

ANOTHER LOOK AT THE NEW LOOK: THE MODERATING IMPACT OF STEREOTYPIC BELIEFS ON THE DELBOEUF ILLUSION

GIULIO BOCCATO

UNIVERSITY OF PADOVA — UNIVERSITY OF VERONA

VINCENT YZERBYT

OLIVIER CORNEILLE

UNIVERSITÉ CATHOLIQUE DE LOUVAIN

In two studies, we examined the role of perceivers' social beliefs on perceptual judgments. In Experiment 1, participants evaluated the width of two circles in the context of the Delboeuf illusion. The diameters of the two circles were taken to represent dimensions on which two social groups did or did not differ. Contrast and assimilation effects, typically found in the Delboeuf illusion, were moderated by the nature of the specific dimension that was made salient. Experiment 2 examined the moderating role of motivational factors on the Delboeuf illusion. Students in economics learned that the diameters of the two circles represented a dimension on which psychology and economics students did or did not compete. Competition resulted in magnified contrast and reduced assimilation. These findings are discussed in the context of recent work on motivated reasoning and distinctiveness.

Key words: Stereotyping; Perceptual illusion; Group distinctiveness.

Correspondence concerning this article should be addressed to Giulio Boccato, Dipartimento di Psicologia e Antropologia Culturale, Università degli Studi di Verona, Lungadige Porta Vittoria 17, 37129 Verona (VR), Italy. E-mail: giulio.boccato@univr.it

INTRODUCTION

The New Look movement conceived categorization as a highly functional process. As Bruner insisted, however, “perception is not merely a neutral registration of what is out there but is, rather, an activity affected by other concurrent processes of thought (and) memory (...)” (1992, p. 780). Indeed, the New Look demonstrated that motivational factors relating to emotions and attitudes can interfere with our experience of the physical world. A classic illustration of the combined impact of perception and motivation was provided by Bruner and Postman (1948) who showed that 10-year old children coming from poor families overestimated the width of coins, compared to middle-class children.

Extending the work by Bruner to cultural factors, Tajfel (1969) stressed the importance of individuals' past experience in defining and selecting perceptual information. When living in different cultures, individuals are exposed to different shapes and artifacts. Because some artifacts are more common in some cultures than others, people from different cultures spontaneously evoke different mental categories in appraising the world. This may in turn influence their construal of the physical environment. A good demonstration of this process can be found in a

study by Allport and Pettigrew (1957) in which the Ames' rotating trapezoid illusion was presented to rural Zulu and European African participants. This illusion consists of the vision of a window swaying back and it is interpreted in terms of visual familiarity with lines. In the traditional Zulu culture, lines cannot be discovered because everything is experienced as spherical. Allport and Pettigrew (1957) reported that, under sub-optimal conditions, Zulus experienced the illusion less than European Africans.

Despite an impressive amount of research conducted until the Sixties, the last three decades saw a decline in the study of social factors involved in visual illusions. The renewed interest in this issue within social psychology is largely due to Stapel and Koomen's work (1997) on the Ebbinghaus illusion. In this illusion, a central circle appears smaller when surrounded by larger rather than smaller circles (a contrast effect). The width of the central circle is evaluated in a relative way, with the context used as a comparative standard. Coren and Enns (1993) showed that the comparison process is more likely in conditions of conceptual similarity between central and context circles. Higher perceptual contrast emerges when central and context circles belong to the same category (i.e., all dogs) rather than to different categories (i.e., dogs and shoes). Adapting this "similarity breeds comparability" paradigm to a social context, Stapel and Koomen (1997) used face stimuli that belonged to the same category or to different social categories. They found that social categorization affected the magnitude of the Ebbinghaus illusion both when physical (e.g., gender) and non-physical (e.g., profession) dimensions were involved. Along the same lines, Pickett (2001) provided evidence that beliefs about the entitativity of the category (Campbell, 1958; Brewer & Harasty, 1996; Hamilton & Sherman, 1996; Yzerbyt, Rogier, & Fiske, 1998; for a collection, see Yzerbyt, Judd, & Corneille, 2004) may influence comparisons between central and context face stimuli. Pickett (2001) reported higher perceptual contrasts in high entitativity (e.g., faces of members from the same fraternity) as compared to low entitativity (faces from individuals born during the same month) conditions.

In this article, we sought to examine the potential influence of a different aspect of social knowledge, namely the very content of social categories. Beyond their labels and some global features, social categories are also characterized by series of specific traits thought to describe category members. For instance, the trait "extroverted" may be more strongly associated with the category of lawyers than with the category of librarians (Kunda & Oleson, 1995; Yzerbyt, Coull, & Rocher, 1999). At the same time, the trait "competence" may be equally associated with lawyers and librarians. Whereas such associations have traditionally been evidenced by means of checklists or rating scales (Katz & Braly, 1933; McCauley & Stitt, 1978; Park & Judd, 1990; for a discussion of various explicit measures of stereotype content, see Leyens, Yzerbyt, & Schardon, 1994), recent work on stereotyping and prejudice examined the existence of such associations by relying on implicit measures (Greenwald & Banaji, 1995; Kawakami, Dion, & Dovidio, 1998; Wittenbrink, Judd, & Park, 1997, 2001).

One advantage of focusing on the content of the categories and the specific dimensions that may define some categories, as opposed to others, is that people may indeed be motivated to see some dimensions as defining a category. People generally tend to think that their social knowledge reflects the actual distribution of characteristics in the social environment. To the extent that these convictions indeed bear relation to reality, one can speak of reflective distinctiveness among the categories (Spears, Jetten, & Scheepers, 2002). Sometimes, perceivers are uncer-

tain about the differences that exist between two categories. This is not likely to pose a major problem if perceivers experience no strong concern for the categories in question. For social identity theorists (Tajfel & Turner, 1979), however, perceivers may have a vested interest in seeing categories as being different from one another on some critical dimensions. This reaction is most likely when people belong to one of the categories and more or less explicit competition is going on with the other category. In several studies, Jetten and colleagues (Jetten, Spears, & Manstead, 1997, 1998, 1999, 2001; Spears et al., 2002) suggested that the blurring of social categories on critical dimensions indeed motivates group members to reinstate a sharp distinction between the categories in spite of the available evidence. Traditionally, the reaction to the lack of distinctiveness has been to produce positive differentiation (van Knippenberg & Ellemers, 1990). Spears et al. (2002) speak of reactive distinctiveness to refer to group members' tendency to see a gap between two groups on a given dimension when none or very little in fact exists.

Our explicit ambition in this research was to extend recent demonstrations of the role of social knowledge using perceptual illusions by looking at content aspects of stereotypes. More specifically, we wanted to examine the viability of using a perceptual illusion paradigm to gather evidence for the operation of both reflective and reactive distinctiveness. Whereas a first study examined the emergence of assimilation and contrast effects depending on the content aspects of stereotypes, a second study focused on the same perceptual effects in an intergroup context. Because the figurative constraints inherent to the Ebbinghaus illusion limit its use to the assessment of the perceived similarity between target and context stimuli, this illusion could not serve our specific aim. We thus searched the perception literature in order to identify a more appropriate visual illusion. The Delboeuf illusion proved to be ideally suited for our concerns, in that it is able to produce not only contrast but also assimilation.

In the Delboeuf illusion (see Figure 1), participants are asked to evaluate the width of a central circle — called the test circumference —, which is embedded in a larger circle — called the inductor circumference (Weintraub, Wilson, & Greene, 1969). The diameter of the inductor circle (I) can be manipulated so as to be similar or dissimilar to the diameter of the test (T) circle (see Figure 1). When T and I are similar to each other, T is likely to be assimilated to I. In this case, T will be perceived as being larger than it actually is (a positive illusion). When T and I are dissimilar to each other, T is likely to be contrasted from I. In this case, T will be perceived as smaller than it actually is (negative illusion). As a matter of fact, studies by Obonai (1954) and Zigler (1960) confirmed that T is perceived proportionally smaller as I becomes larger: “lines, circles, triangles, etc., seem larger when they are adjacent to small to medium extents (the confluence effect) and smaller when they are adjacent to larger extents (contrast effect)” (Obonai, 1954, p. 59).

One clear advantage of the Delboeuf illusion is that it allows examining assimilation and contrast effects independently. Also, because Delboeuf configurations only involve two stimuli (I and T), this paradigm can be easily made to apply to intergroup situations, with T and I symbolizing the respective location of two social groups on a given social dimension. We conjectured that individuals' knowledge and motivation regarding the standings of social groups would affect their judgments of the features of the circles. The idea was thus to see whether the reference to an evaluative dimension that would be superimposed on physical stimuli could guide the judgment of these stimuli.

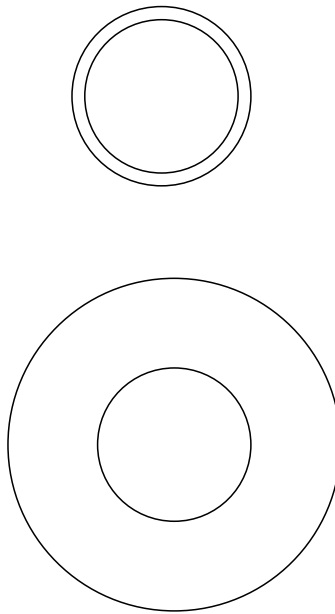


FIGURE 1
Delboeuf configurations with similar (top) and dissimilar (bottom) inductor.

OVERVIEW OF THE STUDIES

In Experiment 1, participants were presented a Delboeuf illusion and told that T and I symbolized the extent to which two national groups could be characterized by a given social dimension. Depending on condition, the dimension was pre-tested to be either equally representative (i.e., typical) of both groups or more representative of one group than the other. We predicted more (less) assimilation and less (more) contrast when the dimension was believed to be equally typical of both groups (more typical of one group than of the other). In Experiment 2, we examined the phenomenon in a more involving group context. Depending on condition, the dimension represented by the circles was one for which pre-test work revealed either the existence or the absence of competition between the participants' group and another group. We predicted more (lower) contrast and less (higher) assimilation when the focal dimension was seen as threatening for the participants' social identity.

EXPERIMENT 1

Our hypothesis was that the superimposition of social information on the circles would enhance contrast and decrease assimilation when this information was believed to be more typical of one group than of the other. Conversely, we expected higher assimilation and lower contrast to emerge when the dimension was believed to be equally typical of both social groups.

Method

Participants and Design

Seventy-three students at the Catholic University of Louvain at Louvain-la-Neuve individually participated in the experiment on a voluntary basis. The study was presented as an investigation on perception. Participants were randomly assigned to a mixed-factor design with Social Information (No Dimension Mentioned vs Dimension Equally Typical vs Dimension Differently Typical of the national groups) as a between-subjects factor, and Inductor (Similar Inductor vs Dissimilar Inductor) as a within-subject factor.

Procedure

Participants were given a booklet. On the first page, they learned how they would have to estimate the diameter of a series of central circles (Ts). The diameter of the central circles (T) was to be reported by means of a 85mm line located at 35mm from the bottom of the page and 22mm from the left side of the page with a 10mm vertical stop line at its left extremity. For each estimate, participants were to draw a second stop vertical line farther on the right of the line so as to reproduce a distance equivalent to the diameter of the Ts between the two vertical stop lines. This method is known as the reproduction method (Coren & Girgus, 1972). Note that the use of an unfamiliar measurement setting may increase participants' uncertainty regarding their estimates, resulting in a greater reliance on categorical information (Corneille, Klein, Lambert, & Judd, 2002). On the same page, after the instructions, a 30mm-diameter practice circle allowed participants to be introduced to the method.

On the next page, participants received one of three sets of instructions. In the *Control condition*, participants were asked to report the diameter of the central circle of every configuration that followed, using the line at the bottom of the page. In the *Equal condition*, participants were told that previous work assessed the *kindness* of German and English people, and that conclusions from different studies would be represented in a graphic manner, with the diameter of the central and peripheral circles representing the level of Germans and English, respectively. They were then requested to report the diameter of the central circle on the bottom line for each pattern that followed. In the *Different condition*, participants learned that previous work assessed the *originality* of German and English people, and that conclusions from different studies would be represented in a graphic manner, with the diameter of the central and peripheral circles representing the level of Germans and English, respectively. Again, participants were asked to report the diameter of the central circle on the bottom line for each pattern that followed.¹

Two Delboeuf illusions were used. Because each illusion involves two configurations (T surrounded by a similar I, and T surrounded by a dissimilar I), participants judged the diameters of a total of four Ts. The stimulus configurations were always presented on the center of a page. We maintained the diameters of the stimuli as similar as possible to those originally used by Piaget, Lambercier, Boesch, and Albertini (1942; see also Santostefano, 1963). One illusion was composed of a 19mm T presented once in a 25mm I (similar I), and once in a 90mm I (dissimilar

I). The second illusion, a 37mm T, was presented once into a 50mm I (similar I), and once into a 100mm I (dissimilar I). The presentation order of the configurations was randomized for each participant.

Results and Discussion

Five participants were discarded from analyses because their responses on the practice trials revealed that they misunderstood the reproduction method. We first examined the difference between the participants' estimates of the Ts and the actual values of the Ts both for stimuli eliciting contrast (Ts in dissimilar Is) and for stimuli eliciting assimilation (Ts in similar Is). The contrast index was created by subtracting the participants' estimates of the Ts surrounded by dissimilar Is from the actual values of these Ts. The assimilation index was created by subtracting the actual values of the Ts surrounded by similar Is from the participants' estimates of these Ts. Assimilation and contrast effects were thus reflected by positive values on both indexes.

For the contrast configurations, we examined the 37(T)/100(I) and the 19(T)/90(I) stimuli. The mean contrast across participants was 5.31 ($SD = 5.16$), significantly higher than 0, $t(67) = 8.51$, $p < .001$. For the assimilation configurations, we examined the 37(T)/50(I) and the 19(T)/25(I) stimuli. The mean assimilation across participants was 1.13 ($SD = 5.28$), which is significantly higher than 0, $t(67) = 1.77$, $p < .05$. Thus, both contrast and assimilation emerged, confirming that participants fell prey to the Delboeuf illusion.

We then examined whether the contrast and assimilation effects varied as a function of Social Information (see Figure 2). An ANOVA with Inductor (Similar I vs Dissimilar I) as the within-subjects factor and Social Information (Control vs Same vs Different) as the between-subjects factor revealed an Inductor main effect, reflecting larger contrast effects than assimilation effects, $F(1, 65) = 20.4$, $p < .001$. More importantly, the predicted interaction between Inductor and Social Information was significant, $F(2, 65) = 19.18$, $p < .02$. A priori comparisons confirmed that the difference between assimilation and contrast effects was larger in the Different ($M = 9.25$, $SD = 9.51$) than in the Control condition ($M = 4.11$, $SD = 9.25$), $t(40) = 1.72$, $p < .05$, and marginally smaller in the Same ($M = 1.15$, $SD = 7.25$) than in the Control condition, $t(50) = 1.28$, $p < .10$. Further analyses confirmed that both the contrast effect, $F(2, 65) = 4.01$, $p < .03$, and the assimilation effect, $F(2, 65) = 2.47$, $p < .09$, varied as a function of Social Information. Specifically, we obtained a linear trend across the different Social Information conditions for both the contrast, $F(1, 65) = 9.86$, $p < .01$ (residual, $F(1, 65) < 1$, *ns*), and the assimilation effect, $F(1, 65) = 2.58$, $p < .03$ (residual, $F(1, 65) < 1$, *ns*).

Present data support our predictions: participants showed more assimilation and less contrast in their estimates, when the Delboeuf circles represented a dimension believed to be equally typical of the two groups than when the dimension was differentially associated to the two groups. This finding stresses the powerful influence of social knowledge in the judgment of physical stimuli, under conditions of uncertainty, when social cues offer a guide to the judgment. Our data also provided encouraging evidence regarding the potential application of the Delboeuf illusion as a measure of people's representation about social categories. We come back to this point in the general discussion.

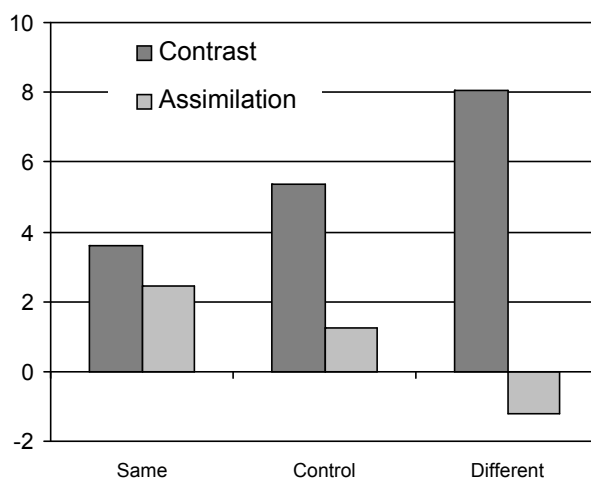


FIGURE 2
Assimilation and contrast as a function of social information (Experiment 1).

EXPERIMENT 2

Experiment 1 extended previous findings by Stapel and Koomen (1997) by providing evidence that the specific trait dimensions used to define social categories moderates the magnitude of contrast and assimilation effects. As it turns out, the particular standing of the two groups on the dimensions mentioned in Experiment 1 was not subject to disapproval by our participants. Because the social categories used in Experiment 1 were groups to which participants did not belong, they may have been unmotivated to question the proposed association between the dimensions and the specific social categories. An important question thus concerns the impact of group membership on the way people react to the dimensions that are being evoked. In particular, if the specific dimension linked to the circles is one on which people feel that their group ought to be higher than the other group, we would expect a substantial contrast effect to emerge. This prediction flows from the abundant literature on intergroup relations in general and intergroup differentiation in particular. Experiment 2 thus aimed to examine whether the Delboeuf paradigm could provide evidence relevant to the participants' search for positive distinctiveness.

Groups often compete with other groups to obtain economic benefits, status, prestige, and the like. Competition at an intergroup level can derive from the scarcity of material resources (Campbell, 1965; Sherif, 1966) or from symbolic concerns (Turner, 1975; Tajfel, 1982). Sherif and colleagues (Sherif, Harvey, White, Hood, & Sherif, 1961) showed that intergroup relations are determined by the compatibility of their interests and goals. Social identity research (Billig & Tajfel, 1973; Tajfel, Billig, Bundy, & Flament, 1971; Turner, 1975; for reviews, see Abrams & Hogg, 1988; Tajfel & Turner, 1979) demonstrated that merely categorizing individuals into groups could similarly trigger a sense of competition. Even in a context that is devoid of all usual correlates of intergroup relations and, instead, builds only on people's mere knowledge that two groups exist, group members compete on a symbolic basis in order to achieve a positive social identity. In other words, ingroup bias in evaluative decisions and allocation of values are being

considered as indicators of the tendency of ingroup members to engage in social competition (Mullen, Brown, & Smith, 1992).

Extensive work by Jetten and colleagues (1997, 1998, 1999) suggests that the evocation of a lack of distinctiveness on prestigious and important dimensions is particularly likely to trigger intergroup competition. In the present study, we hypothesized that the reference to some prestigious dimension on which the participants' ingroup and a comparison outgroup are hard to differentiate, and on which the ingroup is likely to compete with the comparison group, would guide participants' decisions about stimuli, thereby enhancing the potential for contrast and decreasing the potential for assimilation. Conversely, we predicted that assimilation would increase and contrast would decrease when using a superordinate dimension on which no competition is perceived to exist.

Experiment 2 was similar to Experiment 1 with two exceptions. The dimensions of comparison (a) related to students in economics or psychology, and (b) were equally typical of both groups. Importantly, whereas one dimension was characteristic of the superordinate category including the two groups, the other dimension induced a sense of competition.²

Method

Participants and Design

Eighty-one students in economics at the University of Padova individually participated in the experiment on a voluntary basis. The study was presented as an investigation on visual perception. Participants were randomly assigned to a mixed-factor design with Social Information (No Dimension mentioned vs Superordinate Dimension vs Competition Dimension) as a between-subjects factor, and Inductor (Similar Inductor vs Dissimilar Inductor) as a within-subject factor.

Procedure

The general procedure was the same as for Experiment 1. In the *Control condition*, participants were asked to report the diameter of the central circle of every configuration, using the line at the bottom of the page, as indicated when completing the practice trial. In the *Superordinate Dimension condition*, participants also learned that previous work had assessed the *enthusiasm* of students in economics and students in psychology, and conclusions from different studies would be represented in a graphic manner, with the diameter of the central and peripheral circles representing the level of psychology and economics students, respectively. In the *Competition Dimension condition*, participants read that previous work had assessed the *competence* in human resources management of students in economics and students in psychology, and that conclusions from different studies would be represented in a graphic manner, with the diameter of the central and peripheral circles representing the level of psychology and economics students, respectively.³

Results and Discussion

Two participants were excluded from the analyses because their responses on the practice trials revealed that they misunderstood the reproduction method. Before examining the effects of social information on the emergence of perceptual illusions, we checked whether the whole sample displayed the typical assimilation and contrast effects under the similar and dissimilar inductor, respectively. This was the case. For the similar inductor configurations, the mean assimilation was 1.99 ($SD = 5.49$), which was significantly higher than 0, $t(78) = 3.21$, $p < .001$. For the dissimilar inductor configurations, the mean contrast was 4.53 ($SD = 5.29$), which was significantly higher than 0, $t(78) = 7.60$, $p < .001$.

We then examined whether the contrast and assimilation scores varied as a function of social information (see Figure 3). An ANOVA using Inductor (Similar vs Dissimilar) as the within-subjects factor and Social Information (Superordinate Dimension vs Control vs Competition Dimension) as the between-subjects factor revealed a significant Inductor main effect, $F(1, 76) = 7.39$, $p < .01$, with higher contrast ($M = 4.53$, $SD = 5.29$) than assimilation ($M = 1.99$, $SD = 5.49$) effects. More importantly, we also obtained the predicted interaction between Inductor and Social Information, $F(2, 76) = 9.97$, $p < .001$. Follow-up comparisons confirmed that the difference between the assimilation and contrast effects was smaller in the Superordinate Dimension condition ($M = 2.74$, $SD = 9.15$) than in the control condition ($M = 2.67$, $SD = 6.5$), $t(52) = 2.53$, $p < .02$, and larger in the Competition Dimension condition ($M = 8.12$, $SD = 10.48$) than in the control condition, $t(50) = 2.29$, $p < .04$.

Additional analyses confirmed that both contrast, $F(2, 76) = 10.57$, $p < .001$, and assimilation effects, $F(2, 76) = 5.6$, $p < .005$, varied as a function of Social Information. We found a linear trend across the different Social Information conditions both for the contrast, $F(1, 77) = 7.78$, $p < .01$ (residual, $F(1, 77) < 1$, *ns*), and for the assimilation, $F(1, 77) = 5.76$, $p < .05$ (residual, $F(1, 77) < 1$, *ns*) effects.

Thus, in full support of our predictions, we found that the reference to a dimension known to be associated with a superordinate category, equally typical of the two groups, reduced contrast and increased assimilation, while the evocation of a dimension known to be at the heart of intergroup competition led to stronger contrast and smaller assimilation effects.

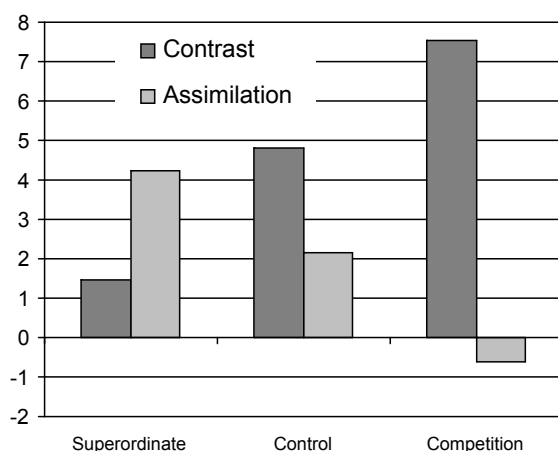


FIGURE 3
Assimilation and contrast as a function of social information (Experiment 2).

GENERAL DISCUSSION

Our aim in the present research was to explore the idea that people's representations about the various characteristics associated to social groups (i.e., stereotypes) may indeed affect judgments of visual stimuli. Because of the specific nature of our questions, we turned our attention to the Delboeuf illusion. This illusion relies on two circles that vary in their diameter and come in two configurations. In one configuration, the two circles are very similar, thereby inducing an assimilation effect. In the other, the two circles have quite a different diameter, thereby provoking a contrast effect. For our purposes, we superimposed social knowledge by informing participants that the two circles represented the level of a given dimension associated with each of two social groups.

Experiment 1 collected initial evidence for the role of social factors in guiding judgments about perceptual stimuli. Compared to control participants, those confronted with a dimension that was known to be strongly associated to one group and weakly to the other manifested a larger contrast effect and a smaller assimilation effect. In contrast, participants who were presented a dimension thought to be equally characteristic of the two groups fell prey to a smaller contrast effect and a larger assimilation effect compared to what happened in the control condition. These results support our first hypothesis in that they highlight the sensitivity of the Delboeuf illusion to the intrusion of social knowledge.

Experiment 2 examined the impact of motivational concerns using the same illusion. This time, all experimental participants were confronted with a superimposed social dimension that was thought to characterize the social groups equally. One dimension was selected because it did not trigger a high level of competition even though it was known to be strongly associated with both groups. The other dimension was chosen because it was at the heart of a dispute, both groups competing to make sure that they were more tightly linked to the dimension (Tajfel & Turner, 1979). As expected, the superordinate dimension led to an increase of assimilation and a decrease of contrast. Quite a different pattern emerged for the dimension for which there was a competition: participants not only exacerbated the contrast effect but also minimized the assimilation effect.

The present results go a long way illustrating the impact of social factors in the emergence of perceptual illusions. They show that people's social knowledge can have a dramatic impact on the way they conceive of their environment. The data are also intriguing in that they not only demonstrate how general knowledge about the social world intrudes in low-level processes, but they also evidence the role of motivational concerns with respect to the intergroup context and the standing of people and their group in the social environment. In line with the growing body of evidence showing that people can indeed feel pressed to reinstate differences between their group and a comparison group when there is a lack of distinctiveness (for a review, see Spears et al., 2002), we found that participants were contrasting the circles when the dimension associated with the groups was one in which they had a vested interest.

Undoubtedly, one may argue that perceptual and response processes could be hard to disentangle. Indeed, as Tajfel (1969) noted, New Look studies lack a clear discrimination between perception and judgment effects of social knowledge. Without either entering this debate or referring to other information processing analysis (Erdelyi, 1974), what the present set of studies suggests is that social information about group-related dimensions may contaminate individuals' per-

ceptual judgments. If anything, it seems more appropriate to refer to categorization as a loose collection of properties and relations, as stated by grounded theories (Barsalou, 1999): concepts are not static recordings but organized into structured representations that establish relations between individual propositions and help us to dynamically interpret social reality. Instead of a single abstraction representing a category, an infinite number of abstractions may be constructed online to represent a category temporarily, supporting the current state of perception and providing goal-relevant inferences about objects, actions, events and the background settings. These processes create perceptions that go beyond the stimulus information (Barsalou, 1999).

An interesting extension for the present line of research would be to explore the possibility of using the present task as an implicit measure of stereotyping (Kawakami et al., 1998; Wittenbrink et al., 1997, 2001). Stereotypes may be conceptualized as patterns of descriptors related to group labels. Once a stereotype is activated through appropriate cues, stereotypical descriptors color our judgments about group members. Explicit measures, mainly represented by overt questions about group members, typicality suffer of social desirability concerns due to their intrinsic controllability. In contrast, implicit measures provide estimates of a construct free of desirability concerns, by limiting individuals' ability to control their answers. The Implicit Association Task (IAT; Greenwald & Banaji, 1995; Greenwald, McGhee, & Schwartz, 1998) is probably one of the best-known implicit measures, and it aims to reduce participants' control over their responses by requiring them to respond as fast and accurately as possible to associations between categories and traits. In the same line, because of its figurative nature, the Delboeuf paradigm that was considered here may also be used to assess stereotypes in an implicit way: to the extent that a specific dimension is thought to be more associated with one group than another, one should see systematic patterns in assimilation and contrast tendencies such that stereotypic dimensions lead to stronger contrast and weaker assimilation. Because the participants' task consists here of assessing metric distances displayed in figural stimuli as accurately as possible, it is hardly likely that participants would distort these estimates in order to conform to normative pressures.

Finally, we note two limitations of the present research. First, one may want to show that the very same dimension triggers a competition pattern or a superordinate pattern depending on some other factor(s). To be sure, this is difficult to achieve when real groups are at stake. It should be possible, however, to design such a study by relying on minimal groups. One critical issue would be that people would need to be sufficiently attached to the group and to the particular dimension to see a competition pattern emerge. A second caveat is the fact we may want to rely on a full-design so that each group would show the relevant competition pattern on the same dimension. Interestingly, most distinctiveness studies do not examine the reactions of both groups as they assign all participants to the same minimal group. Even if the two groups are being used, their reactions are largely similar. Future research should allow us to investigate these issues.

NOTES

1. We asked 20 psychology students to indicate whether each of 10 pre-selected characteristics (i.e., originality, sociability, kindness) was more typical of Germans, English, or equally typical of both. Considering that *originality* was indicated 16 times as typical of English and that *kindness* emerged 12 times as typical of both groups, we chose the former as the dimension that was differently typical, $\chi^2(2) = 19.9, p < .001$, and the latter as the dimension that was equally typical of both groups, $\chi^2(2) = 9.1, p < .01$.

2. The assignment of the populations to the circles reflects the social representation about the two groups involved. We did not counterbalance groups because pilot studies, conducted in our laboratory, showed participants became confused when presented with perceptual information that did not correspond to their stereotypical beliefs.
3. We asked 20 economics students to indicate if each of 10 dimensions was associated more to students in economics, in psychology or equally to both groups because the dimension was typical of students in general. Another sample of 20 economics students indicated for the same dimensions if they did or did not lead to a sense of competition between economics and psychology students. We chose *enthusiasm* as the superordinate dimension because it was indicated 16 times as equally associated to both groups in the first pretest, $\chi^2(1) = 7.2, p < .01$, and the second pretest revealed that it did not lead to a sense of competition, $\chi^2(1) = .80, ns$. We chose *competence in the management of human resources* as the competition condition, because it emerged 17 times as leading to a sense of competition between the two groups in the first pretest, $\chi^2(1) = 9.8, p < .005$, and the second pretest showed that it was not associated to one category more than to the other, $\chi^2(1) = 1.6, ns$.

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