1988, Experiment 3; Wilder et al., 1996) and multi-member experiments (Hewstone, 1994). According to this model, reduced stereotypicality should occur in the moderately deviant condition, but not in the highly deviant condition. The rationale for this prediction is that moderately deviant members have a greater chance of being assimilated in the group representation and, hence, of affecting it, whereas extremely disconfirming target members have a greater chance of being cognitively excluded from the group representation and, thus, have only a reduced impact on it (Rothbart & John, 1985).

Method

Participants and Design

Participants were 60 students (30 males, 30 females; mean age 23.38 years) at Cardiff University who received £2 for their help. The experiment followed a 3 (member's deviance: no information control vs. moderate vs. high) x 3 (measure type: stereotypicality vs. dispersion vs. prejudice) mixed-model design, with repeated measures on the second factor. There were 20 participants in each condition. Preliminary analyses revealed no effects of

gender, and so this variable will not be considered further.

Stimulus Materials

We chose accountants as our first target group because pretesting revealed that Cardiff students are unfamiliar with this group. We prepared the experimental profiles using the multiple-step procedures developed by Gurwitz and Dodge (1977). These are widely employed in social cognition research on stereotype change (Johnston & Hewstone, 1992). We used eight stereotype-relevant traits, all positive in tone (Hewstone, Johnston, & Aird, 1992). The stereotypical traits were “hard-working”, “conscientious”, “intelligent”, and “well-dressed”. The counterstereotypical traits were “interesting”, “fun-loving”, “creative”, and “artistic”.

We carried out three pilot studies in which we approached respondents in libraries and study areas on campus. The primary aim of these studies was to prepare two experimental profiles that (a) varied in descriptive deviance, but (b) did not vary in member valence. To ensure that variables associated with different cognitive loads and trait content would not affect our results, we also needed profiles that were (c) similar in length and (d) conveyed information about the same stereotype-relevant traits (see Hewstone, 1994, for a discussion of these factors). We met these criteria by compiling a *moderately deviant* behavioral profile from two positive stereotype-confirming paragraphs, two positive stereotype-disconfirming paragraphs, and four neutral paragraphs (neither confirming nor disconfirming), and a *highly deviant* behavioral profile from four positive stereotype-disconfirming paragraphs and four neutral paragraphs (neither confirming nor disconfirming). Two disconfirming and two neutral paragraphs were repeated across these profiles.

First pilot study. To prepare the two profiles, we needed 12 behavioral paragraphs of similar length (approximately 60 words). The two *positive stereotype-confirming* paragraphs each provided examples of personality characteristics and behaviors that were consistent with a positive stereotypical trait (“hardworking” or “conscientious”). The four *positive stereotype-disconfirming* paragraphs each provided examples of personality characteristics and behaviors consistent with a positive counterstereotypical trait (“interesting”, “fun-loving”, “creative”, or “artistic”). Finally, the six *neutral* paragraphs each provided examples of personality characteristics and behaviors that were neither consistent nor inconsistent with a positive stereotypical trait (“hardworking”, “conscientious”, “intelligent”, or “well-dressed”) and a positive counterstereotypical trait (creative or artistic). We asked 42 students at Cardiff University to rate how well each paragraph exemplified the relevant trait (1 = *Not at all*, 7 = *Extremely*) and how favorably they viewed the behaviors described in each paragraph (1 = *Not at all positive*, 7 = *Extremely positive*). Consistent paragraphs were rated as good examples of the relevant traits (mean scores between 6 and 7). Neutral paragraphs had mean scores between 3.5 and 4.5. The material in the consistent paragraphs was viewed as positive (mean scores between 5 and 7), and the material in the neutral paragraphs was viewed as neutral (mean scores between 3 and 5). More information about the stimulus materials can be obtained from the first author.

Second pilot study. In the second pilot study, we prepared two profiles of individual accountants, tested them for perceived stereotype deviance, and equated them for valence. Each profile contained a heading, an introductory profile, and eight behavioral paragraphs. The heading conveyed the individual’s name (“John”) and profession (“Accountant”). The introductory paragraph provided some stereotype irrelevant information (age, county of birth, and work location). To ensure that participants understood and accepted the target member’s status as an accountant (Kunda & Oleson, 1997), the introductory paragraph described his main job duties, the number of years that he had worked for his firm, and his satisfaction with his job (“quite satisfied”). The order of the behavioral paragraphs was randomized within

each profile. Each profile was approximately 500 words long, and varied in its relationship to the stereotype (moderately deviant vs. highly deviant).

Twenty-eight undergraduates at Cardiff University were each shown one of the two experimental profiles. To check the profiles for stereotype deviance, we asked respondents to rate both the degree to which the target member was typical of accountants in general and the degree to which he matched their idea of the average accountant. These two ratings were averaged to create a *typicality* index ($\alpha = .88$). To measure member's valence, we asked respondents to rate how much they thought that they would like the target member if they met him and whether they regarded the information about him as favorable. These two ratings were averaged to create a *valence* index ($\alpha = .77$). All ratings were made on 7-point scales (1 = *Not at all*, 7 = *Extremely*). The correlation between typicality and valence was not significant, $r(28) = -.01$, *ns*. The moderately deviant profile was rated as significantly more typical of accountants ($M = 3.29$, $SD = 1.19$) than the highly deviant profile ($M = 2.14$, $SD = 0.69$), $F(1, 26) = 9.67$, $p < .005$, but the two profiles did not differ significantly in valence ($M = 3.65$, $SD = 1.08$ and $M = 4.36$, $SD = 1.35$); $F(1, 27) = 2.45$, $p = .129$. In summary, the profiles differed in descriptive deviance, but not in valence, just as we hoped.

Third pilot study. A third pilot study showed that the valence of the deviant member was consistent with the valence of the group (i.e., the target member was *not* perceived to be evaluatively deviant). Forty-three undergraduates at Cardiff rated how characteristic (1 = *Not at all*, 7 = *Extremely*) the traits "likeable" and "pleasant" were of accountants in general. These ratings were averaged to create another *valence* index ($\alpha = .71$). Accountants were perceived as neutral in valence ($M = 3.74$, $SD = .94$). We contrasted this index of group valence with the index of member valence for each of the two profiles. Two *t* tests confirmed that neither of the member valence indices differed significantly from the index of group valence, both $ps > .05$.

Procedure

A female experimenter randomly assigned equal numbers of males and females to each condition as they entered the laboratory. Participants were told that the experiment was part of a larger investigation about how students view occupational groups. In the moderately and highly deviant conditions, we asked participants to form an impression about an individual accountant based on information about his attitudes and behaviors. Participants expected questions about their impressions to follow.

Member ratings. As a manipulation check of member deviance, we asked participants in the moderately deviant and highly deviant conditions to rate the extent to which the target member was typical of accountants in general and the extent to which he matched their idea of the average accountant. We averaged ratings on these two items to form a *typicality* index ($\alpha = .85$). Participants were then asked to rate how characteristic the traits "likeable" and "pleasant" were of the target member. We averaged ratings on these two items to form a *valence* index ($\alpha = .85$). All ratings were made on 100mm scales (0 = *Not at all*, 100 = *Extremely*). Control participants did not receive a member profile and thus did not make any of these ratings.

Group ratings. All participants made *stereotypicality* ratings of how characteristic each of the eight stereotype-relevant traits (four positive stereotypical, four positive counterstereotypical; see earlier) were of accountants in general. These ratings were also made on 100mm scales. The eight traits were presented in a fixed randomized order. We computed an index of stereotypicality (see Park & Judd, 1990) by subtracting the average rating on the counterstereotypical traits from the average rating on the stereotypical traits (except for "conscientious", which correlated weakly with the other traits and so was excluded). Scores on the index could vary between -100 and $+100$, with higher scores indicating greater

stereotypicality. Cronbach's alpha for the index was .61.

All participants then made *dispersion* ratings by marking two slashes to indicate where they thought that the two most extreme group members would fall on each of the trait scales. We computed the difference between these extremes (i.e., the range) for each scale and then averaged the differences across the seven scales (again omitting "conscientious"). Index scores could vary between 0 and 100, with higher scores indicating greater dispersion. Cronbach's alpha for the resulting index was .89.³ Finally, we measured *prejudice* by asking participants to rate how characteristic the traits "likeable" and "pleasant" were of accountants in general (0 = *Not at all*, 100 = *Extremely*). Because these traits were positive, and prejudice is negative, these items were reverse scored. We averaged the reversed ratings to form an index of prejudice (Cronbach's alpha = .76). Scores on this index could vary between 0 and 100, with higher scores indicating greater prejudice.

No time limit was given for completing the experiment or any of its sections. Participants took an average of 30 minutes to complete the experiment. At the end of the experiment, all participants were debriefed, thanked for their participation, and dismissed. During the debriefing sessions, there was no evidence that participants doubted the information that they had been given during the course of the experiment or that they were aware of our experimental hypotheses.

Results and Discussion

Manipulation Checks

Single factor (member's deviance: moderate vs. high) between-subjects analyses of variance (ANOVAs) were carried out on the member rating indices described earlier. We found a significant effect of member's deviance on member's *typicality*, $F(1, 38) = 9.09, p < .01$. As expected, the target member was seen as being more typical of accountants in the moderately deviant condition ($M = 37.38, SD = 18.28$) than in the highly deviant condition ($M = 20.33; SD = 17.48$). As expected from our pilot research, there was no effect of member's deviance on member's *valence* ($M = 75.70, SD = 18.40$ for moderately deviant; $M = 80.08, SD = 17.68$ for highly deviant). Descriptive deviance (independent of valence) was thus manipulated successfully.

Group Stereotypicality, Dispersion, and Prejudice

A 3 (member's deviance: control vs. moderate vs. high) x 3 (measure type: stereotypicality vs. dispersion vs. prejudice) mixed-model ANOVA, with repeated measures on the second factor, was carried out on the group rating indices described earlier. Index scores were normalized first in order to account for differences in metrics among the indices. The only significant effect was the interaction between member deviance and type of measure, $F(4, 114) = 3.05, p < .05$, confirming that member-to-group generalization varied across measures. We explored this interaction with single-factor (member's deviance: control vs. moderate vs. high) between-subjects ANOVAs on each group measure. The relevant means and standard deviations are shown in Table 1.

Consistent with Hamburger's (1994) predictions, and contrary to the results of previous one-member experiments, there were no significant differences across conditions for the *stereotypicality* index. This was true even when scores on the other two indices were included in the analysis as covariates. As Hamburger's model predicts, however, there were significant differences across conditions on the *dispersion* index, $F(2, 57) = 4.20, p < .05$. LSD post-hoc tests revealed that participants who read about the moderately deviant target member reported increased perceived dispersion ($M = 54.80, SD = 21.41$) compared to participants in the control condition ($M = 39.55, SD = 11.98$), $t(57) = -2.53, p < .05$. Participants who read about the highly deviant target person also reported increased perceived dispersion ($M = 54.37, SD = 18.78$) compared to the control condition, $t(57) = -2.49, p < .05$. The moderately

and highly deviant conditions did not differ significantly from one another, $t < 1$. No significant difference across conditions was found on the *prejudice* index.

Experiment 2

Experiment 1 provided initial support for Hamburger's (1994) model of member-to-group generalization: Exposure to one deviant group member caused generalization on a measure of group dispersion, but not on measures of group stereotypicality or prejudice. With Experiment 2, our aim was to test the stability of these results when using different target groups, simpler experimental materials, and increased category salience, and to rule out three alternative explanations for the null effects of member deviance on group stereotypicality and prejudice found in Experiment 1.

First, the null effects in Experiment 1 may have occurred because the accountant stereotype investigated in this experiment was particularly resistant to change. The way in which schemas about groups develop and the way in which their contents are organized can affect their sensitivity to revision (Haddock, Zanna, & Esses, 1993; Hewstone et al., 1992). For example, stereotypes vary in the extent to which they involve abstract characteristics versus specific group exemplars (Park & Hastie, 1987). Such differences might affect the susceptibility of stereotypes to generalization (Werth & Lord, 1992). Furthermore, stereotypical traits vary in the degree to which they can be disconfirmed, making some stereotypes easier to change than others (Rothbart & Park, 1986). Thus, to make sure that the idiosyncratic qualities of the stereotype used in Experiment 1 were not responsible for our failure to detect generalization on stereotypicality and prejudice measures, we chose two new target groups in Experiment 2. A pilot study revealed that students at Cardiff University held stereotyped (and opposite) views of two traditionally female majors, psychology and pharmacy. So we recruited participants from both of these departments, gave them a profile of a deviant outgroup member (i.e., a deviant psychology or pharmacy student), and measured stereotypicality, dispersion, and prejudice towards the outgroup.

Second, the length and richness of the materials that we used in Experiment 1 might have affected the potential for generalization. We made the member profiles in Experiment 1 substantially longer and linguistically richer than those used in previous research (e.g., Kunda & Oleson, 1997; Park & Hastie, 1987) in order to improve their face validity and, more generally, the ecological validity of our research. However, by adopting this approach, we may have provided our participants with information that seemed to be stereotype unrelated or *individuating* (Fiske & Neuberg, 1990). Individuating information can impede member-to-group generalization through a variety of mechanisms: It could lead perceivers to discount the relevance of disconfirming information about the target member (Kunda & Oleson, 1995; Yzerbyt et al., 1999). It could weaken the association between representations of the target member and the group by encouraging re-categorization of the target member (Rothbart & John, 1985; see also Batson, et al., 1997; Desforjes et al., 1991). Finally, it could encourage perceivers to shift from superordinate to more subordinate levels of categorization, producing de-categorization (Brewer & Miller, 1984; Locksley, Hepburn, & Ortiz, 1982). To rule out these possibilities, we reduced the length and richness of the member profiles in Experiment 2 to the bare minimum, namely lists of personality traits that pilot testing revealed to be stereotype-relevant.

Third, member-to-group generalization may have failed to occur in Experiment 1 because the outgroup was not very salient when perceivers formed an impression about one of its members. According to Hewstone and others (Hewstone, 1996; Hewstone & Brown, 1986), the salience of the ingroup/outgroup distinction and the prototypicality of a particular group member can affect the mental linkage between that member and the group as a whole (Rothbart & John, 1985). Category salience and member prototypicality provide a cognitive

basis for generalization (Van Oudenhoven, Groenewoud, & Hewstone, 1996). Experiment 1 may have created sub-optimal conditions for generalization because, although at least one group member (moderately deviant) was prototypical, there was no clear ingroup or outgroup present.

In Experiment 2, we manipulated category salience during impression formation to increase the potential for member-to-group generalization on measures of group stereotypicality and prejudice. Because social judgments depend in part on the social context in which they are made (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987), we manipulated category salience by varying the comparative context. Participants in intergroup conditions were told that their impressions of both the ingroup *and* the outgroup would be measured. Participants in the interpersonal conditions were told that only their impressions of the outgroup would be measured. Several studies have demonstrated greater polarization of group judgments when the ingroup is explicitly included in the judgment setting (e.g., Doosje, Haslam, Spears, Oakes, & Koomen, 1998; Haslam, Oakes, Turner, & McGarty, 1995, 1996). This effect is probably due to the increased salience of a social category when both the ingroup and the outgroup are cognitively accessible (for an overview, see Doosje, Spears, Ellemers, & Koomen, 1999; see also Simon, 1993). Therefore, we expected category salience to be higher, and generalization to be stronger, in intergroup comparative settings than in the interpersonal comparative settings.

Hypotheses

In Experiment 2, we aimed to test the validity and generalizability of the null effects of membership deviance on measures of stereotypicality and prejudice found in Experiment 1. If the idiosyncratic qualities of the accountant stereotype and/or the length and richness of the experimental profiles that we used were *responsible for these null effects*, then we would expect to find significant effects of member deviance when we used an alternative stereotype and shorter profiles. In addition, if the low salience of the accountant categorization precluded member-to-group generalization on the stereotypicality and prejudice measures in Experiment 1, then we would expect the comparative setting to moderate the effects of member deviance in Experiment 2. Specifically, we would expect little or no generalization in the interpersonal setting (replicating Experiment 1's null findings), but significant generalization in the *intergroup* setting.

Our experimental hypothesis was that we would find the same null effects in Experiment 2 as we did in Experiment 1, and that these null effects would occur independent of comparative context. Evidence in support of this hypothesis would suggest that the null effects of member deviance on stereotypicality and prejudice were due to the refinements that we made to the manipulation of descriptive deviance and to the measurement of stereotypicality, rather than to any methodological deficiency in our research.

Method

Participants and Design

Participants were 120 students (19 males, 101 females; mean age 19.67 years) at Cardiff University. Half were psychology students whose participation helped them meet a course requirement, and half were pharmacy students who hoped to win prizes in a raffle (six prizes of 20 pounds each). The experiment followed a 2 (comparative setting: interpersonal vs. intergroup) x 3 (member's deviance: no information control vs. moderate vs. high) x 3 (measure type: stereotypicality vs. dispersion vs. prejudice) mixed-model design, with repeated measures on the third factor. There were 20 participants in each condition. Preliminary analyses revealed no effects of gender, and few effects of participant major, and so these variables will not be discussed further.

Stimulus Materials

Before the experiment could begin, we needed to identify traits associated with the stereotypes of psychology and pharmacy students. We asked 15 students from the libraries and study areas of the University to rate how well each of 40 trait adjectives described psychology (0 = *Not at all*, 100 = *Very much*) and the degree to which each trait was a positive characteristic (0 = *Not at all positive*, 100 = *Very positive*). A further 15 students rated the same 40 trait adjectives with respect to pharmacy students. Traits were selected for our research if they met three criteria. First, the trait had to be stereotype-relevant for the expected target group, as shown by a significant difference between the mean trait rating and the midpoint (50.00) of the rating scale. Second, the trait had to be more typical of the target group than of the other group, as shown by a significant difference between the mean ratings for the groups. Finally, the trait had to be positive in nature, as shown by a significant difference between the mean evaluation of the trait and the midpoint (50.00) of the evaluation scale. For the psychology students, we chose “sensitive” and “broad-minded” as positive stereotypical traits, and “patronizing” and “opinionated” as negative stereotypical traits. For pharmacy students, we chose “clean” and “scientifically-minded” as positive stereotypical traits, and “reserved” and “clinical” as negative stereotypical traits.

We needed four experimental profiles that depicted a moderately or highly deviant psychology or pharmacy student. We compiled each profile from eight descriptors consisting of one qualifying phrase and one of the traits just mentioned. The qualifying phrases were “extremely” to indicate strong endorsement of the trait (e.g., “extremely sensitive”), “averagely” to indicate moderate endorsement of the trait (e.g., “averagely sensitive”), and “not at all” to indicate weak endorsement of the trait (e.g., “not at all sensitive”). For both the psychology and pharmacy target members, the *moderately deviant* profile contained two stereotype-confirming descriptors (strongly endorsed traits that were stereotypical of the group), two stereotype-disconfirming descriptors (strongly endorsed traits that were stereotypical of the other group), and four neutral descriptors (four moderately endorsed traits, two of which were stereotypical of the group and two of which were stereotypical of the other group). The *highly deviant* profile contained four stereotype-disconfirming descriptors (two weakly endorsed traits that were stereotypical of the group and two strongly endorsed traits that were stereotypical of the other group) and four neutral descriptors (moderately endorsed traits that were stereotypical of the group). The stereotype confirming and disconfirming descriptors were all positive, so all the profiles were moderately positive.

Procedure

The procedures used in Experiment 1 were adapted to the new target groups and modified slightly in order to incorporate the manipulation of comparative setting. A female experimenter randomly assigned equal numbers of males and females to each condition as they entered the laboratory. The experiment was described as part of a larger investigation about students’ impressions of student groups. In the *interpersonal* setting, the psychology (pharmacy) participants were told that we would be measuring their opinions about pharmacy (psychology) students. (This is similar to Experiment 1, in which accountants were an outgroup for all participants.) In the *intergroup* setting, all participants were told that we would be measuring their opinions about both pharmacy and psychology students.

Member ratings. In the moderately and highly deviant member conditions, we presented psychology (pharmacy) participants with a profile of a pharmacy (psychology) student. The profile was supposedly based on an interview with the student. After reading the profile, participants completed the same member ratings as in Experiment 1. These were combined in indices in the same way as before. Cronbach’s alphas for the typicality and valence indices were .88 and .59, respectively.

Group ratings. All participants, including those in the control conditions, made ratings of

the student groups using similar scales to those used in Experiment 1. Psychology (pharmacy) participants rated how characteristic each of the eight traits reported above was of pharmacy (psychology) students in general. After completing these ratings, all participants marked where they thought the two most extreme group members would fall on each of the trait scales. Cronbach's alpha for the stereotypicality index was .72 for psychology participants and .67 for pharmacy participants.⁴ Cronbach's alpha for the dispersion index was .86 for psychology participants and .76 for pharmacy participants. We computed an index of prejudice using a procedure from previous generalization research (Desforges et al., 1991). For each student group, we subtracted the average rating on positive traits from the average rating on negative traits. Index scores thus ranged from -100 to +100, with higher scores indicating greater prejudice. Cronbach's alpha for the prejudice index was .80 for psychology participants and .84 for pharmacy participants.

As in Experiment 1, no time limit was given to complete the experiment or any of its sections. Participants took an average of 30 minutes to complete the experiment. As in Experiment 1, debriefing revealed no evidence that participants doubted the information that they had been given during the course of the experiment or that any of them were aware of our experimental hypotheses.

Results and Discussion

Manipulation Checks

We carried out 2 (comparative setting: interpersonal vs. intergroup) x 2 (member's deviance: moderate vs. high) between-subjects ANOVAs on the member rating indices described earlier. As expected, member's deviance had a significant effect on the *typicality* index, $F(1, 75) = 3.04, p < .05$ (one-tailed). The moderately deviant member was rated as being more typical of the group ($M = 51.77, SD = 19.48$) than was the highly deviant member ($M = 44.17, SD = 18.76$). However, member's deviance had no effect on member's *valence* ($M = 56.21, SD = 18.74$ for moderately deviant; $M = 60.74, SD = 15.66$ for highly deviant). No main effect of setting or interaction involving setting was significant on either index. Hence, we had once again managed to successfully manipulate descriptive deviance independent of valence.

Group Stereotypicality, Dispersion, and Prejudice

A 2 (comparative setting: interpersonal vs. intergroup) x 3 (member's deviance: no information control vs. moderate vs. high) factorial ANOVA was carried out on each of the group rating indices described earlier. The relevant means and standard deviations are shown in Table 2. Consistent with the findings of Experiment 1, and contrary to previous generalization research, we found no significant main effects or interaction effects on the group *stereotypicality* or *prejudice* measures. These null findings suggest that the lack of generalization on the stereotypicality and prejudice measures in Experiment 1 cannot be explained in terms of either the idiosyncrasies of the accountant stereotype, the length and richness of the experimental profiles, or low category salience.

On the group *dispersion* measure, there was a significant main effect of member's deviance, $F(2, 112) = 5.67, p < .01$. Participants who read about a highly deviant member perceived the group as significantly more heterogeneous, ($M = 56.08, SD = 13.31$), than did control participants ($M = 44.16, SD = 15.23$), $t(112) = -3.38, p < .01$. Participants who read about a moderately deviant member perceived the group as marginally more heterogeneous ($M = 50.54, SD = 19.24$) than did control participants, $t(112) = -1.81, p = .07$. Participants who read about highly deviant and moderately deviant members did not differ significantly from one another in their dispersion index scores, $p > .05$.

The main effect of member's deviance was qualified by an interaction between comparative setting and member's deviance, $F(2, 112) = 4.39, p < .05$. Member's deviance

had a significant effect on dispersion index scores in the interpersonal setting, $F(2, 56) = 7.37, p < .005$, but not in the intergroup setting, $F(2, 56) = 1.07, ns$. As in Experiment 1, if only the outgroup was made salient (i.e., in the interpersonal setting), participants exposed to a moderately deviant member reported increased group dispersion ($M = 55.84$) relative to the control participants ($M = 39.84$), $t(56) = -2.86, p < .01$. Similarly, participants in the interpersonal setting who were exposed to a highly deviant member reported increased group dispersion ($M = 60.32$) relative to control participants, $t(56) = -3.66, p < .01$. Dispersion, though, was not significantly different between participants in the two experimental conditions, $t < 1$. However, no generalization occurred on the dispersion index scores when both the ingroup and outgroup were made salient (i.e., in the intergroup setting).

Our lack of member-to-group generalization on the dispersion index scores is consistent with the predictions made by Brewer and Miller's (1984, 1988) model of contact. Brewer and Miller argue that, in interpersonal settings, people attend to information that is relevant to individuals (themselves and/or others), whereas in intergroup settings they attend to information that is relevant to group memberships (see also Scarberry, Ratcliff, Lord, Lanicek, & Desforjes, 1997). As a consequence, people would see more variability among group members in interpersonal settings than in intergroup settings. Support for Brewer and Miller's hypothesis is not new. In a correlational study carried out among Hindus and Muslims in Bangladesh, Islam and Hewstone (1993) found that intergroup contact was associated with decreased perceived variability in the outgroup. And in a series of experiments, Doosje, Haslam and colleagues (Doosje et al., 1999; Haslam et al., 1995, 1996) found that students perceived more variability within their own group when it was judged alone than when the outgroup was also judged. Experiment 2, however, is the first study to identify a moderating condition for Hamburger's (1994) model of generalization from *one* deviant group member to the group as a whole.

Experiment 3

Experiment 2 showed that the comparative setting in which impressions are formed moderates the influence that member's deviance has on group dispersion. This suggests a change to Hamburger's (1994) model. In Experiment 3, we explored another potential moderator, namely member dimensionality. Member dimensionality is the number of stereotype-relevant dimensions that information about the target member conveys or implies. Hamburger's model is silent about the effects of member dimensionality. However, two independent lines of research have explored the relationship between dimensionality and dispersion (Linville, 1982; Park, Ryan, & Judd, 1992).

According to Linville (1982, p. 197), dimensionality increases the number of potential ways in which a member can fit a group stereotype. This would make it likely for that person to confirm, rather than disconfirm, the stereotype (see also Hewstone & Hamberger, 2000; Hewstone et al., 1992). Increases in member dimensionality should thus lead to *decreases* in perceived group dispersion. Evidence consistent with this prediction can be found in Linville's research on the complexity-extremity effect (Linville, 1982; Linville & Jones, 1980). This research shows that a more complex judgmental orientation towards stimuli is associated with a narrower range of judgments about them.

Work by Park and colleagues (Maurer, Park, & Rothbart, 1995; Park et al, 1992) suggests the opposite prediction to Linville (1982); namely, that increases in member dimensionality should lead to *increases* in perceived group dispersion. Consistent with this relationship, Park and her colleagues found that one way to increase perceived group dispersion is to make the existence of distinct subgroups within the outgroup more salient. Park argued that this effect reflects the awareness that group members can vary in many respects. Further support comes from a correlational study by Park and her colleagues (1992, Experiment 2). These

researchers found that the more people evaluated subgroups using different and independent judgment dimensions, the more they perceived the whole group to be variable (see also Richards & Hewstone, 2001).

In Experiment 3, we provided the first test of how dimensionality affects dispersion in a member-to-group generalization paradigm by systematically varying the number of stereotype-relevant dimensions that were used to create member profiles. A ‘high dimensional’ condition reproduced the materials used in Experiments 1 and 2—each profile described a group member using eight stereotype-relevant dimensions or attributes. As in our previous experiments, we expected to find generalization on dispersion index scores under both moderate and highly deviant member conditions. In a ‘moderately dimensional’ condition, we created profiles that described a group member using only four stereotype-relevant dimensions or attributes. This allowed us to test the competing predictions made by Linville (1982) and Park et al. (1992).

We used a measure of member entitativity as a manipulation check on dimensionality. Entitativity refers to the perceived unity and coherence among components of a target object (Campbell, 1958; Hamilton & Sherman, 1996; Hamilton, Sherman, & Lickel, 1998). We expected the moderately dimensional member profiles to be more entitative than the highly dimensional profiles. It is possible, however, that our dimensionality manipulation (which varied the amount of information conveyed) might also affect the perceived ‘judgeability’ of a group member (Leyens, Yzerbyt, & Schadron, 1992; Yzerbyt, Dardenne, & Leyens, 1998), that is, the perceiver’s sense of being in a position to judge the group member. To rule out this possibility, we also included an index of judgeability.

Method

Participants and Design

Participants were 125 students at Cardiff University (13 males, 112 females; mean age = 19.17) who took part in the experiment on a voluntary basis. The experiment followed a 2 (member’s deviance: moderate vs. high) x 2 (member’s dimensionality: moderate vs. high) x 3 (measure type: stereotypicality vs. dispersion vs. prejudice) mixed-factor design, with repeated measures on the third factor and one appended control cell (no information). There were between 23 and 27 participants in each condition. Preliminary analyses revealed no effects of gender, and so that variable will not be discussed further.

Stimulus Materials

We used the moderately deviant and highly deviant member profiles from Experiment 1 in this experiment as *highly dimensional* profiles. We created two new experimental profiles with corresponding levels of deviance, but moderate dimensionality. These profiles contained only four of the eight behavioral paragraphs contained in the profiles from Experiment 1. The *moderately dimensional-moderately deviant* profile contained one confirming paragraph (consistent with a stereotypical trait), one disconfirming paragraph (consistent with a counterstereotypical trait), and two neutral paragraphs (one neither consistent nor inconsistent with a stereotypical trait and one neither consistent nor inconsistent with a counterstereotypical trait). The *moderately dimensional-highly deviant* profile contained two disconfirming paragraphs (consistent with two counterstereotypical traits) and two neutral paragraphs (neither consistent nor inconsistent with two stereotypical traits). The relationship between these profiles and the group stereotype varied systematically across conditions and was orthogonal to the dimensionality of the profiles.

We carried out a pilot study to assess the perceived deviance and valence of the two new profiles. Thirty-two students found in libraries and study areas at the University rated the typicality and valence of one of the two new profiles just as in Experiment 1. As expected, the moderately dimensional-moderately deviant target member ($M = 3.40$, $SD = 1.00$) was rated

as significantly more typical of accountants, $F(1, 30) = 5.30, p < .05$, than the moderately dimensional-highly deviant target member ($M = 2.65, SD = .83$). The valence of these profiles did not differ, however ($M = 4.00, SD = 1.20, M = 4.55, SD = 1.45$).

Procedure

A female experimenter collected the data just before an introductory psychology class. She handed out booklets representing the different experimental conditions on a random basis. We used the same cover story and instructions as those used in Experiment 1.

Member ratings. After reading the material, participants in the experimental conditions completed the two standard items measuring member typicality: They rated the extent to which the target member was typical of accountants in general and the extent to which he matched their idea of the average accountant. Ratings on these items were again averaged to create a typicality index (Cronbach's $\alpha = .87$). Participants then completed two new items measuring member *entitativity* and *judgeability*. Participants first rated the extent to which they perceived the target member's personality to be a coherent unit (entitativity item taken from Hamilton & Sherman, 1996). They then rated the extent to which they would feel awkward about judging his personality (judgeability item based on Leyens et al., 1992). Both ratings were made on seven-point (1 to 7) scales. We reverse-scored the ratings of the second item, so that higher scores indicated greater judgeability. Participants in the control condition did not receive materials about a target member, however, to reduce the risk of reactivity to differences in questionnaire format; we gave them a filler task that resembled the member ratings made by the experimental conditions.

Group ratings. All participants, including those in the control cell, made the same group ratings as in Experiment 1. A stereotypicality index (Cronbach's $\alpha = .72$), a dispersion index (Cronbach's $\alpha = .85$), and a prejudice index (Cronbach's $\alpha = .65$) were computed in the same way as before. Although, no fixed time limit was explicit given to participants to complete the experiment, slow participants were encouraged to complete their questionnaire when the large majority of the participants had already done so. The testing session lasted around 30 minutes. At the end of the experiment, participants were given a debriefing sheet explaining the rationale of the study. Two months later a summary of the experiment's results was returned to the participants during another class of the same introductory psychology course.

Results and Discussion

Manipulation Checks

As expected, a 2 (member deviance: moderate vs. high) $\times$ 2 (member's dimensionality: moderate vs. high) between-subjects ANOVA found only a main effect of member's deviance on the *typicality* index, $F(1, 94) = 10.95, p < .005$. Moderately deviant members were rated as more typical of accountants in general ($M = 37.63, SD = 24.10$) than highly deviant members ($M = 24.12, SD = 16.96$). Also, as expected, we found only a main effect of member's dimensionality on the *entitativity* index, $F(1, 93) = 7.87, p < .01$. Moderately dimensional members were rated as being more entitative ($M = 55.92, SD = 20.73$) than highly dimensional members ($M = 43.71, SD = 22.81$). This suggests that the manipulations of deviance and dimensionality were successful. There were no differences across conditions in the *judgeability* index, confirming that the manipulation of dimensionality (and deviance) did not alter the perceived judgeability of the target member.

Group Stereotypicality, Dispersion, and Prejudice

To test our generalization hypotheses within the between-subjects impression formation paradigm with appended control group, we followed the analytical strategies used in recent social cognitive research on stereotype change (Yzerbyt et al., 1999). We first carried out a 2 (member's dimensionality: moderate vs. high) $\times$ 2 (member's deviance: moderate vs. high)

between-subjects ANOVA on each dependent measure, and then followed this analysis with independent t tests between each experimental condition and the control cell. The relevant means and standard deviations are shown in Table 3. As in our first two experiments, analyses of variance showed no significant effects on the *stereotypicality* or *prejudice* indices. None of the comparisons between the experimental conditions and the control cell were significant for stereotypicality. Unexpectedly, however, the moderately dimensional-moderately deviant condition ($M = 45.56$, $SD = 9.54$) differed significantly from the control cell ($M = 53.48$, $SD = 12.30$) for prejudice, $t(48) = -2.53$, $p < .05$. No other prejudice comparisons were significant. We believe that the single significant comparison is best treated as a chance effect. Overall, then, our previous results for stereotypicality and prejudice were generally replicated in this experiment.

Our ANOVA on the *dispersion* index revealed a significant main effect of member's deviance, $F(1, 94) = 7.48$, $p < .01$, qualified by a significant member's deviance $\times$ member's dimensionality interaction, $F(1, 94) = 5.24$, $p < .05$. We explored this interaction using simple effects analyses, which revealed that (as in Experiments 1 and 2) dispersion was not affected by member's deviance in the *high dimensionality* conditions ($M = 50.61$, $SD = 14.38$ for moderately deviant; $M = 49.27$, $SD = 17.66$ for highly deviant). However, we did find an effect of member's deviance in the new conditions that exposed participants to profiles that were *moderate in dimensionality*, $F(1, 45) = 15.15$, $p < .001$. Here, dispersion was greater when a member's deviance was moderate ($M = 57.77$, $SD = 14.36$) rather than high ($M = 42.71$, $SD = 12.70$). The control cell ($M = 41.57$, $SD = 16.39$) differed significantly only from the highly dimensional-moderately deviant condition ($M = 50.61$, $SD = 14.38$), $t(50) = -2.11$, $p < .05$, and the moderately dimensional-moderately deviant condition ($M = 57.77$, $SD = 14.36$), $t(48) = -3.70$, $p < .005$. This generalization advantage of the moderately deviant conditions is consistent with a prototype model of change (Hewstone, 1994; Kunda & Oleson, 1997).

From Experiments 1 and 2, we also expected the control cell to differ significantly from the highly dimensional-highly deviant cell. Although means were in the right direction ($M = 41.57$ vs. $M = 49.27$), the difference was not significant, $t(47) = 1.59$, $p = .10$. We carried out a series of parallel analyses to take into account the fact that there were fewer traits in the moderately dimensional profiles (four) than in the dependent measures (eight). A strict attribute-matching hypothesis would predict change only on traits directly relevant to the information provided in the profiles (Oakes, Haslam, & Reynolds, 1999). Hence, in these analyses, we computed stereotypicality and dispersion indices for the moderately dimensional condition using only the four traits included in the moderately dimensional profiles. No changes were made to those indices for the highly dimensional conditions. However, the results of these parallel analyses exactly replicated in direction and size the previous results. Hence, our dispersion results showed a positive effect of dimensionality, which is consistent with the predictions made by Park et al. (1992) and is inconsistent with those made by Linville (1982).

Increasing dimensionality may work in a similar way to subgrouping (Maurer et al., 1995; Park et al., 1992) by making people aware that group members can vary in many respects (Park et al., 1992). Indirect support for this argument comes from the only multiple-member generalization experiment in which member deviance was manipulated and group dispersion was measured (Hewstone & Hamberger, 2000, Experiment 2). Participants were presented with information about deviant members of a rival student group. Before the impression formation phase, half of them identified any subgroups within that group and wrote a few lines describing what each subgroup was like and how it was different from other subgroups (subgrouping condition). The remaining participants did not perform these tasks (no-

subgrouping condition). The results of that experiment were strikingly similar to those of Experiment 3. In the subgrouping condition, group dispersion increased regardless of member deviance. In the no-subgrouping condition, dispersion increased in the moderately deviant condition, but not in the highly deviant condition (see Hewstone, 1994; Johnston & Hewstone, 1992). Together with our own results, these findings suggest that group dispersion increases when several stereotype-relevant attributes are made cognitively accessible during impression formation. When few such attributes are accessible, people may rely on a prototype model of change, with the result that they generalize only from typical group members.

General Discussion

Our three experiments yielded consistent support for Hamburger's (1994) model of member-to-group generalization. Participants generalized from one deviant group member to group dispersion, but not to either group stereotypicality or prejudice. This pattern of generalization held across different group stereotypes (accountants Experiments 1 & 3; psychology and pharmacy students in Experiment 2) and across different formats for member information (long and linguistically rich profiles in Experiments 1 & 3; short and linguistically simple profiles in Experiment 2). Experiment 1 detected the basic dissociation that Hamburger predicted among measures. Experiment 2 ruled out the possibility that this dissociation resulted from low category salience (Hewstone & Brown, 1986) and extended Experiment 1 by identifying comparative setting as a moderator of generalization in dispersion. Experiment 3 replicated Experiment 1 and detected a second moderator of generalization in dispersion, namely member dimensionality. We will discuss our results first in terms of the lack of generalization in stereotypicality and prejudice, and then focus on generalization in dispersion. Finally, we will consider the implications of dissociations among group measures.

Lack of Generalization on Group Stereotypicality and Prejudice

Hamburger (1994) predicted no generalization of member descriptive deviance on measures of stereotypicality and prejudice, and this is what we found in all three of our experiments. Our null effects are inconsistent with the results of previous one-member generalization experiments, which found that member deviance plays a significant role in changes of stereotypicality. To explain this discrepancy, we highlighted possible confounds in past research. We suggested that previous researchers provided participants with member information that mismatched both stereotype attributes *and* the evaluative component of the group stereotype, and that they used measures that detected changes in prejudice towards the group, in addition to changes in group stereotypicality. To provide a clearer test of Hamburger's model, we tried to overcome these confounds by holding member evaluative deviance and valence constant while manipulating only descriptive deviance (Dijksterhuis & van Knippenberg, 1996). We then measured stereotypicality separately from prejudice.

To provide a more complete assessment of the independent effects that member descriptive and evaluative deviance can have on stereotypicality and prejudice, future research should try to contrast (1) the effects of member profiles that confound descriptive and evaluative deviance with the effects of profiles that unconfound these types of deviance and (2) the effects of member deviance on group measures that confound stereotypicality and prejudice with its effects on unconfounded measures. If our reasoning is correct, then we expect (a) a group member who is descriptively *and* evaluatively deviant to affect *correlated* measures of stereotypicality and prejudice; (b) a group member who is descriptively, but not evaluatively deviant *not* to affect either *uncorrelated* stereotypicality *or* prejudice measures, thus, replicating our results and once again supporting Hamburger's prediction; and (c) a group member who is evaluatively, but not descriptively deviant to affect a prejudice

measure, but not an uncorrelated stereotypicality measure. If confirmed, this last prediction would support hypotheses of attitude change advanced in the attitude literature (Edwards, 1990; Edwards & von Hippel, 1995; see also Fabrigar & Petty, 1999), and models of stereotype change that have pointed out the causal role of member evaluative deviance and produced generalization in measures of prejudice (the ‘generalized appraisal model of change’, Bodenhausen, Schwarz, Bless, & Wänke, 1995; the ‘two-step model of contact generalization’, Desforges et al., 1991, 1997; see also Scarberry et al., 1997).

These predictions suggest that distinctions between descriptive and evaluative deviance and between stereotypicality and prejudice have the potential to group together, in a single theoretical framework, a variety of independent hypotheses about stereotype change (see e.g., Bodenhausen et al., 1995; Desforges et al., 1991; Hamburger, 1994; Johnston & Hewstone, 1993). These hypotheses share a common theoretical matrix (member-to-group generalization) and assume a common underlying mechanism (member deviance). Thus, our approach has the potential to contribute to a more integrative view of generalization research, research that is too often characterized by fragmentation (Mackie & Smith, 1998).

Generalization on Group Dispersion

Group dispersion emerged, across our experiments, as a sensitive measure of member-to-group generalization effects (Hamburger, 1994). Hence, generalization researchers who neglect dispersion are not only failing to benefit from a growing sophistication in the conceptualization and measurement of group representations (Ford & Stangor, 1992; Linville et al., 1998; Kraus et al., 1993; Park et al., 1991; Quattrone, 1986; Ryan et al., 1996), but they may also be underestimating the potential for stereotype change (see also Garcia-Marques & Mackie, 1999). Notably, however, change in dispersion may not be as simple as Hamburger’s model suggests. We identified two factors that moderate such change.

Experiment 2 revealed the importance of the comparative setting. Consistent with Brewer and Miller’s (1984, 1988) interpersonal model of contact, and with previous correlational (Islam & Hewstone, 1993) and experimental research (Doosje et al., 1999; Haslam et al., 1995, 1996), participants recognized variability among group members when (regardless of deviance levels) the impression formation phase took place in an *interpersonal* setting, but not when it took place in an *intergroup* setting. The lack of generalization in the intergroup setting may seem disconcerting to those who seek to reduce group stereotyping through intergroup contact. It suggests that there is little hope for increasing perceived group heterogeneity when members of rival groups meet under conditions where both the ingroup and outgroup are salient. However, we think that there is still reason for hope. Contact does have stronger effects on prejudice than on stereotyping (see Pettigrew & Tropp’s, 2000, meta-analysis). In addition, contact that involves multiple outgroup members who are representative of their group can increase the perceived variability of that group, especially when the contact is structured so as to reduce intergroup anxiety—which tends to narrow the focus of attention and lead to stereotype-confirming behavior (see Hewstone, 1996; Pettigrew, 1998).

Experiment 3 explored the role of a new construct, namely member dimensionality. We found that increased dispersion occurred, regardless of member deviance, when information about a group member was *high in dimensionality*. Consistent with a prototype model of change (Hewstone, 1994), this generalization effect was limited to a moderately deviant group member who was described using few attributes (for a similar interactive effect, see Hewstone & Hamberger, 2000, Experiment 2). This pattern of results is consistent with research on subgrouping (Maurer et al., 1995; Park et al., 1992), and with the claim that perceived group heterogeneity can be increased and stereotyping decreased by making people aware of the many dimensions on which group members can differ (Park et al., 1992; see also

Bigler & Liben, 1993; Levy, 1999).

Although comparative setting and dimensionality moderate generalization in terms of group dispersion, we still believe that it is very important to pursue this kind of change in group representations. Increases in perceived variability decrease confidence in the attribution of stereotypical traits to someone from a group and thus decrease stereotype use (Ryan et al., 1996). This loss of confidence may be an important first stage in the 'softening' or 'unfreezing' of stereotypes, one that opens them up for change in central tendency, as well as variability (see Hewstone & Hamberger, 2000). A fascinating topic for future research is to explore the interplay between different types of change and the extent to which one type of change entails, facilitates, or depends on other types of change.

Conclusions

Kunda and Oleson (1997) concluded that “people apparently believe that they should generalize the behavior of *even a single* group member to the group as a whole” (p. 567, emphasis added). Our three experiments yielded robust support for Kunda and Oleson’s claim on a measure of group dispersion, but not on measures of either stereotypicality or prejudice. If the results of stereotype change research are measure-specific, or only generalize to multiple aspects of group stereotypes under specific circumstances, then achieving a general improvement in group judgments may seem difficult. We believe that this conclusion needs to be carefully qualified. Hamburger (1994) predicted measure-specific change after exposure to one deviant group member, but not after exposure to several disconfirming group members. Hence, repeated experiences of stereotype disconfirmation are expected to change *both* stereotypicality and dispersion. This means that, although Bishop Tutu's memory of Bishop Huddleston had a heartwarming impact on his perception of outgroup variability, real group prejudice and stereotyping may be overcome only through multiple instances of outgroup behavior that provide both evaluative and descriptive challenges to entrenched views, in ways that cannot simply be discounted, subtyped, or explained away.

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Correspondence concerning this article should be addressed to Stefania Paolini at the School of Behavioural Sciences, Psychology Building, University of Newcastle, University Drive, Callaghan NSW 2308, Australia. Tel: + 61 (0)2 49215938 Fax: + 61 (0)2 49216980 E-mail: Stefania.Paolini@Newcastle.edu.au

Footnotes

1. The distinction between descriptive and evaluative deviance is more theoretical than empirical. The global evaluation of a group usually goes together with (and may be due to) the evaluative nature of the attributes attached to it. So, descriptive deviance usually co-varies with evaluative deviance. A group member who disconfirms the group stereotype descriptively thus tends to be perceived as evaluatively deviant. By disentangling the natural co-occurrence of descriptive and evaluative deviance, however, we believe that generalization research carried out in controlled settings can clarify the process of member-to-group generalization and make predictions about generalization outcomes more accurate.

2. For points 3 and 4, group stereotypicality co-varies perfectly with prejudice when counterstereotypical attributes are reverse scored or subtracted from stereotypical attributes.

3. Two participants did not complete this measure.

4. We excluded two participants from all the analyses because they did not complete many of the measures.

Tables

Table 1

Means and Standard Deviations for Group Measures (Experiment 1)

Dependent variable	Member's Deviance		
	Control	Moderate	High
Stereotypicality			
<i>M</i>	48.38	42.53	42.20
<i>SD</i>	(18.19)	(22.95)	(22.84)
Dispersion			
<i>M</i>	39.55	54.80	54.37
<i>SD</i>	(11.98)	(21.41)	(18.78)
Prejudice			
<i>M</i>	49.98	42.10	46.70
<i>SD</i>	(13.28)	(15.54)	(18.99)

Note. Ratings were made on 100mm scales (1 = not at all, 100 = extremely). Stereotypicality index scores varied between –100 and +100; higher scores indicated greater group stereotypicality. The dispersion and prejudice index scores varied between 0 and 100; higher scores indicated greater group dispersion or more prejudice towards the group.

Table 2
Means and Standard Deviations for Group Measures (Experiment 2)

Dependent variable	Comparative Setting					
	Interpersonal			Intergroup		
	Member's Deviance			Member's Deviance		
	Control	Moderate	High	Control	Moderate	High
Stereotypicality						
<i>M</i>	11.49	16.39	19.98	19.39	21.46	13.81
<i>SD</i>	(17.26)	(19.67)	(14.85)	(11.88)	(17.45)	(11.55)
Dispersion						
<i>M</i>	39.84	55.84	60.32	48.26	45.24	51.62
<i>SD</i>	(15.24)	(20.88)	(15.56)	(14.42)	(16.28)	(8.82)
Prejudice						
<i>M</i>	.62	-1.64	1.48	2.38	.49	-.536
<i>SD</i>	(22.73)	(16.41)	(13.15)	(11.62)	(12.29)	(12.37)

Note. Ratings were made on 100mm scales (1 = not at all, 100 = extremely). Stereotypicality and prejudice index scores varied between -100 and +100; higher scores indicated greater group stereotypicality or more prejudice towards the group. Dispersion index scores varied between 0 and 100; higher scores indicated greater group dispersion.

Table 3
Means and Standard Deviations for Group Measures (Experiment 3)

Dependent variable	Member's Dimensionality				
	Control	Moderate		High	
		Member's Deviance		Member's Deviance	
		Moderate	High	Moderate	High
Stereotypicality					
<i>M</i>	46.97	40.67	46.44	49.97	44.58
<i>SD</i>	(24.19)	(16.59)	(25.25)	(19.21)	(21.80)
Dispersion					
<i>M</i>	41.57	57.77	42.71	50.61	49.27
<i>SD</i>	(16.39)	(14.36)	(12.70)	(14.38)	(17.66)
Prejudice					
<i>M</i>	53.48	45.56	47.64	48.69	47.20
<i>SD</i>	(12.30)	(9.54)	(17.58)	(9.34)	(15.84)

Note. Ratings were made on 100mm scales (1 = not at all, 100 = extremely). Stereotypicality index scores varied between –100 and +100; higher scores indicated greater group stereotypicality. Dispersion and prejudice index scores varied between 0 and 100; higher scores indicated greater group dispersion or more prejudice towards the group.