

Direct and indirect dimensional compensation:

Is there a difference between observers and group members?

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Keywords: compensation effect; indirect measures; direct measures; stereotype content model; minimal group paradigm

Abstract

Dimensional compensation takes place when perceivers judge one of two social targets higher on one of the two fundamental dimensions while judging the other target higher on the second dimension. Interestingly, the majority of studies on the compensation effect focused on direct measures, with almost no attempt to rely on more indirect measures. We tested whether dimensional compensation also takes place at a more indirect level (Brief-IAT). In Experiment 1, observers presented with unknown groups compensated both directly and indirectly. Experiment 2 had participants assigned to one of two novel groups. Whereas low-competence group members compensated on both direct and indirect measures, high-competence group members compensated at the direct level but did not concede any advantage to the low-competence group at the indirect level. As a set, our findings shed new light on direct and indirect compensatory judgments as a function of perceivers' vantage point as observers and group members.

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Dimensional compensation takes place when a contrasting pattern emerges between warmth and competence in people's judgments about two social targets (Yzerbyt, Provost, & Corneille, 2005; for a review, see Yzerbyt, 2018). Although a considerable body of evidence supports the robustness of the compensation effect, the vast majority of the research relied on direct, also called explicit, measures (e.g., traits ratings). This raises the possibility that social desirability concerns contribute to shaping the specific pattern reported in previous work. Indeed, Yzerbyt, Kervyn, and Judd (2008) suggested that dimensional compensation might emerge partly because of people's desire to manifest a balanced evaluation of the social targets under comparison, particularly among high-status groups (Cambon & Yzerbyt, 2018). The goal of the present research is to investigate whether dimensional compensation emerges when measured both directly and indirectly, and when people are in a position of external observers or group members.

Social perceivers rely on two dimensions to deal with their social environment (Abele, Cuddy, Judd, & Yzerbyt, 2008; Fiske, 2015; Yzerbyt, 2016). When it comes to group stereotypes, the Stereotype Content Model (SCM; Fiske, 2018; Fiske, Cuddy, Glick, & Xu, 2002) holds that warmth refers to the target's intentions and encompasses traits such as kindness, friendliness, and sociability, whereas competence translates the

capacity of the target to materialize these intentions and comprises characteristics such as intelligence, skillfulness, and organization (Fiske, 2015). Although the SCM considers stereotypes corresponding to all possible values on these two dimensions, a great many groups are in fact linked to so-called mixed stereotypes, that is, that are positively valenced on one dimension but negatively on the other (e.g., rich, lawyers, homemakers, disabled people; for a recent review, see Yzerbyt, 2016).

Building on social identity approaches (Tajfel & Turner, 1979), Yzerbyt et al. (2005) argued that one possible account for ambivalent stereotypes resides in the negative relationship between the two fundamental dimensions that results whenever perceivers approach groups in comparative terms. That is, intergroup relations often operate such that a group higher than another on one of the two fundamental dimensions comes across as lower on the other dimension, a phenomenon that Yzerbyt et al. (2005) called the compensation effect. Initial work on French and Belgians, two groups enjoying different prestige and power, confirmed this conjecture: Respondents from both groups agreed that French were more competent but less warm than Belgians (see also, Kervyn, Yzerbyt, Demoulin, & Judd, 2008). A follow-up study also revealed that the compensation pattern proved stronger for group members (i.e., Belgians or French people) than for external observers or third-party members (i.e., Swiss citizens).

The compensation effect occurs not with any pair of dimensions. Indeed, a halo effect materializes when considering a third dimension (e.g., healthiness; Yzerbyt et al.,

2008). Dimensional compensation is thus not a mere artefact emerging with any two dimensions in a comparative context (i.e., a contrast effect; Mussweiler, 2007) or solely the product of undifferentiated justice concerns (Kay et al., 2007). Rather, it builds on the unique structural and functional components of the two fundamental dimensions of social perception (Kervyn, Yzerbyt, & Judd, 2010).

Empirical evidence of the so-called dimensional compensation model (DCM; Yzerbyt, 2018) is plenty. For instance, Judd, James-Hawkins, Yzerbyt, and Kashima (2005) asked their participants to form an impression about two novel groups from behaviors allegedly performed by their members. The authors manipulated behaviors in such a way that one group came across as superior than the other on one dimension (the manipulated dimension; e.g., competence), while both groups were ambiguous on the other dimension (the non-manipulated dimension; e.g., warmth). Explicit ratings revealed dimensional compensation, although the effect was somewhat stronger when the manipulation concerned competence rather than warmth. Interestingly, dimensional compensation also emerged in a variant of the scenario that manipulated participants' membership. Both low- and high-competence group members dimensionally compensated. Replicating Yzerbyt et al.'s (2005) pattern, group members also maximized intergroup differences on their preferred dimensions (i.e., competence for the high-competence group and warmth for the low-competence group) and reduced

differences on the other, less crucial, dimension (i.e., warmth for the high-competence group and competence for the low-competence group).

Accounting for the compensation effect

Several psychological motivations possibly account for a negative relation between the two fundamental dimensions (Kervyn et al., 2010; Yzerbyt, 2018; Yzerbyt et al., 2008). Here we identify four core motivations that could give rise to dimensional compensatory judgments. For each, we consider a moderating factor, namely, the vantage points of the perceiver as a member of either the advantaged or the disadvantaged group or as an external observer.

A first motivation is the *desire to promote harmonious intergroup relationships*. Building on Mummendey and Schreiber (1983) and the social identity approach (Tajfel & Turner, 1979), Yzerbyt et al. (2005) reasoned that when group members find themselves in a comparative context, granting each group with superiority on a different aspect stands as an ideal strategy to promote collaboration (for a review, see Yzerbyt & Demoulin, 2010). This motivation may be especially relevant for group members who are willing to overcome conflictual intergroup relationships (e.g., over scarce resources) or would like to promote cooperation. Conversely, this motivation is presumably absent when there is no status asymmetry between groups as well as in highly conflictual contexts (Cambon, Yzerbyt, & Yakimova, 2015; Durante et al., 2017; Durante et al.,

2013), or when there are few incentives to interact, as often the case in minimal group scenarios.

A second motivation is *justice concerns*. According to system justification theory (SJT; Jost & Banaji, 1994), people strive to justify and rationalize the *status quo* and are keen to perceive the current system as fair, legitimate, and desirable (Kay et al., 2007). Indeed, stereotypes often play an important role in maintaining and bolstering the hierarchical social system that people navigate (Jost & Kay, 2005; Tajfel, 1981). Complementary stereotypes appear particularly suited for such a purpose as they confer both advantaged and disadvantaged groups a set of weaknesses and strengths that even out, thus boosting the sense that the system is balanced, fair, and justified (Jost, Kivetz, Rubini, Guermendi, & Mosso, 2005; Kay & Jost, 2003). Given that dimensional compensation engenders and perpetuates complementary stereotypes, such a process might indeed satisfy a concern for justice (Kervyn et al., 2010; Yzerbyt et al., 2008). Interestingly, system-justification appears particularly insidious, as it would seem not only to operate among those who benefit from the *status quo* (i.e., high-status groups) but also among those who suffer from it (i.e., low-status groups). Moreover, this tendency also seems to take place under less controlled conditions (i.e., as assessed by implicit measures), presumably as the product of the internalization and acceptance of consensual stereotypes. Indeed, derogated group members can exhibit implicit outgroup

favoritism (Jost, Pelham, & Carvallo, 2002) and exposition to non-complementary (i.e., non-compensatory) stereotypes implicitly activates justice concerns (Kay & Jost, 2003).

A third motivation stems from the need for *self-affirmation*. In the context of intergroup relations, this motivation is at the heart of Social Identity Theory (SIT; Tajfel, 1981; Tajfel & Turner, 1979). Indeed, SIT holds that group members are motivated to maintain and achieve positive ingroup distinctiveness and a concomitant positive social identity for the self. Although group members would readily affirm themselves on both fundamental dimensions of social perception (i.e., warmth and competence), inescapable structural factors often restrain such a desire. A common structural constraint in modern societies is that groups rank according to competence-based outcomes (Oldmeadow & Fiske, 2007; Son Hing et al., 2011). When the social hierarchy comes across as legitimate and stable, and when group boundaries are impermeable, low-status groups may then adopt a social creativity strategy (Tajfel & Turner, 1979) in order to cope with their disadvantaged position. Because competence is perceived as more objective and more constrained by reality than warmth is (Yzerbyt & Cambon, 2017), low-status group members will likely acknowledge their inferiority on the status-relevant dimension (i.e., competence) while focusing on a status-irrelevant dimension (i.e., warmth) that is more malleable (Yzerbyt & Cambon, 2017) and can be turned in their favor (Lemaine, 1974; Mummendey & Schreiber, 1983). Doing so offers them the opportunity to redeem positive distinctiveness and self-esteem (Yzerbyt et al.,

2008). In line with this reasoning, depriving low-status group members from the opportunity to shine on the warmth dimension (Yzerbyt & Cambon, 2017) or giving them the opportunity to complete a self-reaffirmation task prior to making judgments (Cambon & Yzerbyt, 2018) prevented dimensional compensation.

A fourth motivation is *self-presentation*. Indeed, when making judgments about disadvantaged groups, displaying dimensional compensatory judgments may allow people to avoid appearing discriminatory. Being “politically correct” may thus come at hand in contemporary societies where expressing criticisms, at least toward the so-called “protected” groups, is hardly tolerated (Bergsieker, Leslie, Constantine, & Fiske, 2012; Cambon & Yzerbyt, 2018; Cambon et al., 2015; Crandall, Eshleman, & O'Brien, 2002; Dambrun & Guimond, 2004; Jeffries, Hornsey, Sutton, Douglas, & Bain, 2012; Owuamalam, Wong, & Rubin, 2016). Clearly, this motivation should be more at work among high-status group members, leading advantaged groups to feel embarrassed to express ingroup favoritism (i.e., self-affirmation) on both fundamental dimensions. As a consequence, they should be willing to concede outgroup superiority on the status-irrelevant dimension (i.e., warmth) while ascertaining their advantage on the relevant one (i.e., competence). Research confirms that dimensional compensation emerges to the extent that high-status group members can secure their dominance on their favorite dimension (i.e., competence; Yzerbyt & Cambon, 2017) and that the non-discrimination norm remains activated (Cambon & Yzerbyt, 2018), a pattern known as magnanimity or

noblesse oblige (Vanbeselaere, Boen, van Avermaet, & Buelens, 2006). Dimensional compensation may thus reflect a more thoughtful motivation or strategy fueled by self-presentation concerns that would deceptively appear to others as justice concerns.

In sum, distinct motivations may lead people to compensate on the two dimensions and their relevance and strengths may differ both as a function of the context and the social position of the perceiver. Specifically, the desire to promote harmonious relations would seem more relevant for group members than for uninvolved observers. As to justice concerns, these may stand high on the agenda of both observers and group members, although the latter may also have more pressing concerns in mind. In particular, self-affirmation seems highly relevant for advantaged and disadvantaged group members as they would both readily enhance or secure a positive identity by affirming the value of their group on the two fundamental dimensions. This motive may take the form of social creativity (i.e., dimensional compensation) for low-status group members because of structural constraints (e.g., status gap and the objectivity of competence). For high-status group members, self-affirmation may conflict with self-presentation concerns due to non-discrimination pressures. Instead of displaying ingroup bias on all dimensions, high-status group members may come across as just and humble by publicly granting superiority to the low-status group on the less relevant dimension (i.e., by displaying dimensional compensation). In other words, although not

necessarily absent among external observers and low-status group members, self-presentation concern may be particularly at work among high-status group members.

Compensation effect at the indirect level

Clearly, the above-mentioned motives may sometimes conflict with each other, potentially leading to the public expression of dimensional compensation that departs from their announcer's convictions. This is most interesting insofar as dimensional compensation research predominantly used such measures as self-report questionnaires with almost no attempt to rely on indirect measures¹ (Corneille & Hütter, 2020). The few intergroup relations studies assessing judgments on the two dimensions at both the direct and indirect level reveal not only discrepancies between these measures but also inconsistencies across findings.

Wade and Brewer (2006) investigated implicit stereotypes of businesswomen and homemakers using a lexical decision task (LDT). Although both male and female participants refer to the mixed stereotype of these subgroups of women on direct measures, indirect measures were driven by respondents' general affect (i.e., non-ambivalent). Specifically, female participants evaluated businesswomen more positively than homemakers whereas the opposite was true for male participants. Similarly, Rohmer and Louvet (2012, 2018) found mixed stereotypes of disabled people on self-report measures whereas LDT measures revealed non-mixed stereotypes (low

competence/low warmth). Clément-Guillotin et al. (2018) replicated these results using the Implicit Association Test (IAT).

In addition, Imhoff, Woelki, Hanke and Dotsch (2013) found complementary stereotypes of managers and nursery teachers in self-report and in reaction-time-based measures, namely a Brief Implicit Association Test (BIAT). The same mixed pattern also emerged in prototypical facial representations of these groups, as assessed by what admittedly counts as an indirect measure, that is, a reverse correlation method. In a similar vein, Carlsson and Björklund (2010) observed mixed stereotypes of preschool teachers and lawyers on both direct and indirect measures (IAT). Importantly, their participants did not belong to either of these two groups. In a follow-up study, preschool teachers implicitly evaluated their own group as warmer and as more competent than lawyers, suggesting ingroup favoritism. Ebert, Steffens, and Kroth (2014) obtained similar results when investigating gender stereotypes. The gender-warmth IAT revealed an overall association between women and warmth, consistent with SCM predictions. In contrast, an ingroup-favoring pattern emerged for the gender-competence IAT among both male and female respondents.

To sum up, the available intergroup perception literature reveals inconsistencies when testing the relation between the fundamental dimensions with direct and indirect measures as well as among group members and observers. Interestingly, none of the studies reviewed above aimed to examining the dimensional compensation *per se*.

Additionally, all of them relied on existing group stereotypes and it remains difficult to evaluate whether previous knowledge and prevailing structural factors (e.g., groups status and power, group size, competence-relevant context) play a role in the observed pattern. It is thus not possible to evaluate the extent to which dimensional compensation emerges differently at the direct level and in indirect measures and whether the vantage point of the judge influences this pattern.

To our knowledge, only one experiment looked at dimensional compensation at the indirect level. Kervyn, Yzerbyt, and Judd (2011) presented their participants with pictures illustrating various behaviors allegedly performed by members of one of two novel groups differing on one of the two fundamental dimensions. For each picture, participants had to select one of four descriptions varying in degree of abstractness, from very concrete to very abstract. According to the Linguistic Category Model (LCM; Semin & Fiedler, 1988), judges should rate behaviors in line with their expectations in more abstract than concrete terms (Wigboldus, Semin, & Spears, 2000). As predicted, behaviors supporting dimensional compensation led to more abstract terms than the other behaviors, suggesting stronger trait inferences. Even though this research provides a first look into dimensional compensation on indirect measures, its message remains tentative and requires further research. Beyond checking whether these findings with observers replicate, it would also be important to look at what happens when people

belong to one of the two groups, as their underlying motivations to dimensionally compensate may differ.

The present research

The present research aimed to examine the above questions in a more systematic manner. We used indirect measures (i.e., based on reaction times) and relied on a minimal group paradigm to manipulate participants' social position. In two experiments, participants read about two fictitious groups (i.e., the "green" and "blue" group). Groups initially differed on one of the two fundamental dimensions (i.e., either competence or warmth in Experiment 1; competence in Experiment 2). Whereas participants were external observers in Experiment 1, they believed to be members of one of the two groups in Experiment 2. We assessed participants' impressions about these groups at both the direct and indirect level to help disentangle the motives that give rise to dimensional compensation by capitalizing on responses believed to be less sensitive to social desirability and normative pressures (Greenwald & Lai, 2020; Nosek, 2005; for a critical evaluation, see Corneille & Hütter, 2020).

We used the Brief Implicit Association Test (BIAT; Sriram & Greenwald, 2009) as this measure offers several benefits over other reaction-time-based measures. First, it has good psychometric properties together with a high versatility to measure stereotypes of all kinds (Nosek, Bar-Anan, Sriram, Axt, & Greenwald, 2014), including those revolving around warmth and competence (e.g., Imhoff et al., 2013). Secondly, it has

proven to be a valid and sensitive tool to assess implicit ingroup favoritism in a minimal group paradigm (Yang, Shi, Luo, Shi, & Cai, 2014). Thirdly, the structure of the task fosters a comparative context because the to-be-classified targets in each block include stimuli pertaining to both groups and dimensions (Gawronski & De Houwer, 2014). This is an important feature given that a comparison context between the social targets on the two dimensions simultaneously facilitates the emergence of a compensation effect (Judd, Garcia-Marques, & Yzerbyt, 2019; Judd et al., 2005). Finally, it is considerably shorter than the traditional Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998).

Compared to real groups that bring about a vast array of emotions and attitudes that are hardly malleable, fictitious groups ensure that a compensation effect emerges because participants did dimensionally compensate. They also greatly facilitate the manipulation of the vantage point of participants (as high- or low-competence group members or external observers).

In Experiment 1, we expected observers to compensate at both the direct and indirect level, in line with several compensation studies (see Yzerbyt, 2018). Such a pattern is consistent with the idea that dimensional compensation among observers is not merely driven by self-presentation concerns but rather by justice concerns that do not only manifest publicly but that have also been internalized and should thus show at an indirect level as well (Jost et al., 2002; Kay & Jost, 2003; Yzerbyt et al., 2008).

A different picture should emerge in Experiment 2 in which participants believed to be members of one of the two novel groups. Turning to low-status, i.e., low-competence, group members first, self-affirmation should be especially high on their agenda because of their threatened social identity (Tajfel, 1981; Tajfel & Turner, 1979). In line with previous studies (e.g., Cambon & Yzerbyt, 2018; Judd et al., 2005; Yzerbyt & Cambon, 2017), we predicted a compensatory pattern (i.e., social creativity) on direct measures. Such a pattern allows members of disadvantaged groups to build on the malleability of the warmth dimensions in order to affirm some positivity as a means to deal with the rather objective disadvantage on competence (Cambon et al., 2015; Yzerbyt & Cambon, 2017). Given the presence of these self-affirmation concerns, we expected this pattern to show on indirect measures as well.

As for of high-status, i.e., high-competence, group members, and in line with previous studies (e.g., Cambon & Yzerbyt, 2018; Cambon et al., 2015; Judd et al., 2005; Yzerbyt & Cambon, 2017), we expected self-presentation concerns to result in explicit dimensional compensation. In sharp contrast, we expected these group members' responses on indirect measures to tell a different story: Self-affirmation concerns would lead them to acknowledge their upper hand on competence and, more importantly, to dispute the superiority of low-competence group members on warmth.

For both experiments, the data and R scripts to analyze the data are publicly available on Open Science Framework (https://osf.io/uwrma/?view_only=a29ec230f5ac4d2cb62e2a83022b34a0).

Experiment 1

In Experiment 1, participants were observers and learned about two novel groups, namely the “blue group” and the “green group”, that initially differed on one of the two fundamental dimensions (i.e., the manipulated dimension) but were equal on the other (i.e., the unmanipulated dimension). We expected uninvolved observers to display dimensional compensation both on direct and indirect measures.

Method

Participants and design. We conducted a power analysis with the PANGEA web app (<https://jakewestfall.shinyapps.io/pangea/>) to estimate the sample size required to find a small effect size ($d = 0.20$) for the main effect of target group in the context of a 2×2 design with one factor varying within participants and the other between them. The analysis revealed that 351 participants would be required to achieve a power of 90% with a .05 alpha two-tailed criterion. Because the dropout is usually higher in crowdsourcing platforms than in laboratory settings (Peer, Brandimarte, Samat, & Acquisti, 2017), we decided to collect the data from 500 participants.

We recruited 511 participants from the United States using Prolific Academic—an online crowdsourcing platform (<https://www.prolific.co/>). Participants who had an

invariant response style on the self-report measures ($n = 23$), responded faster than 300ms to more than 10% of their trials ($n = 31$), or showed an error rate greater than 30% ($n = 43$) during the indirect measure were excluded from the analyses, leaving a sample of 414 ($M_{\text{age}} = 33.65$, $SD_{\text{age}} = 11.85$; 226 males). The experiment involved a 2 (Manipulated Dimension: Competence vs. warmth) $\times$ 2 (Target Group: High vs. low group on the manipulated dimension) $\times$ 2 (Judged Dimension: Manipulated vs. non-manipulated) design, with the first factor varying between participants and the others within them.

Measures. Participants' impressions about the two groups were assessed by direct (i.e., self-reported ratings of traits) and indirect (i.e., BIAT) measures.

Direct measures. We evaluated participants' impressions about the target groups by means of traits rated on a 7-point scale (0 = strongly disagree; 6 = strongly agree). Efficient, competent, and hardworking stood for the competence dimension ($\alpha = .87-.89$ for the fictitious blue and green group, respectively), whereas warm, sociable, and friendly tapped the warmth dimension ($\alpha = .92-.93$ for the fictitious blue and green group, respectively).

Indirect measures. We assessed the association between target group and dimension (i.e., competence or warmth) by means of two Brief Implicit Association Tests (BIAT; Sriram & Greenwald, 2009). This reaction time task maps two focal categories onto a focal key, and two non-focal categories onto a non-focal key.

Participants learned that they had to press as fast and accurately as possible the focal key whenever the stimuli belonged to either one of the focal categories and the non-focal key otherwise. Each BIAT task comprised four blocks of 20 trials with the first two blocks being identical to the last two to increase reliability. The focal dimension remained constant (i.e., warmth or competence), whereas the focal category (i.e., “blue” or “green” group) was distinct for each block. For the warmth-BIAT ($\alpha = .49$; for similar levels of internal consistency see Imhoff et al., 2013), we used *warmth* as the focal attribute and *competence* as the non-focal attribute. The opposite held for the competence-BIAT ($\alpha = .50$). We computed a d-score for each BIAT (for scoring algorithm, see Greenwald, Nosek, & Banaji, 2003; Nosek et al., 2014), with a positive value indicating a stronger association between the advantaged vs. disadvantaged group and the dimension of interest. We used traits (i.e., warmth dimension: sociable, caring, friendly, and kind; competence dimension: capable, skilled, smart, and organized) and figures (i.e., four green and four blue face shaped figures presented during Step 1) as the to-be-classified targets.

Procedure. The experiment comprised three steps. Step 1 relied upon Judd et al.’s (2005) procedure whereby subjects had to form an impression about two fictitious groups—the green group and the blue group—based on a series of behaviors allegedly performed by their members. Twenty-four behaviors, 12 for each group, were adapted from this study (i.e., the accountability of the actor was made more explicit for some

behaviors; e.g., we changed “X’s electricity was turned off because the bill hadn’t been paid” to “X’s electricity was turned off because he/she didn’t paid the bill”). Judd et al. (2005) pretested each behavior to be either diagnostic of positive competence (e.g., “X wrote a little computer program that solved a tough calculus integration problem”), negative competence (e.g., “X’s bicycle was stolen several times because he/she forgot to set the lock”), positive warmth (e.g., “X loves to be with other people”), or negative warmth (e.g., “X couldn’t be bothered to give directions to a stranger”).

Initial differences between groups on the manipulated dimension (e.g., competence) were created by assigning 6 positive diagnostic behaviors of the manipulated dimensions (e.g., positive competence) to the group high on the manipulated dimension (e.g., high-competence group), and by assigning 6 negative diagnostic behaviors of the manipulated dimensions (e.g., negative competence) to the group low on the manipulated dimension (e.g., low-competence group). Moreover, both groups received 2 positive and 2 negative behaviors related to the non-manipulated dimension (e.g., warmth). In other words, when competence was the manipulated dimension, the high-competence group was ascribed more positive and less negative competence-diagnostic behavior but an equal number of positive and negative warmth-diagnostic behaviors than the low-competence group. Conversely, when warmth was the manipulated dimension, the high-warmth group was ascribed more positive and less negative warmth-diagnostic behavior but an equal number of positive and negative

competence-diagnostic behaviors than the low-warmth group. Each participant saw a random sample from the pool of behaviors within the constraints of the aforementioned ratio. We also randomized the identity of the high group on the manipulated dimension between participants (i.e., for some participants the high group on the manipulated dimension was the blue group and the green group was the low group on the manipulated dimension whereas for other participants it was the inverse).

Behaviors appeared one at a time and in random order at the center of the screen for 5500ms with an inter-stimulus delay of 400ms. Each of them came with a colored background rectangle as well as four colored face shaped figures to indicate group membership (blue vs. green). Participants were then paced a second time through the randomly sorted statements and had to read and classify them one by one according to their author's group membership. They then went through the entire list of behaviors a third time with the behaviors sorted by group identity (e.g., all the blue group statements came first). Next, participants had to convey in a few lines their general impression about each group in order to solidify their impression. In this last step, we randomized the identity of the first group (blue vs. green) across participants (e.g., some participants first provided their impression of the blue group and then for the green group whereas it was the reverse order for other participants).

In Step 2, we collected the indirect measures. Participants first completed a 20-trial practice BIAT with birds/angled as focal categories and mammals/curved as non-

focal categories. Next, two BIATs tapped each fundamental dimension. We randomized the identity of the first group (blue vs. green group) and the first focal dimension (i.e., warmth vs. competence) across participants.

In Step 3, we collected the direct measures. We assessed participants' impression about each group by means of a series of traits ratings presented in a random order and covering the two fundamental dimensions of judgment. Finally, we collected demographic information and debriefed participants. For steps 1 and 2, we relied on Psytoolkit (Stoet, 2010, 2017). We implemented Step 3 using Qualtrics.

Results

Direct measures. We first examined participants' ratings on the manipulated dimension to assess the success of our manipulation. There was a main effect of Target Group on the score relative to the manipulated dimension, $F(1, 411) = 366.69, p < .001, \eta^2_p = .471$, such that the high group on the manipulated dimension ($M = 5.71, SD = 1.09$) received a higher score than the low group ($M = 3.79, SD = 1.38$) on this dimension. The Target Group $\times$ Manipulated Dimension interaction was not significant, $F(1, 411) = 0.35, p = .557, \eta^2_p = .001$, confirming that this difference was not affected by whether warmth or competence was the manipulated dimension.

Of more interest, and in line with our hypothesis, there was a main effect of Target Group on the score relative to the unmanipulated dimension, $F(1, 411) = 11.37, p < .001, \eta^2_p = .027$, such that the high group on the manipulated dimension ($M = 4.69,$

$SD = 1.28$) received lower ratings than the low group ($M = 5.05$, $SD = 1.34$). Again, the Target Group $\times$ Manipulated Dimension interaction was not significant, $F(1, 411) = 0.58$, $p = .447$, $\eta^2_p = .001$, signaling that this difference was not affected by whether warmth or competence was the manipulated dimension. Taken together, these results signal the presence of a dimensional compensatory pattern on the direct measures (see Figure 1 and Table 1).

[insert Figure 1.]

[insert Table 1.]

Indirect measures. Again, we analyzed the d-scores for the manipulated vs. non-manipulated dimension separately. Specifically, we found a significant positive d-score for the manipulated dimension ($M = 0.11$, $SD = 0.38$), $F(1, 412) = 34.22$, $p < .001$, $\eta^2_p = .077$. The Manipulated Dimension, i.e., whether we manipulated warmth or competence, did not qualify this main effect, $F(1, 412) = 0.29$, $p = .588$, $\eta^2_p = .001$, confirming that participants were faster at mapping the manipulated dimension with the high vs. low group on the manipulated dimension.

More importantly, we found a negative d-score for the non-manipulated dimension ($M = -0.04$, $SD = 0.39$), $F(1, 412) = 4.68$, $p < .05$, $\eta^2_p = .011$, which was not affected by the Manipulated Dimension, i.e., by whether warmth or competence was the manipulated dimension, $F(1, 412) = 0.14$, $p = .706$, $\eta^2_p < .001$, confirming that participants were faster at mapping the non-manipulated dimension with the low vs.

high group on the manipulated dimension. As a whole, these results confirm the presence of a dimensional compensatory pattern at the indirect level (see Table 2).

[insert Table 2.]

Discussion

Experiment 1 tested whether observers would show dimensional compensation both on direct and on indirect measures. Whether we manipulated competence or warmth, both participants' ratings on Likert-type scales and their reaction times via a BIAT confirmed the success of our manipulation such that the high group on the manipulated dimension was superior to the low group on this dimension. More importantly, and in line with our predictions, both types of measures revealed the presence of dimensional compensatory evaluations of the groups on the non-manipulated dimension.

One distinct feature of the present experiment is that participants were observers rather than members of either group. The question is whether this pattern would replicate for participants who see themselves as members of one of the two groups involved in the comparison. Admittedly, and building upon Yzerbyt and Cambon's (2016) findings that reality constraints play a larger role in judgments of competence than in judgments of warmth, one would expect all participants in this situation to acknowledge the superiority of the high-competence group. Moreover, this differential

should emerge on both direct and indirect measures. In sharp contrast, judgments of warmth should be more open to disagreement.

Specifically, self-affirmation concerns on the part of low-competence, coupled with the lesser flexibility of competence, would generate dimensional compensation on warmth. As for high-competence group members, and in line with findings showing that members of more privileged groups not only derogate stigmatized groups on competence but also tend to question their superiority on warmth (Clément-Guillotin et al., 2018; Rohmer & Louvet, 2012, 2018), the more subjective nature of warmth rating should render dimensional compensation less likely. That is, when it comes to the dimension of warmth, high-competence group members' magnanimity judgments should be apparent on direct measures but less so on indirect measures. We designed Experiment 2 to test the difference in pattern for members of low- and high-competence groups.

Experiment 2

In Experiment 2, we assigned participants to the high- or the low-competence group. We only manipulated the competence dimension because previous studies have shown that the compensation effect is usually stronger than when warmth is manipulated (e.g., Judd et al., 2005; Kervyn et al., 2011; Yzerbyt et al., 2008). Although this asymmetry may be accounted for by the primacy of warmth over competence (see Abele & Wojciszke, 2007; Fiske, Cuddy, & Glick, 2007), an additional factor resides in

the constraints imposed by the more “objective” quality of competence over warmth (Yzerbyt & Cambon, 2017). Indeed, it is generally difficult to deny the reality of a power, status, or resource differential between groups and this holds even for low-competence group members. In contrast, warmth is more “negotiable”, and all parties involved can claim a high level on this dimension. In light of this reasoning, we deemed it important to start by manipulating the dimensions that is most likely to remain undisputed and by checking for the emergence of differences between direct and indirect measures on the more malleable dimension.

Our decision to manipulate competence thus works in favor of our hypothesis for the low-competence group members but against it for the high-competence group members. Indeed, we expected participants to face a different set of motivations that would give rise to a compensation effect as a function of their distinct social status as high- or low-competence group members. Based on previous research (e.g., Cambon & Yzerbyt, 2018; Rohmer & Louvet, 2012, 2018; Yzerbyt & Cambon, 2017), we predicted both groups to display a dimensional compensation pattern on a direct level. At the indirect level, we expected high- and low-competence group members to acknowledge the superiority of the high-competence group on competence. In contrast, we predicted that participants would diverge with respect to warmth, such that low-competence group members would preferentially associate warmth dimension with their

group but that high-competence group members would not go along with such a characterization.

Method

Participants and design. As in Experiment 1, we conducted a power analysis with the PANGEA web app to estimate the sample size required. Because previous studies on dimensional compensation have shown that ingroup members tend to exaggerate the difference on their favored dimension compared to external observers (Judd et al., 2005; Yzerbyt et al., 2005), we expected a medium effect size ($d = 0.50$) for Target Group $\times$ Group Membership interaction. The analysis revealed that 94 participants would be required to achieve a power of 90% with a .05 alpha two-tailed criterion. We decided to involve about 100 participants.

Ninety-five participants from a large European university took part in this experiment in exchange for credits. We applied the same exclusion criteria from Experiment 1. Two participants with an error rate greater than 30% during the indirect measure were excluded from the analyses, leaving a sample of 93 ($M_{age} = 20.41$, $SD_{age} = 2.69$; 83 females). The experiment involved a 2 (Group Membership: High- vs. low-competence group) $\times$ 2 (Target Group: High- vs. low-competence group) $\times$ 2 (Judged Dimension: Competence vs. warmth) design, with the first factor varying between participants and the others within them.

Measures. The measures collected in Experiment 2 were almost identical to those of Experiment 1, except that we added an identification measure at the end of the survey as a manipulation check and that the BIAT tasks did not repeat blocks in order to reduce the length of the experiment. The internal consistency of the direct measures (warmth traits rating $\alpha = .89-.91$; competence traits rating $\alpha = .91-.92$; for the blue and green group, respectively) and indirect (warmth-BIAT $\alpha = .52$; competence-BIAT $\alpha = .50$) and were similar to those in Experiment 1. We assessed identification with the ingroup versus outgroup on two 7-point scales (0 = not at all; 6 = very much) with the following instruction: “indicate your degree of identification with each of the two groups”. We computed an overall identification score by subtracting outgroup from ingroup identification.

Procedure. The experiment took place in a laboratory at the university. We manipulated participants’ membership using a bogus personality test similar to Judd et al. (2005, Study 5). Participants completed a dot estimation task in which they had to indicate, over the course of several trials, whether there were more yellow or orange dots on the screen. After completion, they learned that the task was a new unobtrusive personality test aimed to categorizing people in two groups, namely the “blues” and “greens”. The remaining part of the procedure was the same as in Experiment 1.

Results

Identification with the ingroup. Confirming the success of our group membership manipulation, ingroup identification was positive ($M = 0.45$, $SD = 1.58$) and significant, $F(1, 91) = 7.46$, $p < .01$, $\eta^2_p = .076$, and did not differ as a function of group membership, $F(1, 91) = 0.05$, $p = .818$, $\eta^2_p = .001$, suggesting that both high- and low-competence group members felt more identified with their ingroup than with the outgroup.

Direct measures. Again, we first examined participants' ratings on the manipulated dimension (i.e., competence). Confirming the success of our manipulation, there was a main effect of Target Group on the competence ratings, $F(1, 91) = 109.81$, $p < .001$, $\eta^2_p = .547$, such that participants judged the high-competence group ($M = 5.09$, $SD = 0.87$) more competent than the low-competence group ($M = 3.17$, $SD = 1.33$). The Target Group $\times$ Group Membership interaction was not significant, $F(1, 91) = 0.19$, $p = .663$, $\eta^2_p = .002$, suggesting that this difference was not affected by Group Membership.

More importantly, and in line with our prediction of dimensional compensation on direct measures, there was a main effect of Target Group on the warmth ratings, $F(1, 91) = 30.25$, $p < .001$, $\eta^2_p = .249$, such that the high-competence group ($M = 3.11$, $SD = 1.40$) came across as less warm than the low-competence group ($M = 4.48$, $SD = 1.30$). Again, the Target Group $\times$ Group Membership interaction was not significant, $F(1, 91) = 1.47$, $p = .229$, $\eta^2_p = .016$, suggesting that this difference was not affected by Group

Membership. These results confirm that both high- and low-competence group members dimensionally compensated on direct measures (see Figure 2 and Table 3).

[insert Figure 2.]

[insert Table 3.]

Indirect measures. As in Experiment 1, we analyzed the d-score for the competence vs. warmth dimension separately. The positive d-score for the competence dimension ($M = 0.15$, $SD = 0.55$) confirmed that participants were faster at mapping the high-competence group than the low-competence group with the competence dimension, $F(1, 91) = 6.75$, $p < .05$, $\eta^2_p = .069$, and this difference was not affected by Group Membership, $F(1, 91) = 1.12$, $p = .293$, $\eta^2_p = .012$.

Turning to the warmth dimension, the negative d-score ($M = -0.07$, $SD = 0.57$) was not significant, $F(1, 91) = 1.32$, $p = .254$, $\eta^2_p = .014$. Importantly, and in line with our hypothesis, there was a significant effect of Group Membership, $F(1, 91) = 4.58$, $p < .05$, $\eta^2_p = .048$, revealing that high- and low-competence group members disagreed as to the ascription of warmth to the groups. As expected, this score was significantly negative for low-competence group members ($M = -0.19$, $SD = 0.51$), $F(1, 91) = 5.46$, $p < .05$, $\eta^2_p = .057$, but not for high-competence group members ($M = 0.06$, $SD = 0.61$), $F(1, 91) = 0.49$, $p = .487$, $\eta^2_p = .005$. In other words, low-competence group members saw warmth as more associated with the low-competence group (i.e., ingroup) than with

the high-competence group (i.e., outgroup) whereas no preferential association emerged among high-competence group members (see Table 4).

[insert Table 4.]

Discussion

In Experiment 2, we tested whether dimensional compensation would take place for participants who find themselves to be members of the target groups rather than mere observers. We manipulated participants' membership via a bogus personality test and randomly assigned them to either the high- or low-competence group, while both groups were ambivalent on the warmth dimension.

As expected, a compensation pattern emerged at the direct level for both high- and low-competence group members. This pattern confirms earlier findings that relied on existing groups (e.g., Cambon & Yzerbyt, 2016; Yzerbyt et al., 2005) or minimal groups (e.g., Cambon et al., 2015; Judd et al., 2005). Crucially, we conjectured that dimensional compensation would emerge at the indirect level only for low- but not high-competence group members. In line with our hypothesis, high-competence group members did not concede their inferiority on the warmth dimension. In contrast, and in agreement with our prediction, low-competence group members exhibited dimensional compensation by showing ingroup bias on warmth.

These data confirm the presence of a compensation pattern for low-competence group members on both direct and indirect measures. This was not the case for high-

competence group members, who proved reluctant to concede outgroup superiority on warmth on indirect measures even though they professed dimensional compensation on direct measures.

General Discussion

An increasing body of research has established the robustness of dimensional compensation, i.e., a negative relationship between the two fundamental dimensions when judging two social targets (for a recent review, see Yzerbyt, 2018). As of today, the available empirical evidence rests almost exclusively on direct measures such as traits ratings. To the extent that dimensional compensation may in some cases reflect a response strategy fueled by self-presentation concerns to cope with normative pressures (Cambon & Yzerbyt, 2018; Cambon et al., 2015; Yzerbyt & Cambon, 2017), the sole use of direct measures remains a limitation. In this context, the present research aimed to test dimensional compensation on both self-reports, i.e., direct, as well as less controlled reaction-time-based, indeed indirect, measures (Greenwald & Lai, 2020; Nosek, 2005). Additionally, we examined whether judges' social position as observers or as group members shapes people's responses.

In Experiment 1, participants were third-party observers and read about two novel groups that initially differed only on one of the two dimensions, i.e., the manipulated dimension. Not surprisingly, participants ascribed higher (lower) ratings to the high (low) group on the manipulated dimension. Crucially, however, they

manifested lower (higher) ratings to the high (low) group on the non-manipulated dimension. Furthermore, this compensation pattern held whether we manipulated warmth or competence. These findings at the direct level replicate earlier work on fictitious groups (e.g., Judd et al., 2005; Kervyn, Yzerbyt, Judd, & Nunes, 2009; Yzerbyt et al., 2008) and further supports the idea that this effect goes beyond the mere covariation between the fundamental dimensions from existing stereotypes.

More importantly, the predicted compensation pattern also emerged at the indirect level, in line with Kervyn et al.' (2011) earlier findings using the Linguistic Category Model (Semin & Fiedler, 1988). Because such indirect responses are less likely to fall under participant's intention or control (Gawronski & De Houwer, 2014), the obtained findings suggest that dimensional compensation among external observers is likely driven by justice or harmony concerns (rather than, for instance, self-presentation concerns) that may have been internalized. In other words, their judgments seem consistent with a need of justice and harmony that promotes a hydraulic relationship between warmth and competence when forming an impression about social targets that are initially asymmetrical on one of the two dimensions.

In Experiment 2, participants were either members of the high- or low-competence group. In agreement with previous investigations (e.g., Cambon et al., 2015; Judd et al., 2005; Yzerbyt & Cambon, 2017), a compensation pattern emerged at the direct level. Not only did participants from both groups acknowledge the superiority

of the high-competence group over the low-competence group on the competence dimension but the reverse pattern also emerged for the non-manipulated warmth dimension. Crucially, we expected the driving forces behind this compensatory pattern to be essentially different between the two groups, producing distinct response at the indirect level. Specifically, we reasoned that members of both groups would strive to achieve positive distinctiveness (i.e., self-affirmation concerns) as previous studies have found an evaluative preference for the ingroup (i.e., ingroup favoritism) at an indirect level even with minimal groups (e.g., Greenwald, Pickrell, & Farnham, 2002; Otten & Moskowitz, 2000; Pinter & Greenwald, 2004). However, we posited that the differential reality constraints of the two dimensions and the existence of normative pressures should join forces to give way to different indirect judgments as a function of group membership.

The “more objective” and “less negotiable” nature of competence compared to warmth (Yzerbyt & Cambon, 2017) makes it difficult for low-competence group members to dispute the outgroup superiority on this dimension. Consequently, they would likely seek to redeem positive distinctiveness by shining on the status-irrelevant dimension (i.e., warmth). This ought to produce a compensation effect at both the direct and indirect level. The present results support our hypothesis. Of course, to the extent that research has shown that even low-status group members may endorse stereotypes that disfavor them and perpetuate the *status quo* (Jost et al., 2002; Kay & Jost, 2003),

we cannot totally exclude the possibility that internalized justice concerns shaped this compensatory effect.

More importantly, we conjectured that the situation would likely be different for high-status group members. Although these group members would be tempted to claim their superiority on both dimensions (i.e., self-affirmation concerns), such a behavior would infringe the non-discrimination norm (Jeffries et al., 2012). Actually, several pieces of evidence emphasize the presence of self-presentation concerns among high-status group members (e.g., Cambon & Yzerbyt, 2018; Owuamalam et al., 2016; Yzerbyt & Cambon, 2017). To cope with these normative pressures, high-status group members may readily concede some advantage to the low-status group on the dimension they care the less about (i.e., warmth) even though they may not fully adhere to the idea. Experiment 2 confirmed that they dimensionally compensated at the direct level. In contrast, and in line with our rationale, we found no outgroup bias on the warmth dimension at the indirect level. This incongruence between direct and indirect measures suggests that dimensional compensation as manifested by advantaged members may indeed result from self-presentation concerns.

The present experiments shed interesting light on earlier research (see Rohmer & Louvet, 2012). Some of these efforts attributed the discrepancies between direct and indirect measures to the social norms that protect the evaluated groups, i.e., it may be less acceptable to express criticism towards disabled people than towards lawyers. Other

invoked the difficulty to access in memory the different social categories used in the indirect measure, i.e., the social category of lawyers may be more accessible in memory than that of disabled people. Clearly, the use of unknown groups allows ruling out these alternative explanations. At the same time, because these categories are novel, they might also make participants more thoughtful about their responses. Indeed, the IAT might alert participants of what is being measured (Oswald, Mitchell, Blanton, Jaccard, & Tetlock, 2013). Future research may want to investigate dimensional compensation with novel groups using alternative, possibly less controllable, indirect measures.

As such, the present work also provides a new framework to interpret past findings. For instance, Carlsson and Björklund (2010; Study 1), and Imhoff et al.' (2013) participants (i.e., students) can be seen as observers who, just as in Experiment 1, showed direct and indirect mixed stereotypes about two outgroups (i.e., preschool teachers and lawyers, and nursery teachers and managers, respectively). In stark contrast, and just like in Experiment 2, Rohmer and Louvet's (2012, 2018; see also Clément-Guillotin et al., 2018) participants (i.e., students) were in fact members of the high-status group (i.e., non-disabled people) advocating mixed stereotypes while portraying themselves as superior to the low-status outgroup (i.e., disabled people) on both dimensions under less direct measures. Interestingly, when participants were members of the disadvantaged group (i.e., preschool teachers as in Carlsson & Björklund, 2010; women as in Ebert et al., 2014), they dimensionally compensated on

direct measures but favored their ingroup on indirect measures regardless of the dimension. Although we predicted and found an indirect compensation pattern for low-competence group members, one could speculate that the competence asymmetry between existing groups is less strict and thus more malleable than with artificial groups produced under an experimental context. Future studies need to be conducted to nail down these boundary conditions.

One possible caveat of the present research is that, although Experiment 1 evidenced that direct and indirect dimensional compensation held whether competence or warmth was the manipulated dimension, we only manipulated competence in Experiment 2. Actually, several studies reported a weaker effect when warmth is the manipulated dimension (e.g., Judd et al., 2005; Kervyn et al., 2011; Yzerbyt et al., 2008). Clearly, it would be interesting for further research to investigate the direct and indirect response pattern when manipulating warmth rather than competence.

Although the current research offers valuable insights about the motivations that underlie dimensional compensation, our results constitute an initial step, as they do not allow disentangling every motive at work. This is because the compensation pattern may be accounted by more than one motive. Thus, new research could examine each motive in more detail. For instance, testing whether dimensional compensation among low-status group derives from self-affirmation concerns, justice concerns, or both. Similarly, research could manipulate the intergroup relations (e.g., competitive vs

cooperative) to test the impact of the desire to promote harmonious intergroup relations on the emergence of dimensional compensatory responses.

An additional limitation concerns the spectrum of traits that we used as stimuli. Different lines of research suggest that the two fundamental dimension of social perception could be broken down into facets: ability and assertiveness for the competence/agency dimension, and sociability and morality for the warmth/communion dimension (Abele et al., 2008; Abele et al., 2016). Our experimental material comprised the facets of capability and sociability, but further studies should seek to generalize our results to the other facets (Abele, Ellemers, Fiske, Koch, & Yzerbyt, in press).

As a final remark, the reported effect sizes of the indirect measures may come as statistically small. At the same time, numerous studies have shown that such effects can have a societally large and significant impact as they may affect a large number of people or affect a single individual on a regular basis (Greenwald, Banaji, & Nosek, 2015; but see Oswald et al., 2013; Oswald, Mitchell, Blanton, Jaccard, & Tetlock, 2015). Future work should allow clarifying these issues by examining the impact of compensation on a variety of phenomena down the line.

To sum up, the current efforts contribute to extend our understanding of the dimensional compensation effect. To our knowledge, the present experiments constitute the first attempt to assess dimensional compensation between two fundamental dimensions on both direct and indirect measures and to do so with participants either as

observers or as members of fictitious groups. Our results emphasize the discrepancies between indirect and direct responses as a function of people's social position and shed new light on the different motives underlying dimensional compensation. As such, they contribute to enriching the research on the way people navigate their social world.

Open Practices Statement

The data and R scripts to analyze the data are publicly available on Open Science

Framework (https://osf.io/uwrma/?view_only=a29ec230f5ac4d2cb62e2a83022b34a0).

Declaration of Conflicting Interests

The authors declare that there is no conflict of interest.

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Notes

¹ We used the term *indirect* following the recommendations from Corneille and Hütter (2020) to discontinue the usage of the *implicit* terminology to avoid conceptual ambiguities associated with this nomenclature.

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Table 1

Ratings as a function of Target Group, Manipulated Dimension and Judged Dimension

Judged Dimension	Manipulated Dimension			
	Competence manipulated		Warmth manipulated	
	High-competence group	Low-competence group	High-warmth group	Low-warmth group
Competence	5.71 (0.94)	3.84 (1.25)	5.72 (1.23)	3.73 (1.49)
Warmth	4.51 (1.29)	4.96 (1.40)	4.87 (1.26)	5.15 (1.27)

Note. Standard deviations are in parenthesis.

Table 2

D-scores as a function of Manipulated Dimension and Dimension

Dimension	Manipulated Dimension	
	Competence manipulated	Warmth manipulated
Competence	0.12 (0.35)	-0.03 (0.42)
Warmth	-0.05 (0.36)	0.10 (0.40)

Note. A positive d-score indicates a stronger association between the high vs. low group on the manipulated dimension and the dimension of interest. Standard deviations are in parenthesis.

Table 3

Ratings as a function of Target Group, Group Membership and Judged Dimension

Judged Dimension	Group Membership			
	High-competence group members		Low-competence group members	
	High-competence group	Low-competence group	High-warmth group	Low-warmth group
Competence	5.05 (0.73)	3.22 (1.27)	5.12 (0.99)	3.13 (1.40)
Warmth	3.25 (1.27)	4.32 (1.39)	2.96 (1.51)	4.63 (1.20)

Note. Standard deviations are in parenthesis.

Table 4

D-scores as a function of Group Membership and Dimension

Dimension	Group Membership	
	High-competence group members	Low-competence group members
Competence	0.21 (0.53)	0.09 (0.57)
Warmth	0.06 (0.61)	-0.19 (0.51)

Note. A positive d-score indicates a stronger association between the high- vs. low-competence group and the dimension of interest. Standard deviations are in parenthesis.

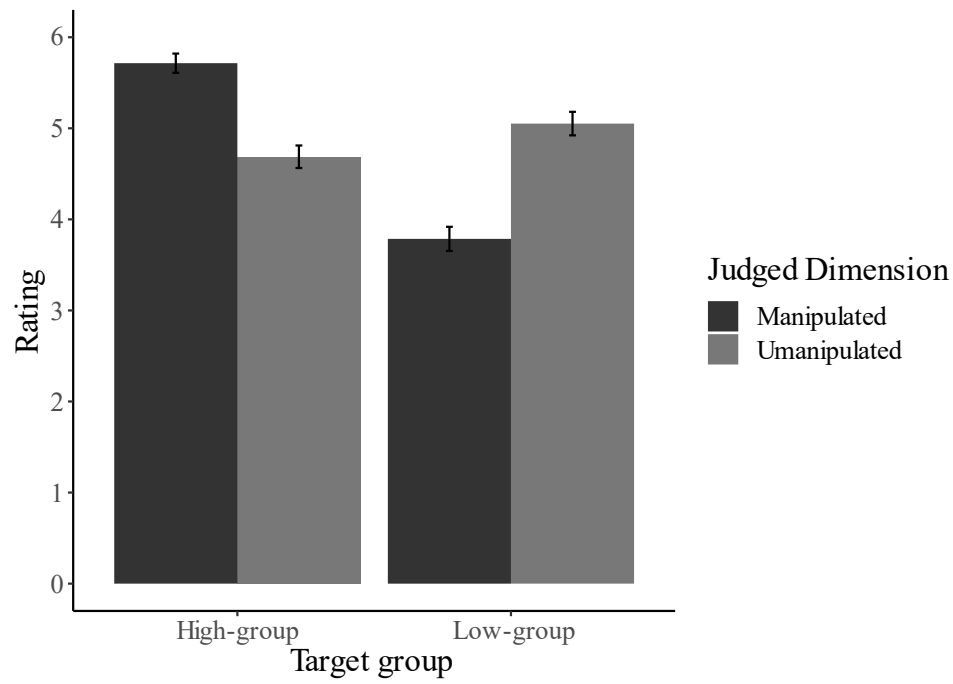


Figure 1. Ratings as a function of Target Group (high- vs. low-group on the manipulated dimension) and Judged Dimension (manipulated vs. unmanipulated). Error bars represent 95% confidence intervals.

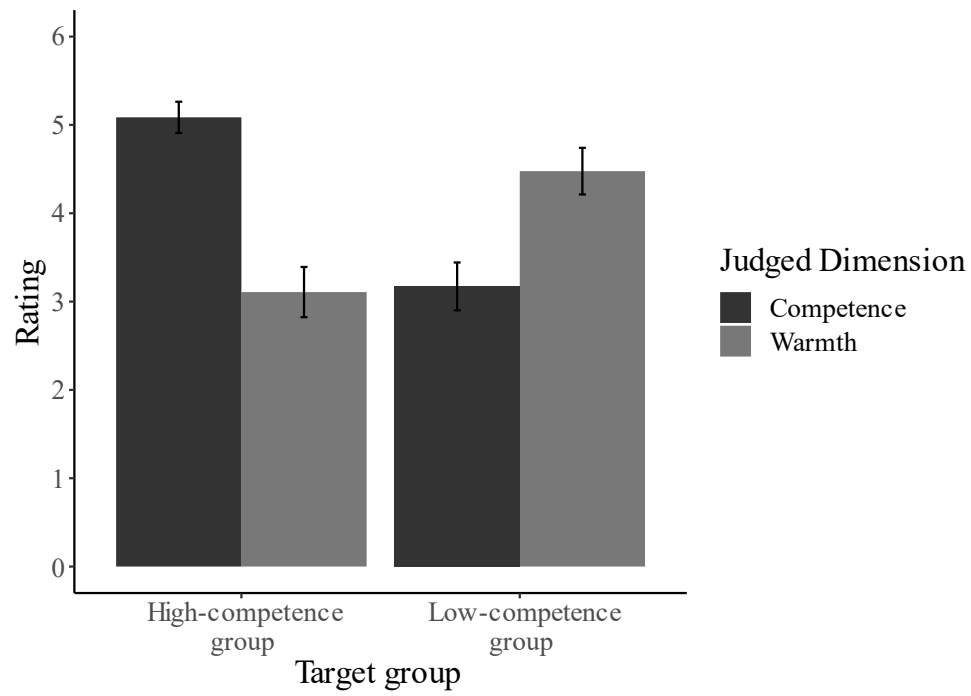


Figure 2. Ratings as a function of Target Group (high- vs. low-competence group) and Judged Dimension (competence vs. warmth). Error bars represent 95% confidence intervals.