Integrating The Stereotype Content Model (Warmth And Competence) And The Osgood Semantic Differential (Evaluation, Potency, And Activity)

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Abstract

We integrate two prominent models of social perception dimensionality. In three studies, we demonstrate how the well-established semantic differential dimensions of evaluation and potency relate to the stereotype content model dimensions of warmth and competence. Specifially, using a correlational design (Study 1) and experimental designs (Studies 2 and 3), we found that semantic differential dimensions run diagonally across stereotype content model quadrants. Implications of integrating classic and modern approaches of social perception are discussed.

Over the past decade, research (Abele, Cuddy, Judd, & Yzerbyt, 2008; Cuddy, Fiske, & Glick, 2007; Fiske, Cuddy, Glick, & Xu, 2002; Fiske, Xu, Cuddy, & Glick, 1999; Markus & Kitayama, 1991; Wojciszke, 1994, 2005; Wojciszke, Bazinska, & Jaworski, 1998) has identified warmth and competence as the two fundamental dimensions of social perception. With the stereotype content model (SCM), Fiske and colleagues (Fiske, Cuddy, & Glick, 2007) offered a comprehensive model of social perception based on these two dimensions. The present paper aims to compare this fairly recent model of social perception and another older, important, and widely used model of attitudinal dimensions, namely Osgood, Suci, and Tannenbaum's (1957) semantic differential (SD).

These two models have thus far been applied to different domains of research, respectively the social perception and the attitude measurement domain. This has allowed them to develop without ever having to address how one model relates to the other. Investigating how the two models relate and compare with one another, we hope to take one step in the direction of a more integrated account of social perception. We expect that the two models are systematically related, one set of dimensions representing the diagonals of the other set. Specifically, we expect SD evaluation to go from the SCM low-competence, low-warmth

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quadrant up to the high-competence, high-warmth quadrant. For SD potency, we hypothesize that it will go from the paternalized groups' quadrant (warm and incompetent) to the envied groups' quadrant (cold and competent). As for the activity dimension, we have less specific expectations, as that third dimension was not consistently different from potency for social targets (Osgood et al., 1957).

Stereotype Content Model

The idea that two dimensions underlie social perception of groups (Hayes, 1958), individuals (Bakan, 1966), and leader- ship styles (Bales, 1950) can be traced back to the mid-20th century. This theoretical framework has seen a recent revival of interest both in the person perception (Abele, 2003; Abele & Wojciszke, 2007; Kervyn, Bergsieker, & Fiske, 2012; Wojciszke, 1994; Wojciszke et al., 1998) and the intergroup perception domain (Abele et al., 2008; Fiske et al., 2002, 2007; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005; Yzerbyt, Provost, & Corneille, 2005). In both domains, using warmth and competence as two orthogonal dimensions provide an effective model to map social perception.

In group perception, the SCM (Fiske et al., 1999, 2002, 2007) describes how social structural variables influence stereotype dimensions and how that stereotype content leads to different emotions felt toward different groups. At the heart of the SCM are the two dimensions of warmth and competence. Simply put, warmth answers the question, "What are this group's intentions?" And competence answers the question, "Is that group able to carry out its intentions?" Warmth is thus linked to friendliness, helpfulness, sincerity, and trustworthiness; competence is linked to efficiency, conscientiousness, intelligence, and skill. Fiske et al. (1999, 2002) have shown that these two dimensions effectively organize stereotypes about a society's different social groups into four quadrants. The competent, warm quadrant cluster consists of respondents' ingroups and aspirational groups such as middle-class, Americans (for studies run in the USA), and Christians. The incompetent, cold quadrant cluster contains commonly derogated social groups such as homeless people, poor people, and Latino immigrants. The warm, incompetent quadrant cluster contains paternalized groups (e.g., elderly, disabled, and Italians). Finally, the fourth quadrant cluster includes groups perceived as competent and cold, the envied groups (e.g., Asians, Jews, and rich people). These results have since then been replicated in over 30 countries across the world (Cuddy et al., 2009; Durante et al., 2013).

Besides the SCM, social perception researchers have found that similar pairs of dimensions underlie the perception of individuals (Abele, 2003; Wojciszke, 1994), countries (Phalet & Poppe, 1997; Poppe & Linssen, 1999), and cultures (Markus & Kitayama, 1991; Oyserman, Coon, & Kemmelmeier, 2002). Although these different lines of research use different names for the two dimensions and slightly different definitions, Abele and Wojciszke (2007) have shown that they all are very similar and explain upwards of 80% of the variance in social perception (Wojciszke et al., 1998). Using warmth and competence as the two fundamental dimensions of social perception has provided new angles on questions such as the higher diagnosticity of some traits over others (Skowronski & Carlston, 1987, 1989), the actor-observer effect (Abele & Wojciszke, 2007), and stereo- type change (Bergsieker, Leslie, Constantine, & Fiske, 2012; Cuddy, Fiske, & Glick, 2004; Cuddy, Norton, & Fiske

2005; Kervyn, Dolderer, Mahieu, & Yzerbyt, 2009). Thus, the two dimensions of warmth and competence explain a lot of variance (Wojciszke et al., 1998), have high agreement (Abele & Wojciszke, 2007), and definite predictive validity (Fiske et al., 2007).

Semantic Differential

In *The Measurement of Meaning,* Osgood et al. (1957) proposed the SD as a way to measure the meaning of concepts. Their technique consisted of getting ratings for a number of attitude objects on a long list of bipolar scales. For instance, for his intercultural study, Osgood (1964) used a list of 100 attitude objects rated on about 60 bipolar scales (different scales were used in the different countries). Many adjectives for the scales were collected through pilot studies in the different countries, and the best adjectives were selected on the basis of their frequency, diversity, and independence. Those ratings were then subjected to factor analyses. Osgood et al. (1957) consistently observed that scales related to evaluation (e.g., positive–negative, good–bad, and true–false) loaded on the first factor. The second and third factors were interpreted as potency (e.g., hard–soft, strong–weak, and heavy–light) and activity (e.g., active–passive, fast–slow, and hot–cold). This SD technique has been applied to a wide variety of attitude objects and in different cultures (Eagly & Chaiken, 1993, 1998; Osgood, 1962, 1964; Osgood, May, & Miron, 1975). The two dimensions of evaluation and potency consistently appeared as factors that organize the different ratings. However, activity has proved to be less stable across samples and targets than evaluation and potency. As our interest is on stereotypes, or attitudes about social objects, we note that Osgood et al. (1957), who proposed the SD for all attitude objects, stated that for social objects the potency and the activity dimensions combine together into what they called the dynamism dimension.

Integrating the Semantic Differential and the Stereotype Content Model

Our goal of integrating these two models can be informed by the work of Rosenberg, Nelson, and Vivekananthan (1968). These authors used an empirical approach to investigate how the wealth of personality traits in language can array in social perception. Using a card-sorting task in which participants grouped traits often encountered in the same person, these authors derived distance ratings among the 69 most frequently used personality traits. They then analyzed the matrix of distances between these 69 traits using multidimensional scaling in order to find a two-dimensional solution that fit the data. To interpret these dimensions, they had another set of respondents rate all 69 traits on evaluation, potency, and activity. These SD ratings fit the multidimensional scaling solution fairly well (note that in this case, activity was not confounded with potency in a dynamism factor but was a third, orthogonal, dimension.)

In a move that anticipated the SCM's dimensions, Rosenberg et al. (1968) then went back to data collection and asked new participants to rate the 69 personality traits on two dimensions that had recently been proposed theoretically by Hayes (1958): social good–bad and intellectual good–bad. These two dimensions conformed to the multidimensional scaling solution with a better fit than the SD dimensions. The present paper is thus not the first to look at the SD's dimensions and the warmth-competence dimensions as two ways to

describe social perception. But, beside the fact that Rosenberg et al. (1968) were working on ratings of personality traits (and not of social groups as we intend to do), they did not test how the two sets of dimensions relate to one another. Still, we can get an idea of how the two sets would have been related in their data by superimposing their two figures (Rosenberg et al., 1968, pp. 289–290), one for evaluation and potency (activity was a third dimension not represented on the two-dimensional figure) and the other for social good–bad and intellectual good–bad. When we superimposed them on the same two-dimensional multidimensional scaling solution (Figure 1), the evaluation dimension apparently goes from the social-bad, intellectual-bad quadrant to the social- good, intellectual-good quadrant, whereas the potency dimension goes from the social-good, intellectual-bad quadrant to the social-bad, intellectual-good quadrant. Also from the results of Rosenberg et al. (1968) (Figure 1), one can see that activity is orthogonal not only to evaluation and potency as expected from the SD, but it is also orthogonal to warmth and competence. Activity thus does not belong in the same two-dimensional space as the other four dimensions.

We expect that more systematic tests of the relation between warmth-competence and evaluation-potency on ratings of social groups will find similar results. So, evaluation, potency, warmth, and competence are not expected to be four orthogonal dimensions, neither do we claim that the dimensions of the SCM will duplicate those of the SD but rather that they will relate to each other systematically, one set of dimensions representing the diagonals of the other set. Specifically, we consider that both dimensions of the SCM have an important evaluative aspect. It is better to be competent than incompetent, and it is better to be warm than cold.

This is clear in the labels chosen by Rosenberg et al. (1968) for the two dimensions: social good–bad and intellectual good– bad. Therefore, we expect evaluation to go from the low-competence, low-warmth quadrant up to the high-competence, high-warmth quadrant. This hypothesis is in line with results reported by Wojciszke et al. (1998) in the person perception domain (see also, Suitner & Maass, 2008). These authors asked participants to give global evaluations of 20 people from their social environment and to evaluate them on communality (warmth) and competence traits. The data showed that the communality and competence trait ascriptions were both positive predictors of global evaluations.

We interpret potency (strong and forceful) in a group perception context to be akin to the degree of threat that a group is perceived to possess. Because potency is orthogonal to evaluation, and because of the social groups that land in those two quadrants, as well as our reading of the results of Rosenberg et al. (1968) (Figure 1), we hypothesize that potency will go from the paternalized groups quadrant (warm and incompetent) to the envied groups quadrant (cold and competent). This fits threat theories of prejudice, in that malicious (low warmth) outgroups more able (high competence) to inflict harm elicit the most fear and anxiety (perceived as most potent), in contrast to benevolent (high warmth) outgroups incapable (low competence) of reaching their goals (Stephan & Stephan, 2000).

As for the activity dimension, two alternatives are possible. Activity will either parallel potency, forming a dynamism dimension (Osgood et al., 1957), or it will form a third dimension orthogonal to both evaluation and potency (Rosenberg et al., 1968) and thus also

orthogonal to warmth and competence, as we hypothesize that these four dimensions should all fit into the same two-dimensional space. In any case, our main focus here is on the four dimensions of competence, warmth, evaluation, and potency, whereas the results on activity will be more exploratory.

OVERVIEW OF STUDIES

We conducted three studies in order to test how the SCM and the SD relate to each other. We started with a survey (Study 1) measuring the way relevant social groups are perceived on the three SD dimensions and the two stereotype content dimensions. We then test our predictions on the correlations between the dimensions. We also test whether dimensions from the SCM can predict dimensions from the SD and the other way around, that is, whether dimensions from the SD can be used to predict dimensions from the SCM. To further explore the relationship between these two sets of dimensions, we use experiments to manipulate warmth and competence (Study 2) or evaluation and potency (Study 3) and then measure inferences on the other set of dimensions.

STUDY 1

We hypothesized that evaluation will go from the SCM's low- competence, low-warmth quadrant up to the high-competence, high-warmth quadrant, and potency will go from the low- competence, high-warmth quadrant to the high-competence, low-warmth quadrant. If this is true, there should be a positive correlation between warmth and evaluation as well as between competence and evaluation. On the other hand, there should be a positive correlation between competence and potency and a negative correlation between warmth and potency. As our aim is to test whether knowing how a group is rated on one set of dimensions implies how it is perceived on the other set, a set of linear regressions will test how one set of dimensions predicts the dimensions from the other set. These linear regressions do not mean a causal link between the two sets of dimensions, only that they aim at testing whether knowing the perception of a group on the SCM (or SD) dimensions, one could infer how that group is perceived on the SD (or SCM) dimensions.

Research on the SCM has identified and validated pairs of items to measure warmth (warm and friendly) and competence (competent and capable). Research on the SD, on the other hand, has a more *posteriori* approach to item selection. Studies usually use a long list of items and then discover the items for each of the three factors based on a factor analysis (Osgood, 1962, 1964; Osgood et al., 1957). But most research on evaluation, potency, and activity has addressed attitude objects that were not people or groups, so most of the items used in past research do not primarily apply to social targets (e.g., wide-narrow). For these reasons, we decided for the dimensions of potency and activity to include three *a priori* items that could work as personality traits for each dimension (Appendix 1), in order to be able to select the items that best measured those two dimensions in this context.

Group Selection

Thirty-four US participants (24 women), recruited through M-Turk, took part in the pilot study in exchange for a small monetary compensation. On the first screen, the study was

introduced as a survey on social groups in American society today. Participants were informed that their participation was voluntary and anonymous. Age and gender were recorded; participants under 18 years old were screened out. On the second screen, participants answered the following question: "Off the top of your head, what various types of people do you think today's society categorizes into groups (i.e., based on age, ethnicity, gender, occupation, race, religion, etc.)?" Participants had the possibility to list up to 30 groups for each question, although a minimum of three answers was requested. Twenty-three groups were listed by 20% or more of the respondents: rich people (74%), Blacks/African-Americans (68%), poor people (62%), Whites (56%), Asians (53%), elderly people (53%), Hispanics/Latinos (53%), Muslims (50%), teenagers (47%), women (44%), liberals/democrats (41%), men (41%), Christians (38%), blue-collar workers (35%), Catholics (35%), Jews (35%), conservatives/republicans (32%), gays (29%), atheists/agnostics (26%), children (24%), white-collar workers (24%), young people (24%), and middle-class people (21%).

Participant and Design

Seventy-three US adults (M = 35.24 years, 47% female), recruited through M-Turk, completed our survey in exchange for a small monetary compensation. Participants rated one of two lists of 11 or 12 groups. The lists of groups appeared in reverse order for half of the participants. Participants were randomly assigned to one of the four versions created by crossing the list with the counterbalanced order.

Procedure

The first screen introduced the study as a survey on social groups in American society today. Participants learned that their participation was voluntary and anonymous. Age and gender were recorded; participants under 18 years old were screened out. On the next several pages, participants saw one social group per page and rated the way most Americans view that group on twelve 7-point scales (Table A1). As noted, the groups rated were the 23 selected in the pretest but assigning 11 or 12 for each half of the sample, which helped prevent fatigue. As in the SD research (Osgood, 1962, 1964; Osgood et al., 1957), we used bipolar items. Ratings were made on scales ranging from 1 to 7. Two items each measured competence, warmth, and evaluation. In order to be able to select the best potency and activity items from the data, we included three *a priori* items for each dimension (Table A1). These items were selected both because they were recurring items in SD studies (Osgood, 1962, 1964; Osgood et al., 1957, 1975), and they were applicable to social targets. The 12 items appeared in a random fixed order. On the last page, participants were thanked and given the code that allowed them to claim their monetary compensation.

Results

Results were averaged across all the participants for each list. So, our analyses use a 23 (groups) by 12 (items) matrix, with *n* = 32 to 41 per cell. We created separate warmth, competence, evaluation, potency, and activity scores each by averaging the ratings on the two or three items of each dimension. Cronbach alpha scores showed that the competence (α > .98), warmth (α > .96), evaluation (α > .97), and activity (α > .83) scales all were highly

reliable measures. Because the reliability of the potency scales was somewhat low ($\alpha > .61$), we decided to drop "obvious- subtle" from the potency scores to achieve a more reliable two- item measure ($\alpha > .74$).[1]

As expected, there was a positive correlation between warmth and evaluation and between competence and evaluation. We also found the predicted positive correlation between competence and potency and a marginally significant negative correlation between warmth and potency. In the exploratory analyses, there were no significant correlations between activity and any of the other four dimensions (Table 1).

We then tested our hypotheses about the way one set of dimensions predicts the dimensions from the other set. We ran three separate regressions with each of the SD dimensions as dependent variable (separately) and the two SCM dimensions as predictors. For the prediction of evaluation, the over- all model was significant ($R^2 = .79$, $F(2,20) = 38.48$, $p < .001$). As expected, evaluation was positively predicted by competence ($b = 0.40$, $t(20) = 3.89$, $p < .001$) and warmth ($b = 0.76$, $t(20) = 7.41$, $p < .001$). For the prediction of potency, the over- all model was significant ($R^2 = .43$, $F(2,20) = 7.68$, $p < .005$). Potency was positively predicted by competence ($b = 0.54$, $t(20) = 3.20$, $p < .005$) and negatively predicted by warmth ($b = -0.44$, $t(20) = -2.60$, $p < .05$). However, for the prediction of activity, the overall model was not significant ($R^2 = .04$, $F(2,20) = 0.42$, ns).

In the complementary analyses, we ran two separate regressions with each of the SCM dimensions as dependent variable (separately) and the three SD dimensions as predictors. For the prediction of competence, the overall model was significant ($R^2 = .65$, $F(3,19) = 11.79$, $p < .001$). Competence was positively predicted by evaluation ($b = 0.50$, $t(19) = 3.66$, $p < .002$) and by potency ($b = 0.69$, $t(19) = 4.67$, $p < .001$); activity was a negative predictor ($b = -0.42$, $t(19) = -2.84$, $p < .01$). For the prediction of warmth, the overall model was significant ($R^2 = .82$, $F(3,19) = 29.89$, $p < .001$). Warmth was positively predicted by evaluation ($b = 0.79$, $t(19) = 8.18$, $p < .001$) and negatively by potency ($b = -0.45$, $t(19) = -4.32$, $p < .001$); activity was a positive predictor ($b = 0.30$, $t(19) = 2.87$, $p < .01$).

Discussion

These results strongly support our hypotheses about the way the SCM dimensions would relate to the SD dimensions. The correlation matrix shows that the SCM dimensions of warmth and competence are orthogonal to one another and so are the three dimensions of the SD. As for the relations between the dimensions of the two models, the results support our hypothesis that the four dimensions of competence, warmth, evaluation, and potency are systematically related to one another with the SD dimensions cutting diagonally across the SCM's two-dimensional space. Evaluation is indeed positively correlated to both warmth and competence, and potency is positively correlated with competence and marginally negatively correlated with warmth. Activity is not significantly correlated with any of the

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[1]Semantic differential research usually uses principal component analysis or factor analysis to select the items pertaining to each dimension. However, because of the present ratio between number of targets and number of descriptors such an analysis would prove to be most unstable in the present context. Besides, we have strong theoretical reasons for computing these five scores. Furthermore, our theoretical prediction was that the five theoretical dimensions would end up in a two dimensional space with maybe a third dimension for activity, making principal component analysis or factor analysis inappropriate as a data reduction tool.

other four dimensions, thus proving to be orthogonal not only to evaluation and potency but also to the two SCM dimensions.

The linear regressions show that it is indeed possible to infer the perception of the social groups on one set of dimensions from their perception on the other set. Using the two SCM dimensions to predict each of the SD dimensions, we showed that both SCM dimensions positively predict evaluation. Both SCM dimensions also predict potency, but competence is a positive predictor and warmth a negative predictor. In other words and as expected, evaluation is positively related to both SCM dimensions, whereas potency is positively related to competence and negatively to warmth. Further, showing that activity is orthogonal to the other SD dimensions, activity was not predicted by either of the two SCM dimensions. Our results showed that it is also possible to make the reverse exercise and predict how social groups would be perceived on the SCM dimensions if one knows how they are perceived on the SD dimensions. This second set of linear regression also supports our hypotheses concerning the relations among evaluation, potency, warmth, and competence.

Concerning the activity dimension, a closer look at the results reveals that the group with the lowest activity score (elderly) and the three groups with the highest activity scores (young people, teenagers, and children) all are age-based social groups. Age-based groups, a category that is not central in most studies of social perception, are thus responsible for much of the variance on the activity dimension. This importance of the age-based groups for the activity dimension leads us to think that the activity items picked up on more physical features of the groups' stereotypes and not on the stereotypes of personality that interest us.

The correlation matrix and the regression coefficients seem to show that evaluation is more closely related to warmth than to competence, whereas potency is closer to competence than to negative warmth. This tendency was already apparent when we compared the two figures presented by Rosenberg et al. (1968) (Figure 1). Concerning the closeness of warmth and evaluation, we interpret it as being a consequence of the higher importance of the warmth dimension when judging outsiders. Abele and Wojciszke (2007) have shown that social perceivers pay more attention to warmth when judging others, whereas they pay more attention to competence when judging themselves. In the present study, the majority of groups rated were outgroups. We believe that this explains why warmth exerted a bigger impact on the evaluation of these groups. However, competence is a significant predictor of evaluation over and above warmth, and warmth is a significant negative predictor of potency over and above competence. So, whereas evaluation and potency may not be perfect diagonals of the SCM, these results, nevertheless, show that evaluation does run from the low-competence, low-warmth quadrant up to the high- competence, high-warmth quadrant, and potency does run from the low-competence, high-warmth quadrant to the high-competence, low-warmth quadrant.

STUDY 2

Study 1 provided encouraging support for our hypotheses about the way the SCM dimensions relate to the SD dimensions of evaluation and potency. But all these results were based on correlational data. Our aim in Study 2 is to test our hypotheses using an

experimental design. To do so, we will use a procedure inspired by Caprariello, Cuddy, and Fiske (2009). But instead of the social structure dimensions, we will systematically manipulate warmth and competence between participants and measure the effect of that manipulation on the inferred SD dimensions. Our hypotheses are that a competent group will be perceived as higher in evaluation and in potency than an incompetent group and that a warm group will be perceived as higher in evaluation but also as lower in potency than a cold group. As in Study 1, we do not have a specific hypothesis about the activity dimension.

Participants and Design

One hundred and thirteen US adults (M= 36.43 years, 72% female), recruited through M-Turk, completed our survey in exchange for a small monetary compensation. Participants read about a new social group described in terms of warmth (warm versus cold) and competence (competent versus incompetent). The order of the dimensions (warmth, then competence versus competence, then warmth) was counterbalanced across participants. Participants were randomly assigned to one of the eight versions created by crossing the two dimensions with the counterbalanced order.

Procedure

On the first screen, the study was introduced as a survey on social groups in American society today. Participants were informed that their participation was voluntary and anonymous. Age and gender were recorded; participants under 18 years old were screened out. On the second page, participants read that "*Due to political and economic circumstances, demographers predict waves of immigration in the next few years from an ethnic group outside our border called the Wallonians. In their home country, members of this group are typically perceived as … and …. They are also described as … and … .*" The competence traits were (in)competent and (in)capable. The warmth traits were warm (cold) and (un)friendly. On the third page, participants were asked to guess, on the basis of the description they had read, how the Wallonians were going to be perceived when they arrive in the USA. Participants rated evaluation (good–bad and positive–negative), potency (strong–weak and sturdy–fragile), and activity items (active–passive and energetic–unenergetic), using 7-point bipolar scales. Those six rating scales appeared in a random fixed order. On the fourth page were two manipulation checks. Participants had to recognize the name of the group they had just rated (from among Ackmians, Krakozhians, Wallonians, Arlandis, or Orinthians). The names were presented in a random order. Then, participants had to choose how the group was described, from among four descriptions that corresponded to the four experimental conditions. The descriptions were in the order that fit the counterbalancing factor, and they appeared in a random order. On the last page, participants were thanked for their participation and given the code that allowed them to claim their monetary compensation.

Results

Ten participants were removed from the analysis for failing to answer correctly the manipulation check questions. From the remaining 103 participants, we computed

evaluation ($\alpha > .87$), potency ($\alpha > .86$), and activity ($\alpha > .84$) scores by averaging the ratings on the two items of each scale. Those scores were analyzed by means of a 2 (competence: incompetent versus competent) by 2 (warmth: cold versus warm) analysis of variance (ANOVA) with both factors varying between participants. For the evaluation score, both competence ($F(1,99) = 39.80$, $p < .001$, $\eta^2 = 0.29$) and warmth ($F(1,99) = 35.43$, $p < .001$, $\eta^2 = 0.26$) had a main effect; there was no interaction ($p > .6$, *ns*). Competent groups ($M = 3.87$) received higher evaluation ratings than incompetent ones ($M = 2.67$), and warm groups ($M = 3.88$) received higher evaluation ratings than cold ones ($M = 2.74$) (Table 2). For the potency score, both competence ($F(1,99) = 119.39$, $p < .001$, $\eta^2 = 0.55$) and warmth ($F(1,99) = 5.17$, $p < .03$, $\eta^2 = 0.05$) had a main effect; there was no interaction ($p > .09$, *ns*). Competent groups ($M = 5.02$) were more potent than incompetent ones (M = 2.90), and cold groups (M = 4.29) were more potent than warm ones (M = 3.77) (Table 2). Finally, for the activity score, competence had a main effect ($F(1,99) = 110.69$, $p < .001$, $\eta^2 = 0.53$), but there was no main effect of warmth and no interaction (both $p > .7$, *ns*). Competent groups ($M = 4.73$) were more active than incompetent ones ($M = 2.57$) (Table 2).

Discussion

These results support our hypotheses. As predicted, groups high in competence are perceived as higher in evaluation and in potency than groups low in competence, and warm groups are perceived as higher in evaluation and as somewhat lower in potency than cold groups. As for the activity dimension, results are impacted by the competence manipulation but not by the warmth manipulation. As in Study 1, the effect size indexes show that the competence dimension seems to be closer to (have a greater impact on) potency than the warmth dimension does. Nevertheless, cold groups tend to be perceived as more potent than warm groups. We note that the competence and the warmth manipulation have similar effects sizes on perceived evaluation.

STUDY 3

As we stated in the discussion of Study 1, we do not believe that there is a causal link between the two sets of dimensions. Therefore, to complete the picture, we ran Study 3 that manipulated the evaluation and potency of a hypothetical group and measured inferences of warmth and competence. We decided to leave the activity dimension out of our design because we wanted to focus on the four dimensions hypothesized to function in the same two-dimensional space.

Participants, Design, and Procedure

Ninety-six US adults (*M*= 36.78 years, 58% female) completed our online survey in exchange for a small monetary compensation. The design and procedure were the same as in Study 2, except that the manipulated factors were evaluation and potency. The evaluation description read, "*…they are typically perceived in a positive (negative) way.*" And the potency traits were strong (weak) and sturdy (fragile).

Results

Six participants were omitted for failing to answer correctly the manipulation check questions. From the 90 remaining participants, we computed competence ($\alpha > .84$) and warmth ($\alpha > .75$) scores by averaging the ratings on the two items of each scale. Those scores were analyzed by means of a 2 (evaluation: negative versus positive) by 2 (potency: impotent versus potent) ANOVA with both factors varying between participants.

For the competence score, both evaluation ($F(1,86) = 13.05$, $p < .001$, $\eta^2 = 0.13$) and potency ($F(1,86) = 26.80$, $p < .001$, $\eta^2 = 0.24$) had a main effect; there was no interaction ($p > .4$, ns). Positive groups ($M = 4.05$) are rated as more competent than negative ones ($M = 3.15$). Potent groups ($M = 4.19$) get higher competence ratings than impotent ones ($M = 2.88$) (Table 3). For the warmth score, both evaluation ($F(1,86) = 43.24$, $p < .001$, $\eta^2 = 0.34$) and potency ($F(1,86) = 6.58$, $p < .02$, $\eta^2 = 0.07$) had a main effect; there was no interaction ($p > .8$, ns). Positive groups ($M = 4.71$) are warmer than negative ones ($M = 3.24$). Impotent groups ($M = 4.26$) are warmer than potent ones ($M = 3.63$) (Table 3).

Discussion

Complementing Study 2's findings, the results lend further experimental support to our hypotheses. A group high in evaluation is considered more competent and warmer than a group low in evaluation. A potent group is considered more competent and colder than a group low in potency. As in Studies 1 and 2, effects sizes show that warmth seems to be more closely related to evaluation than to negative potency, and competence seems to be more closely related to potency than to evaluation. But we note that all four expected main effects are significant.

GENERAL DISCUSSION

The aforementioned research efforts lead us to draw three conclusions. First, our results show that the SCM does not merely reinvent the SD. Second, beyond showing that the two models are not redundant, we also showed that the two models are systematically related. Taken together, these three studies offer a comprehensive message of how the two models can be integrated. Third, this integration is more nuanced than we had hypothesized, as across the three studies, differences in effects size indicate that evaluation is somewhat more related to warmth than to competence and that potency is substantially more related to competence than to negative warmth. So, whereas the first two SD dimensions do run across the SCM in the predicted fashion, they do not correspond precisely to the diagonals of the SCM quadrants.

In the succeeding text, we review a number of ways in which adding the SD dimensions to the SCM can lead to further theoretical developments. We will not do the reverse exercise of interpreting the SD literature with SCM dimension. As a matter of fact, because of the authors' theoretical background, a number of methodological choices were made in the designs of all three studies that systematically leaned toward the methods used in SCM research. First of all, we used only social targets, whereas the SD was developed for any kind of attitude object. Second, we selected a couple of items to measure each dimension,

whereas Osgood usually used a large number of items and then inferred the dimensions through factor analyses. Third, for our items of Study 1, we used the SCM formulation of asking how society perceives the different groups. These different SCM-leaning methodological choices mean that these studies should be regarded as investigating how the SD dimensions can enrich the interpretation of the SCM but not necessarily the other way around. We will not be able to make an exhaustive review of the research that can be reinterpreted in such a way. But some examples will show how using evaluation and potency provides new insight into three important results, namely the emotions of the SCM, the compensation effect, and the negativity effect on warmth, together with the positivity effect on competence.

Each of four SCM emotions is evoked by a combination of warmth and competence (the emotion predictions follow from assimilative and contrastive, upward and downward social comparison; for the derivation, see Cuddy et al., 2007). The SCM has identified admiration as the emotion felt toward groups perceived as high in both competence and warmth. Contempt is felt toward groups low in both competence and warmth. Pity is felt toward groups high in warmth and low in competence. Finally, envy is felt toward groups perceived as high in competence and low in warmth (Caprariello et al., 2009; Cuddy et al., 2007; Fiske et al., 2002, 2007; Harris & Fiske, 2006). Statistically, the SCM emotion predictions from the two traits to specific emotions appear as a deviant-cell analysis (1:3) in a 1×4 ANOVA. With the SD dimensions, we can propose simpler predictions whereby high evaluation elicits admiration, low evaluation elicits contempt, high potency elicits envy, and low potency elicits pity. Beyond stereotype content, the dimensions of the SD can thus be placed at the emotional level of the SCM.

Research on the compensation effect (Judd et al., 2005; Kervyn, Yzerbyt, & Judd, 2010, 2011; Yzerbyt, Kervyn, & Judd, 2008; Yzerbyt et al., 2005) has shown that when two groups are in a comparison context, there is a negative relationship between the two dimensions. Judd et al. (2005) presented two hypothetical groups, one competent, the other incompetent, and both ambiguous on warmth. Participants' impressions showed a compensation effect on warmth, such that the competent group was perceived as colder than the incompetent group. This compensation effect was also observed on competence when warmth was manipulated. Compensation thus represents a bias toward the mixed-stereotype quadrant of the SCM in impression formation, and it occurs only for the two fundamental dimensions of social perception of warmth and competence, not with just any pair of dimensions (Yzerbyt et al., 2008). The compensation effect could thus be reinterpreted by saying that social perceivers will tend to separate groups in a comparison context on the dimension of potency (see also Kervyn, Judd, & Yzerbyt, 2009). Along a similar line, our understanding of how evaluation relates to warmth and competence also allows us to understand the negative correlation between warmth and competence in ratings of personality traits that Suitner and Maass (2008) observed when they looked at the relation between warmth and competence, statistically controlling for evaluation. Given our present results, we interpret this result because after controlling for evaluation, potency, which is the orthogonal dimension, becomes the dimension differentiating between the traits, and we have shown that potency represents a mix of positive competence and negative warmth.

Finally, these results illuminate the negativity effect on warmth and the positivity effect on competence. For the warmth dimension, social perceivers consider that negative information is more diagnostic than positive information (a mean behavior can come only from a cold person, whereas a nice behavior could come from either a warm or a cold person; even cold people are nice sometimes, but warm people are never mean). In contrast, for the competence dimension, it is positive information that is considered to be more diagnostic (a brilliant insight can come only from a competent, never an incompetent person, but dumb behavior can come from either; even a genius does dumb things sometimes) (Skowronski & Carlston, 1987, 1989). The current results allow us to propose one simple interpretation for both the negativity effect and the positivity effect. Rather than using warmth and competence, using the SD dimensions, we can summarize both effects by saying that information pointing to high potency (high competence and low warmth) is always considered as more diagnostic.

To sum up, this integration of the SD, the most successful classic model of attitude dimensions, with the more recent SCM provides a new way to look at the relevant literature. It also has a heuristic value for the other research that uses warmth and competence as the two fundamental dimensions of social perception. We hope that taking this look in the rearview mirror is a good way to trigger novel ideas about how to move forward.

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APPENDIX A

TABLE A1

PERSONALITY TRAITS USED IN STUDY 1

Stereotype content dimensions	
Warmth	**Competence**
Warm–cold	Competent–incompetent
Friendly–unfriendly	Capable–incapable

Semantic differential dimensions		
Evaluation	Potency	Activity
Good–bad	Strong–weak	Restless–calm
Positive–negative	Forceful–gentle	Loud–quiet
	(Obvious–subtle)	Active–inactive

The item between parentheses was not included in the potency score in order to get a more reliable score.
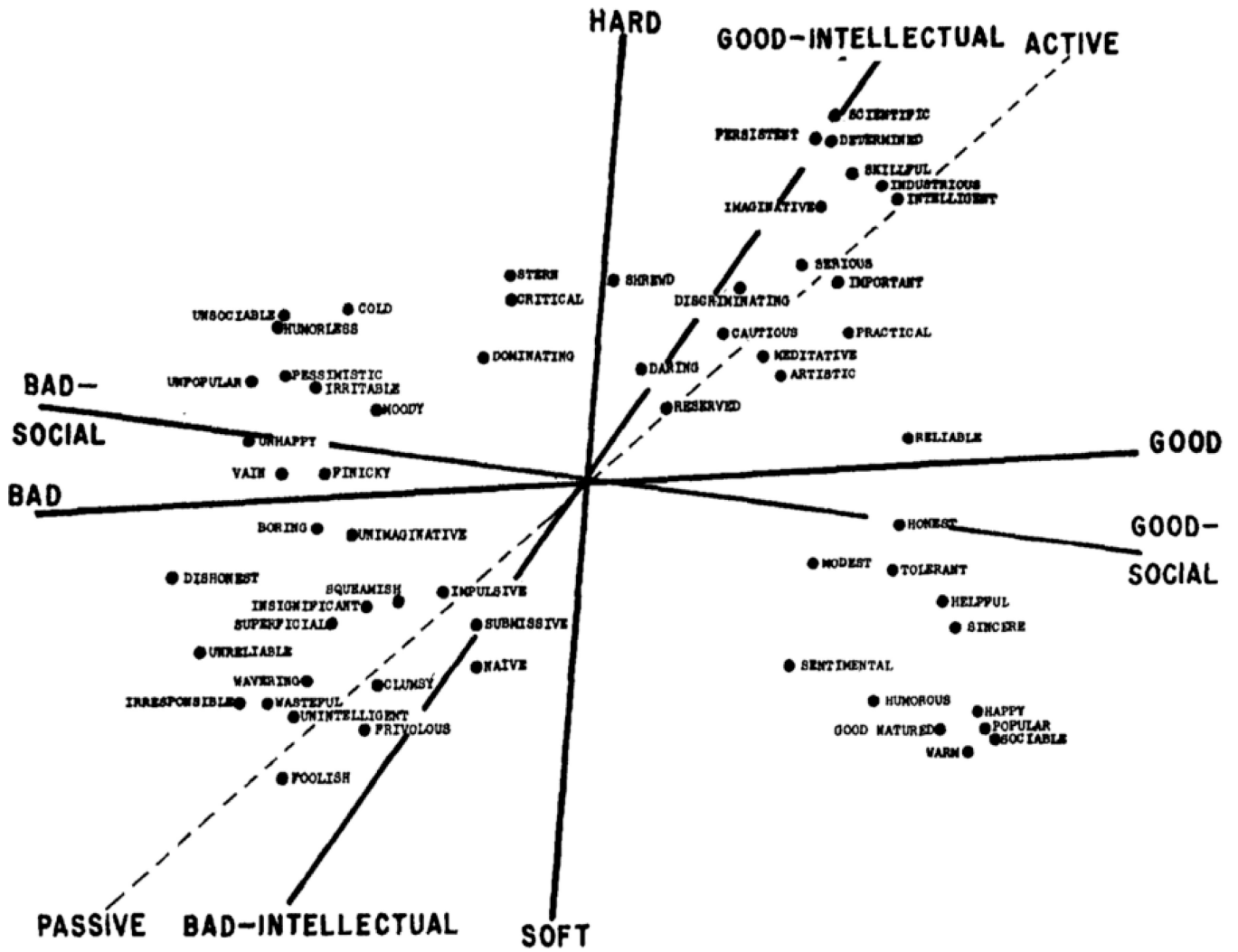
Figure 1.
Superimposition of the two figures from Rosenberg et al. (1968, pp. 289–290) showing the
relation between the dimensions of evaluation (good–bad), potency (hard–soft), intellectual
good–bad, and social good–bad. Active–passive appears on a third dimension, orthogonal to
the two-dimensional space

Table 1

Correlations between competence, warmth, evaluation, potency, and activity in Study 1

	Competence	Warmth	Evaluation	Potency	Activity
Competence	1.0				
Warmth	.106	1.0			
Evaluation	.477[*]	.799[**]	1.0		
Potency	.494[*]	−.382[†]	−.061	1.0	
Activity	−.174	.082	−.050	.393[†]	1.0

[**] p < .01.

[*] p < .05.

[†] p < .1

Table 2

Mean group ratings (and semantic differential) on inferred dimensions for the four experimental conditions of Study 2

Condition	Inferred dimension		
	Evaluation	**Potency**	**Activity**
High competence high warmth	4.52 (1.15)	4.63 (1.01)	4.67 (1.01)
High competence low warmth	3.25 (0.87)	5.39 (0.91)	4.79 (0.98)
Low competence high warmth	3.18 (1.16))	2.84 (0.84)	2.58 (0.93)
Low competence low warmth	2.11 (0.71)	2.96 (1.16)	2.57 (1.23)

Table 3

Mean group ratings (and semantic differential) on inferred dimensions for the four experimental conditions of Study 3

Condition	Inferred dimension	
	Warmth	**Competence**
High evaluation high potency	4.45 (1.29)	4.83 (1.81)
High evaluation low potency	4.98 (0.95)	3.26 (1.07)
Low evaluation high potency	2.96 (1.00)	3.67 (0.98)
Low evaluation low potency	3.57 (0.89)	2.52 (0.99)