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Compensation between warmth and competence: Antecedents and consequences of a negative relation between the two fundamental dimensions of social perception

Nicolas Kervyn
Université catholique de Louvain, and FRS-FNRS (Fonds de la Recherche Scientifique), Louvain-la-Neuve, Belgium

Vincent Yzerbyt
Université catholique de Louvain, Louvain-la-Neuve, Belgium

Charles M. Judd
University of Colorado at Boulder, USA

In the present chapter we first review research that has identified two fundamental dimensions of social perception. Having defined these two dimensions, we then present the results of a research program conducted to explore the relationship between them. In general, using both experimental and correlational data, we find evidence of a compensation effect between the two dimensions when two targets are compared. That is, when one target is judged more positively on one of the two fundamental dimensions, the second is judged more positively on the other dimension. We show that this compensation effect is confined to these two fundamental dimensions rather than something that more broadly characterises comparative judgements on any two judgemental dimensions. We then explore the importance of this compensation effect for the formation, maintenance, confirmation, and communication of mixed stereotypes of social groups.

In college, students who work diligently and get straight As are seen as nerds. Everyone tries to copy their notes and summaries but no one invites them to parties. In sharp contrast, a girl who is on the cheerleading squad will be invited to at least three different parties every Friday night, but she

Correspondence should be addressed to Nicolas Kervyn, Department of Psychology, Catholic University Leuven, Louvain-la-Neuve, Belgium.
E-mail: nicolas.o.kervyn@uclouvain.be

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will have a hard time finding a group to work with for her major assignment. Later in life, stay-at-home mothers are seen as warm, caring, and sensitive. People will turn to them if they don't know how to soothe a baby, but not if they need advice on an important career decision. Successful career women are seen as cold and calculating. They will get the job done, albeit a bit ruthlessly. Everyone can think of similar examples coming from their own experience.

We believe that these different examples all have in common what we have come to call the compensation effect between the two fundamental dimensions of social perception: warmth and competence. As we show below, the compensation effect is defined as social perceivers' tendency to differentiate between two social targets in a comparative context on the two fundamental dimensions of social judgement by contrasting them in a negative direction. So, when two groups or individuals are judged and compared, the one judged more positively on one dimension is also judged less positively on the other dimension. In the present chapter we start by reviewing the research that has identified warmth and competence as the two fundamental dimensions of social perception. We then present our programme of research on the compensation effect.

THE TWO DIMENSIONS ACROSS TIME AND RESEARCH DOMAINS

This first section reviews theoretical and empirical efforts showing that there seem to be two fundamental dimensions underlying social perception. We start with evidence from the person perception literature and then review evidence from the intergroup literature. Finally we briefly discuss some relevant research in other domains. In these literatures, while there is considerable agreement about the existence of two dimensions, these have been named and defined differently over time and across research domains. But, as recent research reveals (Abele & Wojciszke, 2007) and as our discussion shows, these different pairs of dimension all share a common core.

Person perception

In the person perception domain, Rosenberg, Nelson, and Vivekananthan (1968) were the first to provide evidence of the presence of two dimensions that organise how we perceive others in terms of personality traits. These authors asked their participants to describe people they knew by means of 64 commonly used personality traits. Specifically, participants were asked to sort these traits into several piles according to whether they did or did not co-occur in a given person. Rosenberg and colleagues (1968) used these trait

groupings to estimate pairwise similarities among the traits and these similarities were then analysed with multidimensional scaling. Rosenberg et al. (1968) found that a two-dimensional space adequately accounted for the similarity among all pairs of the 64 personality traits. Further analyses of the resulting two-dimensional space suggested dimensional labels of *social good–bad* and *intellectual good–bad*. Figure 1 shows the resulting spatial configuration.

The theoretical importance of this two-dimensional structure was nicely demonstrated by Zanna and Hamilton (1972) who reinterpreted Asch's (1946) classic centrality effect in person perception. Asch had argued that *warm/cold* were central traits based on the very different impressions that were formed by describing someone as *intelligent, skilful, industrious, warm or cold, determined, practical, and cautious*. Zanna and Hamilton argued that what made *warm/cold* central traits in this list was that they were the only traits to make reference to the *social good–bad* dimension, thus radically affecting the overall impression of the person along that dimension. They

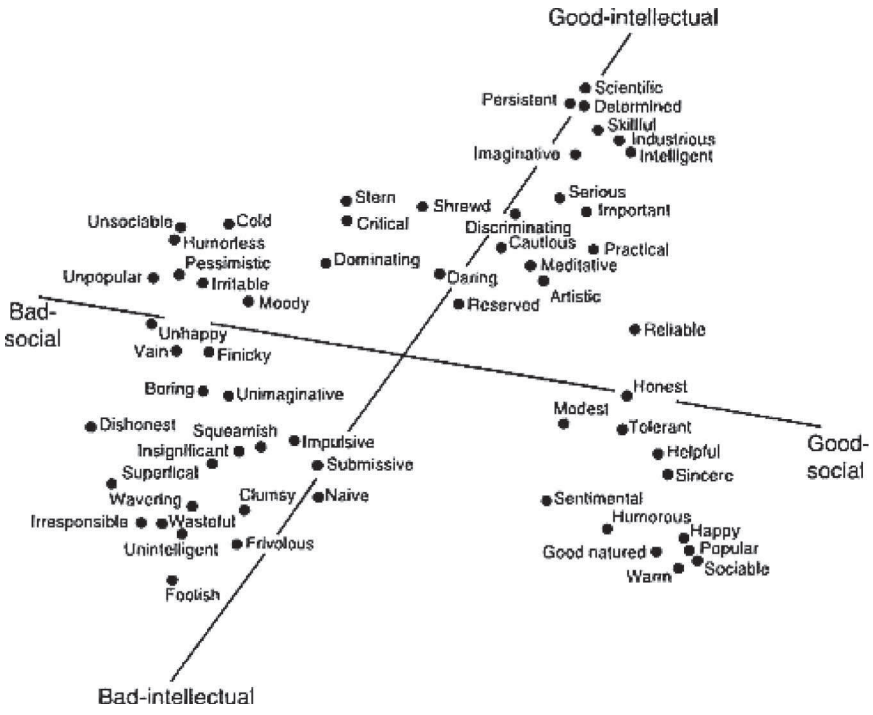

Figure 1. Personality traits on the two dimensions of "social good–bad" and "intellectual good–bad" (Rosenberg et al., 1968).

showed that if all adjectives in a list made reference to the *social good–bad* dimension except for one, then that one, making reference to the *intellectual good–bad* dimension, would emerge as central. Thus, impressions of someone described with the following trait list: *warm, sociable, industrious or lazy, good-natured, humorous*, were dramatically affected by the "central" *industrious/lazy* traits.

Wojciszke (1994) interpreted Rosenberg et al.'s (1968) two-dimensions model through a discussion of the goals that underlie behaviours. Wojciszke (1994, 2005) identified two categories of behavioural goals: the moral category and the competence category. The moral category refers to an actor's intended goal: *Does the actor have good or bad intentions?* whereas the competence category refers to the actor's ability to attain the goal: *Is the actor able to carry out his/her intentions?* (see also Read & Miller, 1989). The combination of the two categories leads to four possible classifications of actions that Wojciszke (1994) called virtuous success, virtuous failure, sinful success, and sinful failure. While these descriptions of behavioural goals engender different terms for the underlying dimensions, they map on very nicely to Rosenberg et al.'s special configuration. Wojciszke, Abele, and Baryla (2009) recently showed that those who virtuously succeed are liked and respected, those who sinfully succeed are disliked and respected, those who virtuously fail are liked and disrespected, and those who sinfully fail are disliked and disrespected.

Intergroup perception

In 1996, Glick and Fiske introduced the concept of ambivalent sexism. Questioning a simple view of prejudice in terms of one valenced dimension ranging from positive to negative, these authors argued that prejudice against women takes the form of benevolent sexism and/or of hostile sexism. Benevolent sexists believe that women are high in warmth but low in competence and therefore that men have to provide for them. This is the traditional stereotypic perception of women (Eagly & Steffen, 1984). Hostile sexists on the other hand see women, or a subgroup of women, as a competent group that is in competition with men (i.e., low in warmth). In Glick and Fiske's (1996; Glick, Fiske, & Mladinic, 2000) ambivalent sexism theory, the two constructs are distinct but are nevertheless positively correlated. And, fundamentally, they rely on two underlying dimensions, warmth and competence.

Turning to national stereotypes, a number of authors (Cuddy et al., 2009; Phalet & Poppe, 1997; Poppe & Linssen, 1999) have shown a two-dimensional structure underlying the perception of nations. In fact, national stereotypes of the four different categories of sinful-loser, sinful-winner, virtuous-loser, and virtuous-winner (Wojciszke, 1994) emerged in these

studies (Phalet & Poppe, 1997; Poppe & Linssen, 1999). Additionally, Phalet and Poppe (1997) found that perceived conflict between the target country and the participants' own country predicted perceived warmth. They also showed that the perceived power of a country was a positive predictor of its perceived competence (see also Poppe & Linssen, 1999). Similarly, Poppe and Linssen (1999) found that the size of the nation was a negative predictor of its perceived warmth.

In order to study the applicability of a two-dimensional model of stereotype content beyond gender stereotypes (Glick & Fiske, 1996), Fiske Xu, Cuddy, and Glick (1999; Fiske, Cuddy, Glick, & Xu, 2002) asked their participants to rate a series of groups on traits of warmth and competence. The analysis of those ratings revealed that the different groups were organised into four clusters defined by the two dimensions (see Figure 2). First, there were a few commonly *derogated groups* (e.g., drug dealers; welfare recipients ...) that ended up with low ratings on both dimensions. The ingroup or the culture's main reference groups (*aspirational groups*) were rated high on both dimensions (e.g., whites; students ...). Other groups were rated high on warmth but low on competence (e.g., elderly people, blind people ...) and still others were rated high on competence but low on warmth (e.g., Jews, Asians ...). Fiske et al. (2002) called these latter two

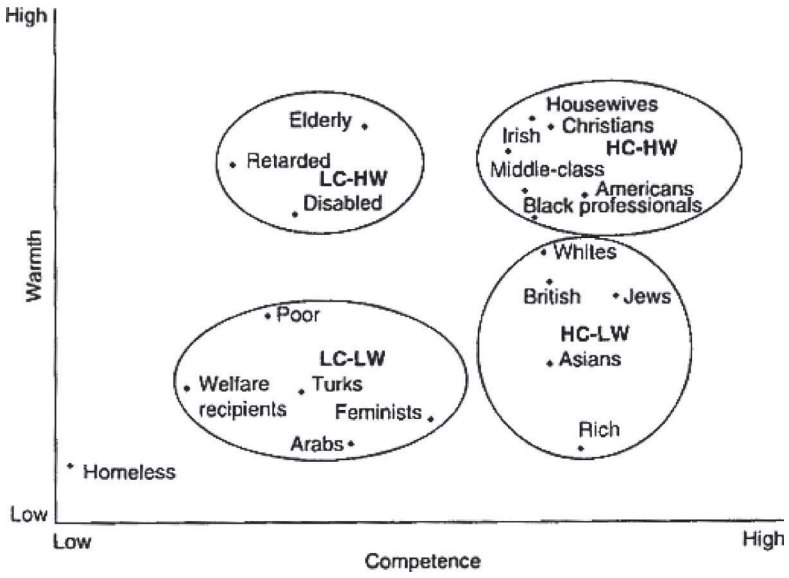

Figure 2. Distribution of social groups on the competence and warmth dimension in the stereotype content model (Fiske et al., 2007).

groups the paternalised and the envied groups, respectively. These authors' stereotype content model (SCM) identifies two structural variables, competition and status, that predict warmth and competence, respectively, and argues that different configurations of warmth and competence lead to different emotions towards social groups. Specifically, admiration is felt towards ingroups and aspirational groups. Contempt is felt towards derogated groups. Paternalised groups trigger pity. Finally, envied groups cause envy and jealousy.

Other research in social sciences

Social psychology is not the only domain in which two dimensions have been thought to underlie social perception. One example can be found in political science, where Kinder and Sears (1985) argued that *moral integrity* and *competence* constitute the two central and most important dimensions in the overall evaluation of politicians. Each of these dimensions shows up repeatedly when analysing voters' open-ended descriptions of candidates (Miller & Miller, 1976) and in factor analyses of trait descriptions of political candidates (Kinder & Sears, 1985).

These same two dimensions also emerge in work on face perception. For instance, Montepare and Dobish (2003) have shown that different facial expressions lead to different dominance and affiliation trait inferences (see also Knutson, 1996; Livingstone & Pearce, 2009). Happiness and surprise expressions lead to high dominance and high affiliation trait inferences. Angry expressions lead to high dominance and low affiliation trait inferences. And sad expressions lead to low dominance trait inferences.

Integration of the different research traditions

Although the names are different in different research domains, communality (Abele, 2003; Bakan, 1966), social good–bad (Rosenberg et al., 1968), morality (Wojciszke, 1994, 2005), affiliation (Montepare & Dobish, 2003), and warmth (Fiske et al., 1999) are all very closely interrelated. Similarly, dominance (Montepare & Dobish, 2003), agency (Abele, 2003; Bakan, 1966; Wojciszke, 1994, 2005), intellectual good–bad (Rosenberg et al., 1968), and competence (Fiske et al., 1999) all share considerable meaning similarity. In research testing this intuition, Abele and Wojciszke (2007) selected five prominent pairs of dimensions that have been proposed in social perception: communion/agency; femininity/masculinity; collectivism/individualism; morality/competence; other-interest/self-interest. Communion and agency were first proposed by Bakan (1966) as the separate dimensions of human existence, and have been used by Abele (2003) to study self-descriptions. Femininity and masculinity have been identified in the gender role literature

as being stereotypically related to communion and agency respectively (Bakan, 1966; Bem, 1974; Eagly & Steffen, 1984). Collectivism and individualism were proposed by Triandis (1995) in the cultural difference literature. Morality and competence have been used in person perception as two separate types of behavioural information (Reeder & Brewer, 1979; Wojciszke, 1994, 2005). And other-interest and self-interest are motivations behind behaviours that are respectively other-profitable and self-profitable (Peeters, 1992, 2005). Abele and Wojciszke (2007) asked their participants to rate 300 traits names on one of these 12 dimensions in a between-participants design. They then conducted a factor analysis on the data and found a two-factor solution that explained 89% of the variance. Communion, interest in others, collectivism, morality, and femininity all loaded strongly on the first factor. Agency, self-interest, masculinity, individualism, and competence all loaded highly on the second factor (see Figure 3). This study illustrates the fact that although the specific terms and the definition behind those terms may vary somewhat, these various pairs of dimensions also greatly overlap.

Furthermore, we note that Wojciszke's (1994, 2005) oriented goal theory on the one hand, and Fiske et al.'s (1999, 2002) stereotype content model on the other, provide well-articulated and widely used models in the person and the intergroup perception domains respectively. Comparing those two models allows us to draw interesting conclusions. The four quadrants identified by the oriented goal theory (virtuous-winner, sinful-winner, sinful-loser, and virtuous-loser) correspond to the four clusters identified by the stereotype content model (aspirational groups, envied groups, depreciated groups, and paternalised groups). The predictors of the two dimensions

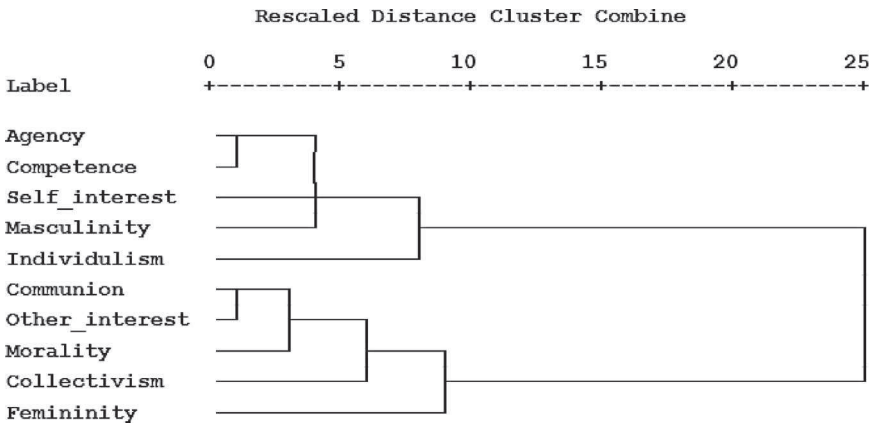

Figure 3. Clustering solution for the five pairs of dimensions (Abele & Wojciske, 2007).

proposed in the two models are rather similar: competition and status for the stereotype content model, intended goals and efficiency for the oriented goal theory. There are also great similarities between these predictors and the predictors of a country's perceived warmth and competence identified by Phalet and Poppe (1997) that they call perceived conflict (negative predictor) and perceived power respectively.

At the same time, the oriented goals theory and the stereotype content model differ in the way they predict the emotional consequences of the two dimensions. The stereotype content model identifies four specific emotions: admiration, pity, envy, and contempt. Each of these four emotions corresponds to a specific combination of high/low warmth and high/low competence. As for the oriented goal theory, Wojciszke (1994, 2005) considers that communion leads to liking and agency to respect. There is thus a 45-degree shift between the emotional predictions of the two models. At the same time, this shift does not necessarily mean that the two models contradict one another. As a matter of fact, the specific emotions of the stereotype content model can be considered to be the result of a combination of respect and liking. So, admiration would be felt towards a target that is both liked and respected. Pity would be felt towards a target that is liked but not respected. Envy would be felt towards a target that is respected but not liked. And contempt would be felt towards a target that is disliked and disrespected.

Given all this work, it seems clear that there really are two fundamental dimensions of social judgement and perception. Additionally, it seems fairly evident that although different terms for the two dimensions have been used in these literatures, they all share a great similarity of meaning. Following Fiske et al. (1999) we have chosen to use the terms *warmth* and *competence* to refer to these two dimensions. Our reading of the literature leads us to believe that there is immense overlap in meaning between these two dimensions and other that have been used. Said differently, we are not aware of any theory of social perception that proposes to use two dimensions that are clearly not related to warmth and competence. Of course, it is possible to further break down the two fundamental dimensions into a greater number of dimensions in order to capture an even more nuanced description of social objects, but these sub-dimensions definitely seem to be more domain-specific (Alexander, Brewer, & Herrmann, 1999; Leach, Ellemers, & Barreto, 2007).

RELATIONSHIPS BETWEEN WARMTH AND COMPETENCE

In this section we address the question of how these two fundamental dimensions of social perception relate to each other. After reviewing past

work on this question, we introduce the compensation effect hypothesis and the empirical work that supports it. Although the relationship between warmth and competence has generally not been the primary focus of the literature in this area, there are a number of suggestive clues that in fact turn out to be rather contradictory. Some work points to a positive relationship between the two dimensions, other research suggests that they are orthogonal, and still other work suggests they are negatively related. We review each in turn.

Evidence for a positive relationship

As can be observed in Figure 1, Rosenberg et al. (1968) found that the *social good–bad* and the *intellectual good–bad* dimensions were not orthogonal to each other. Indeed, the observed angle between them of 65° corresponds to a positive correlation of .42. This means that a trait or a target that is perceived positively on one of the dimensions also tends to be perceived positively on the second. This is an example of what is known as the halo effect. In 1920, E. L. Thorndike defined the halo effect as the tendency to "think of a person in general as rather good or rather inferior and to color the judgement of the separate qualities by this feeling" (p. 25). Such an effect has often been reported in person perception research (Anderson, 1965; Asch, 1946; Kelley, 1950; Srull & Wyer, 1989).

In a classic halo effect experiment, Kelley (1950) manipulated expectations of students before they met a new instructor. Before the course, students were given a vignette with information about their new instructor. Participants read *People who know him consider him to be a rather cold/very warm person, industrious, critical, practical, and determined.* The stimulus person then came in and led the class in a 20-minute discussion. Students who had read the *very warm* vignette rated the instructor as more considerate to others, less formal, more sociable, more popular, less irritable, more humorous, and more humane than the students that had read the *rather cold* vignette. As far as behavioural measures were concerned, 56% of the students in the *very warm* conditions took part in the discussion, whereas only 32% of the students in the *rather cold* condition did so. Kelley's (1950) experiment is generally taken as good evidence of the prevalence and importance of the halo effect. But, having the two dimensions of social perception in mind, we note that all the traits on which Kelley finds an effect are related to warmth. No significant difference was found on traits such as: self-assured, intelligent, will go far, knows his stuff, etc. For these traits, the warmth manipulation proved to have no impact. This leads us to the second possibility: the absence of a relation between warmth and competence.

Evidence for an orthogonal relationship

Research in the field of intergroup relations also informs us on the nature of the relationship between warmth and competence. As already mentioned, studies by Fiske and colleagues (1999, 2002; for a review, see Fiske, Cuddy, & Glick, 2007) showed that different social groups are perceived differently on the warmth dimension and on the competence dimension, and that they were roughly equally distributed around the resulting two dimensional space. Ingroups and aspirational groups are perceived as warm and competent; derogated groups are seen negatively on both dimensions; envied groups are seen as competent and cold; and finally paternalised groups are seen as warm and competent. Given the roughly equal distributions of groups in these four clusters, the implication is that the two dimensions of warmth and competence are orthogonal to each other.

Similarly, the oriented goal theory crosses the two dimensions of morality and competence orthogonally (Wojciszke, 1994). According to this theory a "winner" can either be virtuous or sinful and a loser can either be virtuous or sinful. A series of models proposed in other domains also support this idea of an orthogonal relation. For instance, for the perception of political candidates, Kinder and Sears (1985) do not assume any systematic relationship between moral integrity and competence.

Evidence for a negative relationship

There exist various theoretical formulations that make strong assumptions that the two dimensions of warmth and competence are negatively correlated. In fact, some of these make the very strong assumption that the negative correlation between the two dimensions is perfect, thus reducing the two dimensions to a single one, with one end referring to competent and cold targets and the other end referring to incompetent but warm targets.

In documenting differences among cultures, Triandis (1995) proposed to differentiate between collectivistic and individualistic cultures. Collectivistic cultures are high on communality and individualistic cultures are high on competence. Since cultures are either collectivistic or individualistic, it is impossible with such a framework for a culture to be at the same time high (or low) on both communality and competence.

Similarly, in political science, Funk (1997) argued that as political expertise increases political perceivers value a candidate's competence more than their warmth. In the stimulus materials used to support her argument she asked participants to judge two candidates, one who was competent but cold and a second who was less competent but warmer. As hypothesised, those who possessed great expertise preferred the former candidate to the

latter. Note, however, that the stimulus materials make the assumption of a perfect negative relationship between the two dimensions. It is entirely possible that more expertise is associated with valuing both competence and warmth more in political candidates. However her stimulus materials could not reveal such effects on separable dimensions.

Besides the work that simply assumes the existence of a negative relation between the two fundamental dimensions, recent work has also started to examine the content of stereotypes about groups that are characterised by mixed stereotypes. As already mentioned (Glick & Fiske, 1996, 2001), there are two very different stereotypic perceptions of women. On the one hand, there is the stereotype of the traditional, warm, and caring woman who suffers from a perceived lack of competence. On the other, professional women and feminists suffer from a perceived lack of warmth. These two stereotypes would suggest that beliefs about women are organised around two negatively correlated dimensions. Similar results have been reported by Cuddy and colleagues in examining stereotypic views of other groups that manifest what are called mixed stereotypes. Beyond perception of women, research on the stereotype content model (Fiske et al., 1999, 2002, 2007) has shown that an important proportion of groups are characterised by mixed stereotypes.

Building on these efforts, Cuddy and colleagues focused on two specific groups that are associated with mixed stereotypes, namely working women (Cuddy, Fiske, & Glick, 2004) and elderly people (Cuddy, Norton, & Fiske, 2005). In one of their experiments, Cuddy et al. (2004) presented one of two curricula vitae to their participants. The target was a young working woman: in one condition she had no children, whereas in the other condition she was a mother. Results showed that, compared to the childless working woman, the working mother was perceived as warmer but also as less competent and less likely to be hired, promoted, and trained. What seems to happen in these data is that participants' stereotypic perception moves from one mixed stereotype (competent and cold) to the other mixed stereotype (warm and incompetent). A similar message emerged in the research by Cuddy et al. (2005) on the stereotype of elderly people. Older people are stereotypically perceived as warm but incompetent (Fiske et al., 2002). Cuddy et al. (2005) found that when an elderly target was presented as more competent than expected, i.e., an older person who has a sharp memory, participants rated this target as more competent but also as less warm than an elderly target with memory losses.

Last but not least, Yzerbyt, Provost, and Corneille (2005) proposed that, when it comes to intergroup perception, the two fundamental dimensions of social perception may in fact be related to one another negatively. Specifically, these authors argued that, in the context of a comparison involving two groups, perceiving one of the two groups as higher on one of

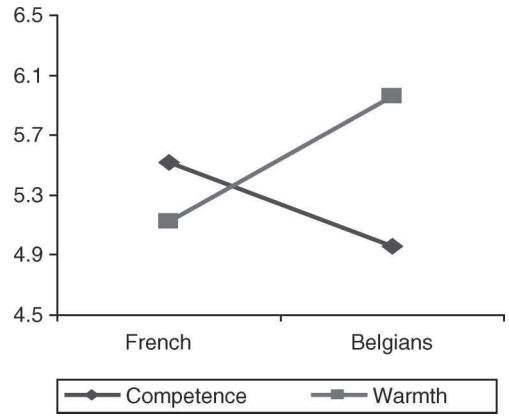

Figure 4. Competence and warmth perception of French and Belgians in Yzerbyt et al. (2005).

the two fundamental dimensions (e.g., competence) should result in perceiving the other group as higher on the other dimension (e.g., warmth), Yzerbyt and colleagues (2005, Study 1) investigated what they called the *compensation effect* in the context of a fully crossed design by focusing on stereotypes held by French-speaking Belgians and by the French about each other. French-speaking Belgian and French participants were asked to rate both their own group and the other group on competence and warmth (Figure 4). Results confirmed that both groups tended to agree that Belgians were less competent but warmer than the French. This compensation pattern in how these two national groups compare to each other was also found in a follow-up study (Yzerbyt et al., 2005, Study 2) in which ratings were collected from the members of a third group (French-speaking Swiss).

Conclusion

In sum, there are substantial differences in the literature about the nature of the relationship between the two fundamental dimensions of social judgement, warmth and competence. It is our belief that this disagreement has arisen in part because no one has ever done the systematic work that is necessary to directly address the question of how the two dimensions are related. Rather, conflicting conclusions have emerged because of widely diverse approaches in methods and measurement. The time has come, we believe, for a systematic and experimental approach to assessing the relationship that characterises these two fundamental dimensions in perceivers' perceptions of individuals and groups. This endeavour is all the more important given the potential consequences of such perceptions for interpersonal and intergroup relations.

SYSTEMATIC EXAMINATIONS OF THE RELATIONSHIP BETWEEN WARMTH AND COMPETENCE

In an effort to examine how the two dimensions of warmth and competence relate to each other in the absence of pre-existing stereotypic beliefs about particular individuals or groups, Judd, James-Hawkins, Yzerbyt, and Kashima (2005) asked participants to form impressions of two groups that they had never encountered before, the *Blue* and *Green* groups. Individual members of these groups were described by behaviours that they had supposedly engaged in. For instance, in the first study reported by Judd et al. (2005, Expt. 1) the majority of the behaviours attributed to one group were high or positive on competence while being relatively undiagnostic of warmth (e.g., *X published a short story in a literary magazine while still in college*.) and the majority of the behaviours attributed to the other group were low or negative on competence and undiagnostic of warmth (e.g., *X failed to make his/her 9 am class because of sleeping through the alarm*.). A few positive and negative warmth behaviours (but relatively undiagnostic of competence) were also attributed to each group. These warmth behaviours were counterbalanced between the two groups across participants, so that the same warm behaviours and cold behaviours were seen with the Blue group and the Green group on average. In sum, the two groups were clearly differentiated on competence but both were equivalent and ambiguous on warmth. After twice reading all the behaviours of both groups, participants were asked to write down their impression of each group. They then rated each group on a number of warmth and competence traits.

Having outlined the specifics of the method, we can now spell out the divergent predictions that would be made by the various traditions of research. According to the supporters of the halo effect, the competent group should be perceived as more competent and also as warmer than the incompetent group. In contrast, for those researchers who conceptualise the two dimensions as being essentially independent, the two groups would be perceived as different on the dimension of competence but they would also be seen as equally warm. Last but not least, the compensation hypothesis predicts that the more-competent groups should in fact be perceived as *less* warm than the less-competent group. This latter pattern is the one that emerged: The group associated with a majority of positive competence behaviours was not only rated as more competent than the other group but, most importantly, the high-competence group was also rated as less warm than the low-competence group (see Table 1). This negative difference on the unmanipulated dimension constitutes clear experimental support for the

TABLE 1
Means competence and warmth ratings for high-competence and low-competence groups

	Group	
Dimension	*Low-competence*	*High-competence*
Competence	−1.02	4.99
Warmth	2.34	0.06

(Judd et al., 2005; Expt. 1.)

compensation effect proposed by Yzerbyt and colleagues (2005): the group that is portrayed by the experimental manipulations as higher on one of the two dimensions is judged as lower on the other.

Importantly, the behaviours that were used as stimuli had been pretested, by asking pretest participants to rate each behaviour individually on the two dimensions. All of the behaviours included in this pretest were written so as to be diagnostic of one of the two dimensions but relatively undiagnostic of the second. However, when we looked at the resulting pretest ratings for the behaviours, the mean ratings of the behaviours on the two dimensions were positively related, thus replicating the positive relationship between the two dimensions found by Rosenberg et al. (1968). The behaviours that were actually used in the stimulus materials for the study were selected to minimise this positive correlation. But even for these behaviours there was a small positive correlation in how they had been rated on the two dimensions. And yet, in spite of this, compensation in the rating of the two groups was found, such that the high-competence group was judged as less warm than the low-competence group.

In a follow-up experiment, Judd et al. (2005, Expt. 2) found a similar compensation effect when warmth was the manipulated dimension. Specifically, they presented participants with a high-warmth group and a low-warmth group, both equivalent and ambiguous on competence. And they found that in the impressions participants formed the high-warmth group was rated as less competent than the low-warmth group.

Because warmth and competence have been shown to be fundamental dimensions in both person and group perception, Judd et al. (2005) further assessed whether the compensation effect could also be demonstrated with individuals as targets of judgement. They replicated their experiment with individuals rather than groups as targets of judgement. The results again demonstrated compensation. Regardless of whether targets of judgements were groups or individuals, the target to which high-competence behaviours had been attributed was judged as less warm than the target to which low-competence behaviours had been attributed.

Necessary conditions

Whether involving national groups (Kervyn, Yzerbyt, Demoulin, & Judd, 2008; Yzerbyt et al., 2005), artificial groups (Judd et al., 2005; Kervyn, Judd, & Yzerbyt, 2009a; Kervyn et al., 2008; Kervyn, Yzerbyt, Judd, & Nunes, 2009b) or individuals (Judd et al., 2005), all of the studies that report a compensation effect included a comparison between two groups. In light of this, Judd et al. (2005) further predicted that the compensation effect would be weaker or even absent without a comparison context. To test this hypothesis, Judd et al. (2005, Expt. 4) replicated their first experiment but had participants learn about only one of the two groups instead of both of them, i.e., the high-competence group for half of the participants and the low-competence group for the other half. Results showed that no compensation effect was found on the warmth dimension. The high-competence group was rated more competent than the low-competence group but both groups were rated similarly on the warmth dimension. Thus it seems that a two-target comparative context is necessary in order to observe the compensation effect. This perhaps partially explains why it is that when individual traits and behaviours are rated, as in Rosenberg et al. (1968) and in the pretest data reported by Judd et al. (2005), a positive relationship is found, whereas these same stimuli yield compensation when they are attributed to two targets and those targets are judged.

Another necessary condition was identified by Yzerbyt, Kervyn, and Judd (2008, Expt. 2). Building on the apparently unique status of the two dimensions in people's perception of individuals and groups, these authors hypothesised that the compensation effect would only hold for the two fundamental dimensions of social perception and not for any pair of dimensions. Replicating the compensation experiment by Judd et al. (2005), these authors manipulated competence for half of the participants and warmth for the other half, but this time they replaced the unmanipulated dimension (warmth or competence) with a third dimension. That third dimension was healthiness. The behaviours used for the healthiness had been pretested to select those that were significantly positive or negative on that third dimension while being neutral on warmth and on competence. For instance, *X hates vegetables and avoids eating them as much as possible* was used as a negative health behaviour and *X does a few stretching exercises every morning* was used as a positive behaviour on the third dimension. So, whereas one of the two groups was high on competence (warmth), the other was low on competence (warmth) and both were equal and ambiguous on the third dimension (healthiness). Results revealed the presence of a halo effect. Specifically, the high-competence (warmth) group was rated as healthier than the low-competence (warmth) group. In a follow-up experiment Yzerbyt et al. (2008, Expt. 3) manipulated competence and

presented equal and ambiguous information on warmth and on the third dimension. They found a compensation effect on warmth and a halo effect on the third dimension. So the high-competence group was simultaneously perceived as healthier and colder than the incompetent group (see Table 2).

These experiments have thus allowed us to identify two necessary conditions of the compensation effect. First, it seems that having a comparative context is necessary for compensation to emerge. But we note that Cuddy et al. (2004, 2005) found a negative relationship between warmth and competence even though their experiment did not set up a comparative context. Comparison might thus be a facilitating factor but not necessarily an indispensable condition for compensation to occur. Second, we showed that compensation does not occur on any pair of dimensions but seems to be specific to the relation between warmth and competence. We interpret this specificity as being due to the fact that, as we have reviewed above, warmth and competence are the *two* fundamental dimensions of social perception. They are thus the default dimensions that social perceivers use to assess their social environment. This specific status is probably the reason why they relate to one another in a different way (compensation) than any pair of dimensions relate to one another. These boundaries of the compensation effect also allow us to account for the fact that, as reviewed above, we found contradictory evidence about the relation between the two fundamental dimensions in past research. The compensation effect is not due to a systematic negative relation between warmth and competence as assumed by some authors (de Dreu, Beersma, Stroebe, & Euwema, 2006; Funk, 1997; Triandis, 1995), as it is only found in some circumstances that can be identified.

Mixed stereotype communication and maintenance

Judd et al. (2005) have shown how people bias their perception in a compensatory direction when they form first impressions of two groups or

TABLE 2
Mean competence, healthiness, and warmth ratings of the low-competence and high-competence group as a function of dimension

	Group	
Dimension	*Low-competence*	*High-competence*
Competence	−2.34	5.66
Healthiness	−0.49	2.59
Warmth	2.65	0.16

(Yzerbyt et al., 2008; Expt. 3.)

individuals. Three series of studies have sought to identify ways in which compensatory processes influence the perception of targets beyond mere first impressions. This work has explored how social perceivers protect, confirm, and communicate compensatory impressions they have formed. Kervyn et al. (2009b, Expt. 1) replicated Judd et al.'s (2005) experiment with a full design, involving manipulations of both dimensions. Half of the participants encountered two groups that differed on competence but were ambiguous on warmth. The other half encountered groups that differed on warmth but were ambiguous on competence. Compensation on the unmanipulated dimension was found in both conditions. And there was no manipulation by dimension interaction. So the competent group was seen as colder than the incompetent group to the same extent than the warm group was seen as less competent than the cold group.

After participants had rated the two groups, Kervyn et al. (2009b, Expt. 1) gave them a list of questions. The questions had been written so that they implied either warmth, lack of warmth, competence, or lack of competence. For instance *What kind of things are you likely to do to cheer up a friend who is depressed or having personal problems?* is a question that implies warmth, and *When you decide to cut class or skip a lecture, what kinds of things are you likely to do instead?* is a question that implies lack of competence. Participants' task was to indicate for each question whether they would prefer to ask it of the high-competence (warmth) or the low-competence (warmth) group (Dumont et al., 2003; Snyder, 1984; Snyder & Swann, 1978; Snyder, Tanke, & Bersheid, 1977). As illustrated in Table 3, showing the category of the 10 questions most strongly associated with the low-warmth and the high-warmth group, questions implying low warmth and high competence were selected for the low-warmth group and questions implying warmth and lack of competence were selected for the high-warmth group. And the reverse was true for the competence manipulation.

In a subsequent experiment, Kervyn et al. (2009b, Expt. 2) collected answers to the questions of each of the four categories (i.e., questions

TABLE 3
Questions selected for the low-warmth and high-warmth group

	Group	
Questions implying	*Low-warmth*	*High-warmth*
Negative warmth	6	0
Positive warmth	0	9
Negative Competence	0	1
Positive Competence	4	0

(Kervyn et al., 2009.)

implying high warmth, low warmth, high competence, and low competence) from naïve respondents, with every respondent answering all of the questions. Then they showed these answers to a new group of participants who thought they were getting interviews with two groups of individuals. Specifically, some participants read the answers to the high-warmth questions, attributed to one group, and the answers to the low-warmth questions, attributed to a second group. Other participants read the answers to the high-competence questions, attributed to one group, and the answers to the low-competence questions, attributed to a second group. Importantly, these participants did not know that all of the answers they read were in fact generated by the same naïve participants. After reading the interviews, participants wrote a few lines and then rated their impression of each group. Results showed that even though the answers had been collected from the exact same respondents, the different sets of questions led to very different impressions that were in line with the compensation effect. The interview using the set of questions selected for the high-competence group led to an impression of a group more competent and less warm than the interview using the set of questions selected for the low-competence group.

In a final experiment, Kervyn et al. (2009b; Expt. 3) took this effect one step further, involving live responses to the questions that had been generated in the first study. They set up real interactions between triads of participants. One participant was randomly assigned to the role of interviewer. And supposedly through their answer to a minimal group paradigm task, one of the remaining participants was told that he was a typical member of the blue group while the other remaining participant was told that he was a typical member of the green group. The interviewer then went on to interview each of the other two participants using, for one interviewee, the 10 questions selected for the group high on warmth or high on competence, depending on the condition and, for the other interviewee, the 10 questions selected for the group low on the same dimension. So, for instance, in the warmth manipulation condition, one interviewee got six questions implying low warmth and four implying high competence, whereas the other interviewee answered nine questions implying high warmth and one implying low competence.

After the interview, each of the three participants rated their impression of the two groups that the interviewees supposedly belonged to, as well as their impressions of the individual interviewees. With the exception of ratings given by participants of themselves, all ratings were in line with compensation. The interviewee asked the high-competence questions was seen as less warm than the interviewee asked the low-competence questions, and the reciprocal was true for interviewees asked the high- and low-warmth questions.

In another series of experiments, Kervyn, Yzerbyt, and Judd (in press) showed that not only the acquisition but also the interpretation of new information is influenced by the compensation effect. In the first experiment, as in Judd et al. (2005), Kervyn et al. (2009b), and Yzerbyt et al. (2008, Expt. 1), two groups were presented by their behaviours, one high and the other low on one fundamental dimension and both ambiguous on the other fundamental dimension. After the impression-writing and trait-ratings task, participants were presented with a set of new behaviours that had allegedly been performed by members of the two groups. For each of these new behaviours, participants had to choose whether they would attribute the behaviour to internal dispositions of the group member or not. Past research (for a review, see Gilbert, 1998) has shown that dispositional attributions mean that the behaviour is seen as relatively diagnostic of the actor. Results supported the compensation effect for the trait ratings variable as well as for the causal attribution measure. For instance, a warm behaviour was attributed more dispositionally if it was associated with a low-competence group member than with a high-competence group member.

In a follow-up experiment, Kervyn et al. (in press, Expt. 2) replicated their first experiment, but they dropped the trait-rating task and instead of new behaviours they showed participants a series of drawings that each represented a behaviour (see Figure 5). For each drawing, participants were asked to choose among four sentences the one that they thought best described the drawing (Geeraert, Yzerbyt, Corneille, & Wigboldus, 2004). The four sentences varied in language abstraction (Semin & Fiedler, 1988). Results were in line with a compensation pattern and the semantic expectancy model (Wigboldus, Spears, & Semin, 2005). For instance, a drawing showing a warm behaviour (see Figure 5) was described in more abstract terms if it was performed by a low-competence group member than by a high-competence group member.

Kervyn et al. (2009a) identified how mixed stereotypes are maintained through the greater differentiation of the two fundamental dimensions when they are in a compensatory pattern. In this work, the authors described two groups to participants, again providing behaviours that group members had allegedly performed. But this time the groups were described with both competence and warmth behaviours. Between participants, Kervyn et al. (2009a) manipulated how the two dimensions were related between the two groups. For one group of participants, the two dimensions manifested a positive or halo relationship: one group was high in both warmth and competence while the other was low in both. For the second group of participants, the two dimensions manifested a compensatory relationship: one group was high in competence but low in warmth while the other was low in warmth but high in competence. Participants were then asked to write down their impression of both groups and to rate them on a number of

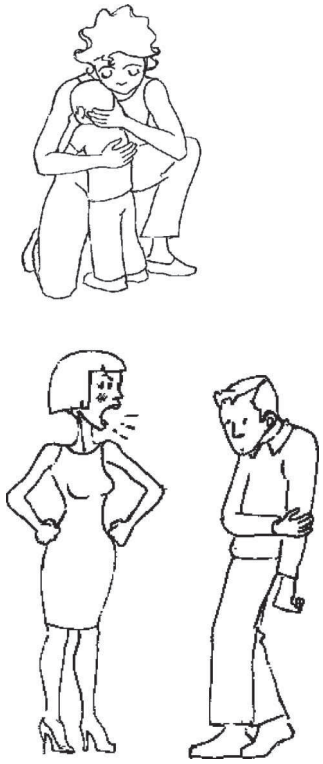

Figure 5. Examples of drawings of high warmth and low warmth used in Kervyn et al. (in press).

warmth and competence traits. Results showed that the ratings of the two groups in the compensation condition were more extreme than those in the halo condition. More precisely, the cold and competent group was rated as more competent than the warm and competent group. And the warm and incompetent group was rated as warmer than the warm and competent group (see Figure 6).

These results on question selection, causal attribution, language abstraction, and group differentiation (Kervyn et al., 2008, 2009a, in press) not only highlight important ways through which compensated impressions are maintained and communicated to others, they also provide evidence for the robustness of the compensation effect. It is important to note that these are very indirect ways of measuring the compensation effect. With traits ratings of the two targets, it might be argued that participants were just using a response strategy or even a logic-of-conversation rule to avoid giving only negative ratings of one target and positive ratings of the other and that this response strategy caused the observed compensation effect. This

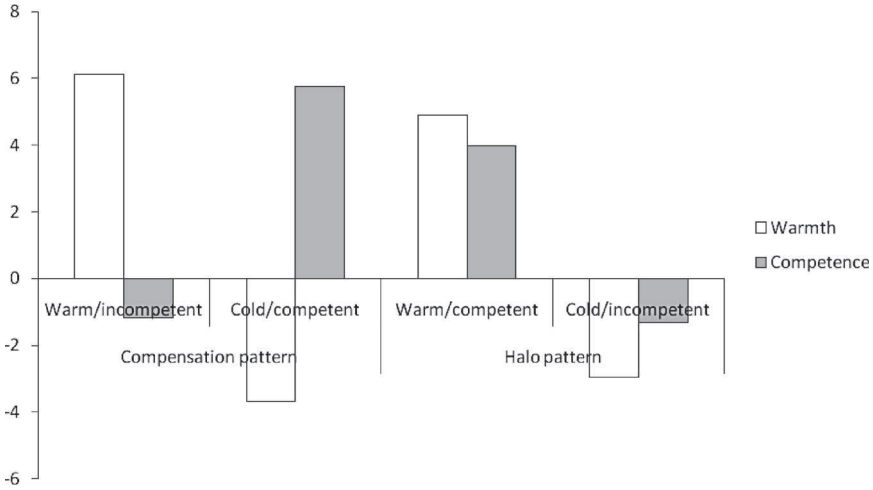

Figure 6. Competence and warmth ratings of the groups in the compensation pattern and the halo pattern condition of Kervyn et al. (2009a).

interpretation does not hold for the more indirect measures such as differentiation (Kervyn et al., 2009a), causal attribution, and language abstraction (Kervyn et al., in press).

Compensation effect within perceivers

Evidence for a compensation effect has been found not only in the way groups are perceived on average (at the mean level) but also in the within-perceiver correlations between the ratings of these groups on the two fundamental dimensions of social perception. In a study already described, Yzerbyt et al. (2005) found that the more the French rated the Belgians as warm, the more they rated their own group as competent. Building on that effect and on the Judd et al. (2005) experiment that showed that a comparative context leads to compensation, Kervyn et al. (2008) designed a study to test the idea that the perception of a group can be influenced by the group that it is compared to and that this influence would be in a compensatory direction.

In their first experiment (Kervyn et al., 2008, Expt. 1), half of the participants first rated Italians (the comparison country) on warmth and competence and then Belgians (the target country and the participants' ingroup). The other half of the participants first rated Germans and then Belgians. Italians are stereotypically perceived to be warm and rather incompetent, whereas Germans are perceived to be competent and rather

cold (Cuddy et al., 2009). Results showed that when Italy was the comparison country, Belgium was rated as more competent and colder than when Germany was the comparison country (see Figure 7). Ratings of the very same group were thus influenced by the comparative context and that influence went clearly in a compensatory direction. This impact of the comparative context was replicated in a follow-up experiment (Kervyn et al., 2008) that used either Japan or Brazil as the comparison country and Canada as the target country. That is, when compared to Japan, Canada was rated as warmer and as less competent than when compared to Brazil.

In both experiments, Kervyn et al. (2008) found that there was a clear pattern of compensation in the within-perceiver correlations. The judged warmth of the comparison country was a positive predictor of the judged competence of the target country. And the judged competence of the comparison country was a positive predictor of the judged warmth of the target country. So the warmer the comparison country was rated, the more competent Belgium (or Canada) was rated. And the more competent the comparison country was rated, the warmer Belgium (or Canada) was rated.

Kervyn et al. (2008) ran a regression model predicting (for instance) the target country's judged warmth as a function of the comparison comparison (e.g., Germany versus Italy), the target country's judged competence, the comparison country's judged warmth, and the comparison country's judged competence. The two significant predictors were the comparison context and the comparison country's competence. Similarly, when the model predicted the target country's competence, the significant predictors were the

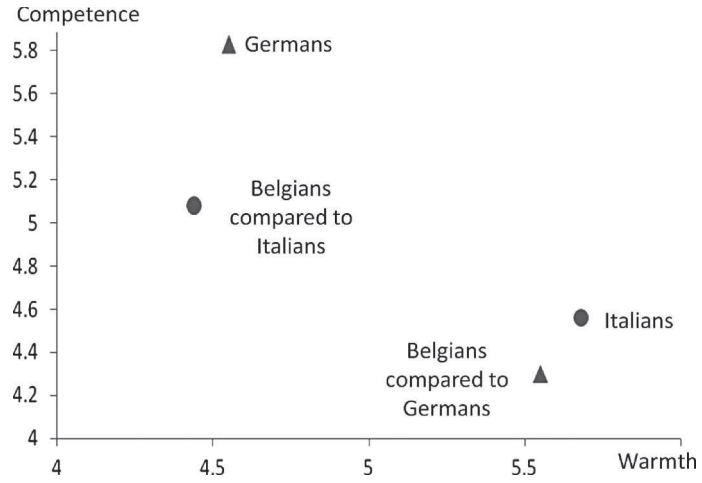

Figure 7. Competence and warmth ratings of the comparison and target countries in Kervyn et al. (2008).

comparison context and the comparison country's warmth. In both cases, it was the judged level of the comparison country on one dimension that positively predicted the target country's rating on the other dimension.

Evidence for a compensation effect in the within-perceiver correlations was also found in experiments that used artificial groups (Judd et al., 2005; Kervyn et al., 2009a). Judd et al. (2005) calculated two difference scores in participant's ratings of the two groups they judged. One of these was the difference in the rating of the two groups on competence; the other was the difference between the ratings of the two groups on warmth. These two difference scores were negatively correlated: Participants who saw a larger difference between the two groups on the manipulated dimension also rated the two groups as more different, in the opposite direction, on the unmanipulated dimension.

Kervyn et al. (2009a) found the same negative correlation when judging two groups that had been presented as compensatory on the two dimensions. For participants who were presented with a warm and incompetent group and a competent and cold group, the more participants differentiated between the two groups on warmth, the more they differentiated them on competence. This correlation did not emerge in the halo condition in which participants were presented with a warm and competent group and a cold and incompetent group.

Interestingly, these results supporting a compensation effect at the within-perceiver level give us further evidence that the compensation effect is not due to a general negative correlation between warmth and competence. The correlations reported by Yzerbyt et al. (2005) and the regression results of Kervyn et al. (2008) show that the compensation effect leads specifically to a positive correlation across groups and across dimensions, not to a general negative correlation between warmth and competence. Furthermore, in the differentiation experiment (Kervyn et al., 2009a), a negative correlation between warmth and competence was found only when the two groups manifested a compensation pattern, not when they manifested a halo pattern.

Compensation and identification

The vast majority of the studies that have found support for the compensation effect (Judd et al., 2005; Kervyn et al., 2008, 2009a, 2009b, in press; Yzerbyt et al., 2008) are characterised by the fact that participants were in the role of an external observer. But a number of studies and experimental results show that compensation also emerges when social perceivers are members of one of the two groups rated. In Yzerbyt et al.'s (2005) first study, respondents were French and Belgians who rated both French and Belgians. Results showed that French respondents saw less of a

difference between the two groups on warmth than their Belgian counterparts. Similarly, compared to the French respondents, Belgian respondents did not see as large a difference between the two groups on competence. In other words, both groups minimised the difference on the dimension along which their ingroup was seen more negatively than the other group. But we note that the compensatory differences were significant nonetheless. The other way to look at this pattern is to say that respondents overstated the difference on the dimension that was advantageous to their group. For Belgian respondents, this tendency to stress the difference on warmth was even stronger for highly identified group members than for less-identified respondents.

A similar pattern was observed in the first experiment of Kervyn et al. (2008) where the target country was Belgium, that is, the participants' ingroup. Here too, the authors measured participants' identification with Belgium. As would be expected, results showed that identification correlated positively with the ratings of Belgium both on warmth and on competence. However, there was no interaction of identification with the comparison context. In other words, the ratings of Belgium made by highly identified participants were still influenced by the comparison context in a compensatory way.

In one of the experiments conducted by Judd et al. (2005, Exp 5), participants were first confronted with a minimal group procedure and induced to believe that they belonged to one of the two groups presented to them via a list of behaviours. Specifically, whereas half of the participants were made to believe that they belonged to the high-competence group, the other half thought that they belonged to the low-competence group. An equal amount of ambiguous information was provided about both groups. Replicating the pattern obtained in the other experiments, the high-competence group was rated as colder than the low-competence group. However, this compensation effect was moderated by group membership. The members of the low-competence group saw a larger difference between the two groups on warmth than the members of the high-competence group. So, as was the case in Yzerbyt et al.'s (2005) first study, participants exaggerated the difference on the dimension that was favourable to them even though a compensation effect was found for both conditions of group membership.

Finally, in one of Kervyn et al.'s experiments (2009b, Expt. 3), two participants were interviewed by a third one. Through a minimal group paradigm, the two interviewees were led to believe that they were each part of one of two groups and that they would receive questions that had been selected to correspond to members of their groups. The questions used were those that had been selected for each of the two groups in an earlier study (Kervyn et al., 2009b, Expt. 1). Concretely, whereas one participant was

asked the questions that had been selected for the high-competence (warmth) group, the other received the questions that had been selected for the low-competence (warmth) group. Not only did the interviewer and the other interviewee rate participants' groups in line with the compensation effect, this effect also emerged in the way participants rated their own group. For instance, participants who received the high-competence questions rated their own group as more competent but also colder than the group of the other participant.

In sum, these various results gathered in a series of studies show that membership in one of the two groups does not prevent the compensation effect from emerging. Although some studies reveal the presence of a moderating impact of membership and/or identification, group members tend to conform to a compensatory pattern in their appraisal of the groups involved, even while perhaps minimising differences on the dimension along which compensation leads to less favourable evaluations of their own group. These findings attest to the robustness of the compensation effect.

GENERAL DISCUSSION

The first portion of this review was focused on diverse lines of work that have all supported the hypothesis that there are two fundamental dimensions of social perception and judgement. Although the resulting two dimensions have been defined in the literature in various ways, fundamentally the perception of both groups and persons is organised along two dimensions, which we have referred to as warmth and competence. The ubiquity of these two dimensions in social perception and judgement is striking.

Somewhat surprisingly, given the widespread agreement on these two fundamental dimensions, there has been no systematic work that has directly examined how the two dimensions are related to each other. There has been some work that has indirectly examined this question. But a review of that work yields rather inconsistent conclusions, with suggestions of both positive and negative relations between perceived warmth and competence. Our own prior work in the judgement of national groups (Yzerbyt et al., 2005) was suggestive of a compensatory relationship between the two dimensions which then motivated our more systematic approach to the topic.

We then turned to a review of our more systematic work that has supported, amplified, and examined the implications of this compensation effect. This work provides unequivocal support for the existence of a compensation effect that is defined as social perceivers' tendency to differentiate two social targets in a comparative context on the two fundamental dimensions by contrasting them in a negative direction.

Throughout this review of our research program, we have highlighted the fact that our results paint a picture of the compensation effect that is much more specific than a general negative correlation between warmth and competence and much more robust than a mere logic-of-conversation strategy. We have identified a number of necessary conditions for the compensation effect. And even our results on compensation at the correlational level show a specific picture of a positive correlation across groups and across dimensions. We also demonstrated some important consequences of such compensatory perception of other people and groups on the formation, maintenance, confirmation, and communication of compensatory stereotypes.

At this stage, one crucial question remains unanswered. Why does the compensation effect emerge at all? Why is there a tendency to differentiate two social targets in a comparative context on the two fundamental dimensions by contrasting them in a compensatory direction? Our research has so far focused on identifying the compensation effect, finding its boundaries, and highlighting its important consequences. Therefore we can only offer conjectures about this important question. In the following we review two lines of research that we think could lead to interesting insights about the origin of the compensation effect. First, we propose an interpretation of the compensation effect based on adherence to mixed stereotypes (Reinhard, Stahlberg, & Messner, 2008, 2009). Then we reflect on how system justification theory (Jost & Hunyadi, 2002) can offer possible reasons for the compensation effect. We also discuss why we think that the compensation effect should not be interpreted as a simple contrast effect (Mussweiller, 2007; Sherif & Hovland, 1961).

Compensation effect and mixed stereotype adherence

One possible interpretation of the compensation effect is that social perceivers have pre-conceived stereotypes that social targets are either warm and incompetent or cold and competent. In a recent series of research, Reinhard et al. (2008) have shown what they call a ''failure as an asset'' effect. They showed that for high-status groups members, failing in a task that is perceived as stereotypical of the low-status group leads to a perception of higher occupational success (Reinhard et al., 2008) and to higher self-esteem (Reinhard et al., 2009). Additionally, those effects were mediated by perceived stereotypicality and group identification. So, for instance, a man who fails at a task that was introduced as a task in which women usually outperform men is perceived as more masculine and as having better occupational success than if he succeeds at the task or if the task is introduced as a task in which men usually outperform women (Reinhard et al., 2008). And when men fail at a stereotypically feminine

task, they feel higher ingroup identification which then leads to higher self-esteem (Reinhard et al., 2009). These results were replicated outside the gender domain with other kinds of high-status groups.

Reinhard et al.'s (2008, 2009) results only show adherence to a competent and cold stereotype (see the link between status and competence and between masculinity and high competence/low warmth discussed above) and does not show a similar effect for the warm and incompetent stereotype. Nevertheless we believe that it points towards the fact that social perceivers expect social targets to manifest a compensated pattern. This would explain why when we present an ambiguous situation, participants err on the side of considering the two groups as two mixed stereotypes groups (Judd et al., 2005; Kervyn et al. 2009b, in press) and that in the differentiation experiment, when the pattern presented fit the mixed stereotype expectation, participants adhere to it more than in the halo condition (Kervyn et al. 2009a). It would also explain why compensation is not observed when the ambiguous dimension is not part of the expected mixed stereotype (Yzerbyt et al., 2008).

Compensation effect and system justification

For Jost and colleagues, people prefer an evaluatively balanced view of social groups in order to justify the existing social structure (Jost & Banaji, 1994; Kay, Jost & Young, 2005; for a review, see Kay et al., 2007). In one illustrative experiment, Kay and Jost (2003) found that exposure to a "poor but happy" exemplar increased system justification scores whereas exposure to a "rich but happy" or to a "poor but miserable" exemplar decreased system justification scores. "Poor" and "rich" are clearly related to status, the structural variable that predicts competence (Fiske et al., 1999, 2002). Conversely, "happy" and "miserable" are directly related to warmth. The "poor but happy" and the "rich but miserable" exemplars are thus typical of compensated exemplars: strong on one dimension and weak on the other dimension. In contrast, the "poor and miserable" and the "rich and happy" exemplars are either high on both dimensions or low on both.

We see the findings obtained by Kay and Jost (2003) as compatible with the compensation effect. That is, we reinterpret Kay and Jost's (2003) results as showing that exposure to the compensated exemplars increased system justification scores, whereas exposure to the halo exemplar decreased system justification scores. When we present two groups that are differentiated on one fundamental dimension and ambiguous on the other in (Judd et al., 2005; Kervyn et al. 2009a, in press), it is after all an unjust "system" that our participants are presented with, a system in which the high group has a higher total amount of positive characteristics (higher on the manipulated dimension and equal on the unmanipulated one) than the low group. Our

interpretation is that participants react to—i.e., correct—this unjust system by compensating on the unmanipulated dimension. They bias their perception of the two groups on the dimension that was left ambiguous in order to create a system in which both groups have strengths and weaknesses, a situation that is closer to one in which both groups would have an equal amount of positive characteristics. Our interpretation of such a pattern of findings is thus that the compensation effect is a tool that the social perceiver uses to perceive the social world as being just.

It is important to emphasise that the work on the compensation effect and the two fundamental dimensions questions the most general, and indeed undifferentiated, version of system justification and instead supports a rather more restricted version. Evidence for this restricted version comes from the *third dimension* experiments conducted by Yzerbyt et al. (2008). In these studies, no compensation but rather a halo effect emerged for an ambiguous non-fundamental dimension. This finding suggests that compensation only happens on the dimensions that matter. As a matter of fact, there is ample evidence for the fact that, in person perception, the dimensions of competence and warmth matter the most, hence their status as fundamental. So social perceivers consider that a social system is justified if targets who are compared have the same total amount of positive characteristics not on *any* given set of dimensions but rather on the two dimensions that do matter.

The result of the differentiation experiment (Kervyn et al., 2009a) also fit our restricted system justification interpretation. The compensated exemplars fit the expectancy of system justification in that participants are comfortable with the differences between the two groups and ready to perceive those differences as rather large. As a matter of fact, even if the difference is very large it remains true that across dimensions both groups have the same total amount of positive characteristics. In contrast, in those cases where participants are confronted with the halo exemplars the high group has globally more positive characteristics than the low group, a situation that presumably leads to questions about the fairness of the system and then perhaps to attempts to restore some fairness. Accordingly, in these conditions participants tend to minimise the difference between the two groups. This interpretation holds for both the mean and the correlational results of the differentiation experiment.

Finally, the compensation effect observed in the within-perceiver correlations (Kervyn et al., 2008) also supports our restricted view of system justification. Indeed, we show that the perceived level of the first group on one dimension predicts the score of the second group on the other dimension. So the way both groups are rated may vary from one respondent to another, but the ratings obey the rule that if the first group is higher than the second group on one dimension then the second group is judged higher

than the first on the other dimension, presumably in order to maintain a balanced (justified) system across the two fundamental dimensions of social perception.

Compensation is a tool that creates and maintains compensated (mixed) stereotypes and the motivation to create those compensated stereotypes may be related to the motivation to perceive the system as fair and balanced. So the compensation effect could be the process that composes the complementary part of a feedback loop. Glick and Fiske (1996) and Kay and Jost (2003) have shown that compensated stereotypes lead to system justification. Our interpretation is that, in turn, the motivation to perceive the system as justified leads to the creation of compensated stereotypes. However, this link between system justification and compensation remains to be experimentally demonstrated.

Compensation effect and contrast

It may be tempting to reinterpret the compensation effect as a specific instance of contrast between two targets (Mussweiller, 2007; Sherif & Hovland, 1961). However, we believe that it is difficult to consider this as an adequate explanation. A contrast effect is said to occur when the judgement of a target on some dimension is influenced by the location of another target on the same dimension (Mussweiller, 2007). In other words, if one target is particularly competent then another contrasted target might be judged to be particularly incompetent. This seems to us to be a rather different result from our compensation result, which involves judgements across *two* different dimensions, with the more positively evaluated target on one dimension judged less positively on the second. It is not that one target is contrasted from another, but that the evaluative difference is reversed across the two fundamental dimensions. Moreover, Yzerbyt et al.'s (2008) experiments have convincingly demonstrated that compensation does not take place on any available second dimension but that this second dimension has to be the second fundamental dimension.

Last but not least, the contrast interpretation is unable to account for the evidence for a compensation effect at the correlational level found in Kervyn et al. (2008) and in Kervyn et al. (2009a). Indeed, the contrast effects always consists of a negative relationship between the ratings of two targets on the same dimension (Mussweiller, 2007), whereas we find evidence of a positive relationship between the ratings of two targets on two different dimensions.

Implications of the compensation effect for stereotype change

We wish to add one final note concerning the implications of the compensation effect for stereotype change. Cuddy et al. (2004, 2005) have

nicely illustrated the pernicious effect that the compensation effect can have when it comes to the modification of stereotypic views. Both for working mothers and elderly people, positive changes on one dimension (warmth and competence, respectively) were compensated by a decrease on the other dimension. The empirical evidence emerging from our experimental work points to the fact that the findings reported by Cuddy et al. (2004, 2005) are not two isolated effects but rather a widespread phenomenon that is likely to influence any stereotype change efforts when it comes to groups associated with mixed stereotypes. The implication would seem to be that there might be unintended effects of stereotype change efforts devoted to a target group that is seen relatively negatively on one of the two fundamental dimensions. Suppose, for instance, that stereotype change efforts were devoted to convincing people that a stereotypically low-competent group was in fact more competent. Such a change, if successful, might have the unintended effect of convincing people that the group is also less positive on the warmth dimension.

A more theoretical implication of the present line of research is that it shows the importance of paying attention to the dynamic relations that exist between warmth and competence. The research on the stereotype content model has shown the meaningfulness of using the two dimensions of social perception to measure stereotype content. The research on the compensation effect has shown that there are systematic biases in the way these two dimensions relate to one another. Of course, one should not expect that the negative relationship observed in the several studies and experiments is always at work. As our work has shown, there are a series of necessary conditions for this effect to emerge (Judd et al., 2005; Yzerbyt et al., 2008). This calls for a continued theoretical and empirical effort to tackle the crucial question of identifying the moderators of the relationship between warmth and competence.

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