Article

What Do You Mean by "European"? Evidence of Spontaneous Ingroup Projection

Personality and Social Psychology Bulletin
36(7) 960–974

DOI: 10.1177/0146167210367488
http://pspb.sagepub.com
SAGE

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Abstract

The ingroup projection model posits that group members project ingroup features onto a superordinate category. The present research aimed at isolating the cognitive underpinnings of this process. If ingroup projection is a spontaneous cognitive process, a superordinate category prime should facilitate the processing of the ingroup prototype rather than the outgroup prototype. Three studies support this hypothesis by comparing subliminal semantic priming in two different populations, an intra- versus intergroup situation, and with an ingroup prototype manipulated by changing the intergroup context. Results indicated that the superordinate category prime facilitated the processing of ingroup rather than outgroup traits (Experiment 1) and that these traits depended on the particular content of the ingroup prototype made salient by different contexts (Experiments 2 and 3). The findings indicate that the cognitive representation of the superordinate category is based on ingroup traits and that this representation is context dependent.

Keywords

ingroup projection, stereotyping, implicit measures, semantic priming, ingroup bias

Received May 7, 2009; revision accepted December 28, 2009

Over the past few years, Europeans have been debating a European Union (EU) constitution. When it comes to the definition of "being European," there is a clash between secular and Christian perspectives. Supporters of these two views have each attempted to explain how and why their *own* definition of European is the right one and to show the limitations of the *other* definition. They have tried to describe why their characterization of "being European" had to be included in the *constitutional* charter. Further problems emerged after the EU Commission decided to use "only" three languages (English, French, and German) in its press conferences (February 15, 2005). Spain, Portugal, and Italy officially opposed this choice and claimed their centrality to the EU. Such events illustrate a particularly interesting intergroup situation, where several groups struggle to impose their viewpoint regarding the definition of the superordinate category.

Social psychologists have long studied intergroup relations (Tajfel & Turner, 1979; for a recent review, see Yzerbyt & Demoulin, in press) and tried to find solutions to the conflicts and hostility associated with them (Brown & Hewstone, 2005). Some models stress how a common identity can improve the relationship between members of different groups (Dovidio, Gaertner, & Saguy, 2007; Gonzalez & Brown, 2003). The encouraging results of this line of research notwithstanding, Mummendey and Wenzel (1999) highlight the potential perils of being in the same superordinate category in their ingroup projection model (IPM). Rooted in self-categorization theory (SCT; Turner, 1987), the IPM proposes that ingroup members project ingroup features onto the superordinate category. The more ingroup members consider their own group as relatively prototypical of the superordinate category, the less positively they evaluate the outgroup. Although substantial evidence in favor of the IPM has accumulated, little is known about the underlying processes. The ambition of the present article is to investigate the association between the superordinate category and the ingroup or

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outgroup prototype, thus isolating the cognitive underpinnings of ingroup projection.

Ingroup Projection: A Spontaneous Cognitive Process?

Based on SCT (Turner, 1987), the IPM (Mummendey & Wenzel, 1999) posits that group members tend to see their own group as more prototypical of the superordinate category than the outgroup if both the ingroup and the superordinate category are psychologically relevant for the self (i.e., high identification) and positively evaluated. Hence, people who belong to a group should generalize (*project*) typical ingroup characteristics (the *prototype*) to the superordinate category (Wenzel, Mummendey, Weber & Waldzus, 2003). As a consequence of being relatively prototypical, the ingroup is evaluated more positively than the outgroup (Waldzus & Mummendey, 2004). A motivation for a positive social identity is, therefore, at the core of the model (Wenzel et al., 2003). Empirical evidence showed that the distance between the ratings of the superordinate category and the ingroup is smaller than the distance between the ratings of the superordinate category and the outgroup (i.e., relative ingroup prototypicality), and this was related to attitudes toward the subgroups (for a review, see Wenzel, Mummendey, & Waldzus, 2007). However, only explicit measures have been used, comprising scales on which participants indicated for the ingroup, the outgroup, and the superordinate category how characteristic of the group a series of attributes were. Based on these typicality ratings, the relative distance between the superordinate category and the ingroup versus the outgroup was calculated as an index of relative prototypicality. Often the attributes used were features previously generated by the participants themselves (in 9 of the 13 studies reported by Wenzel et al., 2007). Not only may this procedure suffer from a potential confound between typicality and valence, but the order of presentation of the typicality scales also influenced findings. Moreover, although the attributes of the groups under study were selected on the basis of their typicality and valence, these factors were not taken into account in the reported analyses, leaving unanswered the question of the representation of the superordinate category in terms of the ingroup prototype. Also, previous findings on ingroup projection could not exclude the possibility that members of different subgroups are simply motivated to impose their views of the superordinate group on others and therefore deliberately present the superordinate group as similar to their subgroup. For instance, Germans might stress their large population to defend their centrality in the EU, whereas Belgians instead stress their situation at the heart of Europe. Showing a relative distance between a subgroup and a superordinate category does not equate to showing that the superordinate category is represented as one of the subgroup prototypes. A motivation to enhance the ingroup image via an association with a positive superordinate category does not necessarily imply that the ingroup prototype is used to characterize the superordinate category itself as claimed by the model.

Machunsky and Meiser (2009) recently proposed a mere cognitive explanation of the IPM. This approach is based on two assumptions. First, generally superordinate categories are weakly defined (Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976); therefore, a mental representation of the superordinate category has to first be created. Second, positive ingroup information (and negative outgroup information) is encoded more abstractly than negative ingroup information (and positive outgroup information; Maass, Salvi, Arcuri, & Semin, 1989). Assuming that abstract positive ingroup information is more readily available, the authors suggest that the mental representation of a weakly defined superordinate category relies on the ingroup mental representation. Therefore, ingroup projection is explained as a heuristic process akin to social projection (Krueger, Acevedo, & Robbins, 2006): People heuristically infer characteristics from the next lower order entity (e.g., positive ingroup attributes) to characterize the superordinate category. Indeed, Machunsky and Meiser found a speed advantage in deciding whether or not an attribute describes a superordinate category when participants previously performed a similar task with the ingroup rather than the outgroup as target, suggesting that ingroup projection can be viewed as a heuristic process. However, the authors used only positive traits, precluding a full test of their cognitive model. In addition, relations between facilitation indices and attitudes were not reported, precluding an examination of the possible impact of ingroup projection as a heuristic process for intergroup relations.

In sum, no research to date has directly tested the cognitive association between the superordinate category and the ingroup or outgroup prototype. Moreover, ingroup projection has been seen either as a primarily motivational mechanism to support the value of the ingroup or as a cognitive heuristic used to characterize a superordinate category. Finally, previous research has not recognized the role of valence and/or typicality of the characteristics of the subgroups involved, thus leaving open the question about the cognitive underpinnings of the model. This is what we undertake in the present series of experiments.

To isolate the cognitive processes underlying ingroup projection, we draw on the frequent distinction between a fast, heuristic, associative system and a slow, systematic, rule-based reasoning system (e.g., Strack & Deutsch, 2004), the former being tapped by implicit measures, the latter by responses to questionnaires. Because we sought to examine the association that participants make with a superordinate category controlling for the impact of possible motivational mechanisms enacted while completing a questionnaire, we decided to use sequential (subliminal) priming techniques that allow investigating association between concepts occurring in the absence of subjective awareness (Bargh & Chartrand, 2000).

The use of implicit measures has often been motivated by a concern for socially desirable responses on explicit measures:

People were assumed to be *unwilling* to report, for instance, their prejudice in the *presence* of prejudiced attitudes (Dovidio, Kawakami, Smoak, & Gaertner, 2009). The current use of implicit measures rests on a different rationale: People may be very much *willing* to report partisan representations of the social world even in the *absence* of actual differences in mental representations. Taking up the introductory example, stating that "Europeans are like us and not like them" may not be the reason for negative attitudes toward outgroups but rather one argument used to justify those negative attitudes. If this were the case, the pattern that supports the mechanism postulated by the IPM and that has been reported in many studies would be spurious, based on correlations rather than reflecting a causal process.

Devos and Banaji (2005) recently investigated the relationship between subgroups and a superordinate category using an implicit measure. Relying on an Implicit Association Test (IAT), Devos and Banaji found an association between the concept of American and the ethnic group of White Americans. Their studies and the present one differ on a number of important features. First, one distinctive feature of the IAT is that it forces a categorization scheme on participants and the association between concepts is measured in a relative manner. We wanted to avoid this constraint by using a semantic priming procedure. Second, it should be noted that these IAT studies rely on target groups characterized by a numerical disproportion in American society (the U.S. population is 4.3% Asian American and 74.7% White American, according to the U.S. Census Bureau, 2005 American Community Survey). Clearly, the availability heuristic (Tversky & Kahneman, 1973) suggests that it is easier to retrieve a White face than an Asian American one from memory when thinking about an American person. Also, it is worth noting that Devos and Banaji relied on pictures of members of the subordinate groups under consideration to examine the representation of the superordinate group. In contrast, we confronted participants with attributes deemed typical of the groups. In this manner, we could directly test the semantic association between the superordinate concept and a series of characteristics typical either of the ingroup or of the outgroup. Another difference between Devos and Banaji's studies and ours concerns the relative status of the groups included. Although their focus was studying the image of the inclusive category held by members of groups with different social status, showing that majority and minority members agree on the image of the encompassing category, our concern was primarily to compare groups with a comparable status (Italians vs. Germans) as a check for ingroup projection (for research on status as a reality constrain for ingroup projection, see Wenzel et al., 2007).[1]

The Present Studies

Our major aim is to investigate the cognitive association between the superordinate category and the ingroup or outgroup prototype, controlling for valence and typicality of the attributes involved and controlling for subjective awareness. In doing so, we elucidate the motivational versus cognitive foundations of the IPM. Given that group prototypes are defined as "mental representations consisting of a collection of associations between group labels (e.g., Italians) and the features that are assumed to be true of the group (e.g., "romantic"))" (Stangor & Schaller, 2000, p. 67), ingroup projection should result in marked associations between the superordinate category label and the features believed to be true of the ingroup (e.g., ingroup stereotypes). Following the arguments exposed above, three different patterns of findings are possible. One possibility would be to find a spontaneous association between the superordinate category and ingroup rather than outgroup traits, as suggested by the model. If this were the case, we would expect spontaneous ingroup projection to be related to intergroup evaluations. The second possibility would be an association between the superordinate category and ingroup positive traits (and possibly outgroup negative traits), as suggested by Machunsky and Meiser's (2009) model. Finally, we could obtain an effect of relative ingroup prototypicality on explicit ratings in the absence of an implicit association between superordinate category and ingroup traits. In this case, we could infer that these explicit ratings are a way to justify negative views of the other group instead of a definition of the superordinate category. Thus, explicit ratings and attitudes were collected in addition to the implicit measure. We tested for relationships among the implicit measure of ingroup projection, the explicit measure often used in previous research, and attitudes (Experiments 1–3).

If ingroup projection can be seen as a cognitive strategy to characterize a weakly defined superordinate category, the effect should be present also in the absence of an intergroup context. We therefore examined whether an explicit intergroup setting is a prerequisite for spontaneous ingroup projection (Experiment 2).

Finally, a stronger test for ingroup projection is to keep an ingroup constant while changing the image of the group itself and test whether this image is used to define the superordinate category. Therefore, we examined whether spontaneous ingroup projection is context dependent (Experiment 3).

Experiment 1

In Experiment 1, we relied on participants from different populations, that is, Italian versus German students, and examined the association between the superordinate category (*European*) and the ingroup (*Italy* or *Germany*, respectively) or the outgroup (*Germany* or *Italy*, respectively) prototype. Using a semantic priming paradigm (Wittenbrink, Judd, & Park, 1997), a prime was briefly presented to participants (15 ms), followed by a target stimulus requiring a lexical decision. Primes comprised two group labels (*Italian*, *German*), one superordinate category label (*European*), and a neutral prime (*XXXXXXX*). Selected on the basis of two pretests, the target

stimuli were attributes that varied in their valence and in their relevance to the groups. If a cognitive representation of the superordinate category in terms of ingroup traits existed, we would expect a stronger association between the superordinate category prime (i.e., *European*) and the stereotypical ingroup attributes (i.e., typical Italian or German traits) rather than the stereotypical outgroup attributes (i.e., typical German or Italian traits). Specifically, we predicted that, after the presentation of the prime *European*, participants would make faster lexical decisions when confronted with ingroup rather than with outgroup traits. If Machunsky and Meiser's (2009) model is correct, this effect should be limited to ingroup positive traits. Finally, if we do not find a difference between the types of traits, the representation of the superordinate category is not prominently based on ingroup features.

Method

Participants. The participants were 95 undergraduate students from either the University of Padova ($N = 52$) or Friedrich-Schiller-University Jena ($N = 43$) who participated voluntarily in exchange for money (€3-5). Six people were excluded from the analyses because they were not Italian or German.

Procedure. Upon their arrival at the laboratory, participants were told that they would take part in a study on cognitive processes comprising three experimental tasks. First, they were asked to complete two identification scales, one with Italy or Germany and the other with Europe. Participants' identification with the superordinate category and that with the ingroup were each measured by means of five items (i.e., "I identify with the Germans (Italians)," "I feel typically German (Italian)," "Sometimes I regret being German (Italian)," "I am glad to be German (Italian)," "I feel a part of the Germans (Italians)") using a scale ranging from 1 (*not at all*) to 7 (*very much*). Both scales proved reliable (αs > .80).

Next, participants completed the lexical decision task (LDT) modeled after Wittenbrink et al. (1997). They sat at a distance of 50 cm from a computer screen and were asked to judge a large number of letter sequences that would appear on the screen. They were told that they would first see a sign (+) at the center of the screen (for 1,000 ms), followed by a letter sequence (for 250 ms). Their task was to judge, as quickly and accurately as possible, whether the sequence constituted a word. Participants were then shown 96 lexical decision trials. The target stimuli of the LDT were traits that were typical of Italians (and atypical of Germans), traits that were typical of Germans (and atypical of Italians), irrelevant attributes, or nonwords. For each LDT trial, a prime referring to a social group (European, Italian, or German) or a neutral prime (XXXXXXX) appeared for 15 ms right before the string of letters. Participants' two index fingers were positioned on the two response keys (i.e., letters *S* and *L* on a QWERTY keyboard). Once participants had responded by pressing one of the two keys, corresponding to a word or nonword decision, the fixation point reappeared on the screen.

Finally, participants completed a questionnaire that comprised a series of typicality scales of the target groups (Italy, Germany, and Europe) with the same adjectives used in the LDT as well as attitude scales toward the target groups. For the typicality scales, participants had to indicate for the ingroup, the outgroup, and the superordinate category how characteristic a series of attributes were on a scale ranging from 1 (*not at all characteristic*) to 7 (*extremely characteristic*; for all studies, all αs > .75). Attitudes toward Germans and Italians were measured by means of five items (i.e., "I like the German (Italian) mentality," "I like Germans (Italians)," "I usually react unfriendly to the way Germans (Italians) behave," "I have a positive opinion about Germans (Italians)," "I like the way the typical German (Italian) behaves") on a scale ranging from 1 (*not at all*) to 7 (*very much*). Both attitude scales were internally consistent (all αs > .80).

Upon completion of this questionnaire, participants were asked whether they were familiar with the LDT and whether they had seen something appearing on the screen prior to the string of letters. If so, they were asked to indicate what they had seen. None of the participants were able to identify any of the primes. Participants were then fully debriefed, thanked, and dismissed.

LDT stimuli. The entire presentation of the experimental stimuli as well as the data collection were conducted by means of the SUPERLAB software package on a laptop computer with a 16-inch color monitor. All stimuli were presented using the 22-point Times font. The experiment included four subliminal prime words, each presented on one quarter of the trials, namely, *European* (*Europeo* or *Europäer*), *Italian* (*Italiano* or *Italiener*), and *German* (*Tedesco* or *Deutscher*), and the neutral prime *XXXXXXXX*. Each prime was presented on 24 different trials. The prime was followed by a word for one half of the trials and a nonword for the remaining half. Words and nonwords were paired for length.

The target words were traits typical of Italians (and atypical of Germans), traits typical of Germans (and atypical of Italians), irrelevant attributes, or nonwords. The target words were selected from two pretests (one conducted at University of Padova, $N = 14$, the other conducted at Friedrich-Schiller-University Jena, $N = 16$). Pretest participants judged how characteristic for Germans, Italians, and Europeans each of 70 adjectives were using a scale ranging from 1 (*not at all*) to 7 (*extremely*). We selected eight traits characteristic of Italians (significantly above the midpoint of the scale pertaining to Italians) and not characteristic of Germans (below the midpoint of the scale pertaining to Germans; all ps < .05), eight that were characteristic of Germans (above the midpoint of the Germans' scale) and not characteristic of Italians (below the midpoint of the Italians' scale; all ps < .05), and eight that were irrelevant (not different from the midpoint of either scale; ps > .05). Importantly, to avoid the use of preformed

stereotypes of the group of Europeans, none of the chosen traits from the pretest were judged as characteristic of Europeans (not different from the midpoint of the scale pertaining to Europeans; *p*s > .05). Half the traits in each category were judged positively on an evaluation scale ranging from –3 (*extremely negative*) to 3 (*extremely positive*), and half were judged negatively (all *p*s < .05). All stimuli are shown in the appendix.

Design. Three factors were manipulated within participants: the type of prime, with three levels (European vs. ingroup vs. outgroup), the type of trait, with two levels (typical ingroup vs. typical outgroup), and trait valence, with two levels (positive vs. negative). Although our main hypothesis concerned the prime *European*, we analyzed ingroup and outgroup primes to check for the validity of our procedure.

Results

In light of the positive skew of response latencies, we log transformed our data (Ratcliff, 1993) before conducting the analyses. For ease of understanding, we report the retransformed data. In all experiments, we followed Wittenbrink et al.'s (1997) procedure and computed a facilitation score by subtracting the response latencies in the social groups' prime condition (European, Italian, German) from those in the nonword prime condition (XXXXXXX). Larger values indicate greater response facilitation because of the specific prime. We analyzed participants' facilitation indexes by 3 (prime: European vs. ingroup vs. outgroup) × 2 (type of trait: typical ingroup vs. typical outgroup) × 2 (item valence: positive vs. negative) repeated measures ANOVA with the first factor varying between participants and the last three within participants.[2]

Italian participants. A main effect of prime, $F(2, 48) = 6.43$, $p < .01$, $\eta^2 = .12$, indicated that participants reacted faster overall when the target words followed the prime European than when they followed the ingroup or the outgroup primes. This effect was qualified by the expected interaction between prime and type of trait, $F(2, 48) = 21.08$, $p < .001$, $\eta^2 = .30$. There were no other significant effects (all *F*s < 1.1).

As shown in Figure 1, our data replicate the implicit stereotyping effect (Wittenbrink et al., 1997). Specifically, there was a reliable difference between ingroup and outgroup primes on ingroup and outgroup traits, with the facilitation score on ingroup traits being larger for the ingroup than for the outgroup prime ($M = 11.56$ and $M = –18.43$, respectively), $t(48) = 5.66$, $p < .001$, $\eta^2 = .40$, and the facilitation score on outgroup traits being larger for the outgroup than the ingroup prime ($M = 6.44$, and $M = –18.43$, respectively), $t(48) = 4.28$, $p < .001$, $\eta^2 = .28$.

For the facilitation scores for the prime European, the data showed the difference between ingroup and outgroup traits that was expected if there was spontaneous ingroup projection ($M = 18.01$ and $M = –0.43$, respectively), $t(48) = 2.17$, $p < .05$, $\eta^2 = .09$. According to the hypothesis of a cognitive representation of the superordinate category in term of ingroup features, in addition, the prime European should work like the ingroup prime and differently from the outgroup prime. Pairwise comparison showed no difference between ingroup and European prime but reliable differences between outgroup versus ingroup/European primes on the facilitation scores related to both ingroup and outgroup traits, $F(2, 47) = 27.97$, $p < .001$, $\eta^2 = .54$, and $F(2, 47) = 9.18$, $p < .001$, $\eta^2 = .28$, respectively. There was no difference between the facilitation scores related to the prime European on ingroup positive (mean facilitation = 20.33) and negative traits (mean facilitation = 15.69; $t < 1$).

German participants. Again, the expected interaction between prime and type of trait was significant, $F(2, 38) = 8.70$, $p < .01$, $\eta^2 = .19$. There were no other significant effects (all *F*s < 1.4). There was again a significant difference between ingroup and outgroup primes on ingroup and outgroup traits (see Figure 1), with the facilitation score on ingroup traits being larger for the ingroup than for the outgroup prime ($M = 4.65$ and $M = –8.00$, respectively), $t(38) = 1.83$, $p < .05$, $\eta^2 = .08$, and the facilitation score on outgroup traits being larger for the outgroup than the ingroup prime ($M = 14.38$, and $M = 1.16$, respectively), $t(38) = 1.94$, $p < .05$, $\eta^2 = .09$.

For the facilitation scores for the prime European, the data showed the expected difference between ingroup and outgroup traits ($M = 17.01$ and $M = –1.62$, respectively), $t(38) = 2.20$, $p < .05$, $\eta^2 = .11$. Moreover, the data showed no difference between ingroup and European prime but reliable differences between outgroup versus ingroup/European primes on the facilitation scores related to both ingroup and outgroup traits, $F(2, 37) = 4.30$, $p < .05$, $\eta^2 = .19$, and $F(2, 37) = 4.68$, $p < .05$, $\eta^2 = .20$, respectively. There was no difference between the facilitation scores related to the prime European on ingroup positive (mean facilitation = 15.15) and negative traits (mean facilitation = 18.86; ($t < 1$).

Explicit measure of relative ingroup prototypicality. Following previous research on ingroup projection, we computed indices of ingroup/outgroup prototypicality for the inclusive category.[3] These indices reflect how dissimilar from the inclusive category each group was considered to be. We also calculated an overall index of relative ingroup prototypicality by subtracting the index of ingroup/inclusive category dissimilarity from the outgroup/inclusive category dissimilarity index. Larger values indicate greater ingroup than outgroup prototypicality.

We analyzed relative ingroup prototypicality indices by means of a 2 (type of trait: ingroup vs. outgroup) × 2 (valence of the trait: positive vs. negative) repeated measures ANOVA with the first two factors varying within participants.

Italian participants. The ANOVA showed an interaction between type of trait and type of valence, $F(1, 49) = 23.95$, $p < .001$, $\eta^2 = .33$. For positive traits, pairwise comparisons showed that the level of relative ingroup prototypicality was

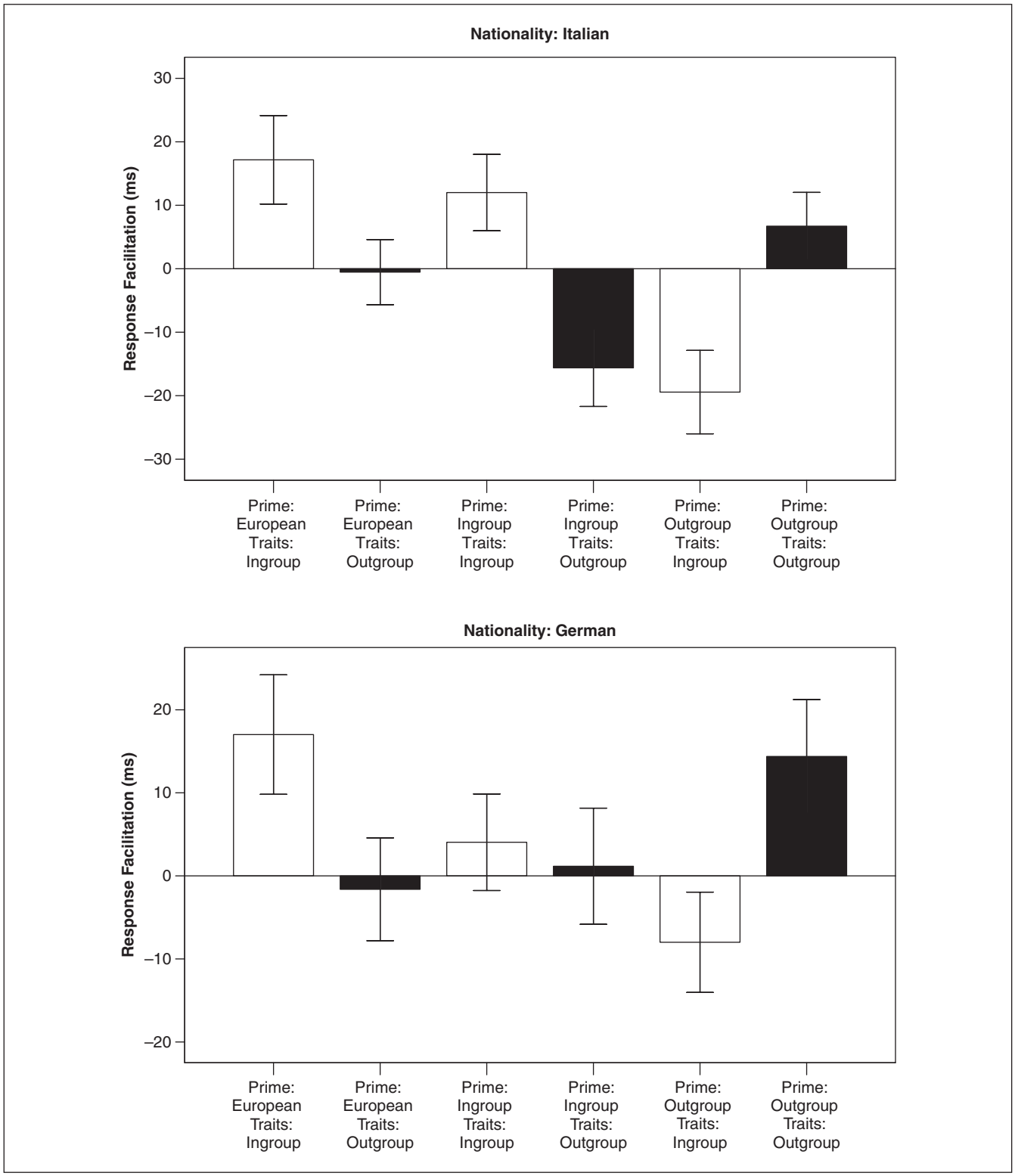

Figure 1. Participants' response facilitation (in milliseconds) as a function of type of prime and type of trait
Error bars show standard errors of means.

significantly larger on ingroup rather than on outgroup traits ($M = 0.46$ and $M = 0.03$, respectively), $F(1, 49) = 5.12$, $p < .05$, $\eta^2 = .09$. For negative traits, the level of relative ingroup prototypicality was significantly larger for outgroup rather than ingroup traits ($M = 0.43$ and $M = –0.10$, respectively), $F(1, 49) = 13.07$, $p < .01$, $\eta^2 = .21$.

Table 1. Experiments 1, 2, 3: Correlations Between Implicit and Explicit Measures

	Measure					
	RIP	IG att	OG att	IG bias	IG id	EU id
Exp. 1						
Spontaneous ingroup projection	–.01	.35*	.01	.26*	.20*	.25*
RIP		–.02	–.04	–.02	–.05	–.03
Exp. 2						
Spontaneous ingroup projection	.18	.20	.13	.30*	.21*	.18
RIP		–.19	–.10	.06	.13	–.09
Exp. 3						
Spontaneous ingroup projection	.18	.35*	.13	.19	.28*	.18
RIP		.13	–.30*	.15	.10	.17

RIP = relative ingroup prototypicality; IG att = ingroup attitude; OG att = outgroup attitude; IG id = ingroup identification; EU id = European identification. An index of ingroup bias (IG bias) was calculated by subtracting the averaged outgroup attitude items from the averaged ingroup attitude items.
*$p \leq .05$.

German participants. The ANOVA showed a main effect of valence, $F(1, 37) = 10.78$, $p < .01$, $\eta^2 = .23$. Overall, the index of relative ingroup prototypicality on positive traits ($M = 0.34$) was significantly larger than on negative traits ($M = 0.02$). The main effect was qualified by an interaction between type of trait and type of valence, $F(1, 37) = 23.22$, $p < .001$, $\eta^2 = .39$. Again, for positive traits the level of relative ingroup prototypicality was significantly larger on ingroup rather than on outgroup traits ($M = 0.66$ and $M = 0.01$, respectively), $F(1, 37) = 14.49$, $p < .01$, $\eta^2 = .28$. For negative traits, the level of relative ingroup prototypicality was significantly larger for outgroup rather than ingroup traits ($M = 0.25$ and $M = –0.20$, respectively), $F(1, 37) = 8.68$, $p < .01$, $\eta^2 = .19$.

In sum, for both Italian and German participants explicit ratings show that the distance between Europeans and the ingroup (in comparison to the outgroup) is smaller on positive ingroup and negative outgroup traits.

Relationship between LDT and explicit measures. To examine the correlation between the explicit measures and spontaneous ingroup projection, we computed an index of individual spontaneous ingroup projection, subtracting the facilitation score because of the prime European on *outgroup* traits from the facilitation score because of the prime European on *ingroup* traits. We correlated this index with the explicit measure of relative typicality as well as with the attitude and identification measures (see Table 1). We found a significant relation between spontaneous ingroup projection and ingroup, but not outgroup attitudes. Finally, in line with the IPM, we found a correlation with both identification measures. Participants who showed higher levels of identification with the ingroup or with Europeans showed a higher activation of the ingroup prototype compared to the outgroup prototype after the presentation of the prime European. The often reported correlation between the explicit measure of relative ingroup prototypicality and other measures was not found for our social groups.

Discussion

Experiment 1 aimed at testing whether a superordinate category prime would facilitate the processing of ingroup as opposed to outgroup attributes. We found strong evidence in support of this hypothesis. In contrast to the prediction derived from Machunsky and Meiser's (2009) model, we found the effect of ingroup projection to be related to both positive and negative traits. Moreover, we obtained the same pattern in two different populations. At the same time, using these two groups served as a control of the materials because typically German traits are ingroup traits for Germans but outgroup traits for Italians, and vice versa for Italian traits. This feature of our study rules out the potential confound that Europeans are generally perceived similar to one of the subgroups. These results are clearly in line with the predictions made by the IPM on the projection of the prototype of the ingroup, rather than the prototype of the outgroup, onto the superordinate category. Importantly, Experiment 1 constitutes the first test of a cognitive association between a superordinate category and the ingroup prototype using semantic priming measures. Furthermore, spontaneous ingroup projection correlated with attitude and identification measures. A different picture emerges if we take into account the results on the explicit measure. As far as relative ingroup prototypicality ratings are concerned, not only the type of trait that defines the subgroups but also the valence of the traits is important. Our findings suggest that relative ingroup prototypicality ratings are larger on ingroup positive and outgroup negative traits. As the explicit measure focuses on the distance between the ratings of the superordinate category and of the groups, it does not capture the direction of the effect. However, these results highlight the importance of valence for relative ingroup prototypicality. It seems that although at the implicit level people associate the superordinate category with both positive and negative ingroup traits, they used different kinds of traits to compare ingroup and outgroup to

the superordinate category when completing a self-report questionnaire.

We replicated the implicit stereotyping effect reported by Wittenbrink et al. (1997). Our participants were faster to react to the typical features of the ingroup and slower to react to the typical features of the outgroup when confronted with the ingroup rather than the outgroup prime. This pattern speaks to the validity of our procedure. At the same time, by including primes related to ingroup and outgroup, we may have created an intergroup context at the implicit level. That is, we may have made the images of the subgroups more clearly defined. Perhaps, in the absence of a salient intergroup context, people do not activate a clear representation of their ingroup. In contrast, if ingroup projection can be seen as a heuristic to "make sense" of a higher order category, we should find the effect even in a context where the motivation to differentiate between ingroup and outgroup is weaker.

Research rooted in SCT highlights that what is assumed of the ingroup depends on the particular frame of reference in which participants are embedded. For example, national stereotypes (e.g., Scottish as a whole) for an ingroup member perspective (e.g., a Scottish person) vary according to the "Other" (e.g., Greeks vs. English) to whom they are compared (Hopkins, Regan, & Abell, 1997). Moreover, when an intergroup context is present, the degree of ingroup–outgroup differentiation on several characteristics significantly increases and becomes meaningful in comparison to a "solo" ingroup context (Hopkins & Murdoch, 1999).

In Experiment 2, we investigated whether spontaneous ingroup projection (i.e., the definition of the superordinate category in terms of ingroup traits) occurs even in the absence of an explicit intergroup context.

Experiment 2

The aim of Experiment 2 was to compare spontaneous ingroup projection in an ingroup alone versus an intergroup context. We used the same paradigm as in Experiment 1 but included only the superordinate category prime to avoid a possible activation of an intergroup context at the implicit level. The target stimuli were the same attributes used in Experiment 1 for the German sample. Before the LDT, we manipulated the context so that half the participants were in an ingroup (German group) and half in an intergroup context (Germans vs. Italians).

We expected to replicate the results of Experiment 1 in the intergroup context condition, finding a stronger association between the superordinate category prime (i.e., *European*) and stereotypical ingroup attributes (typical German traits). An even stronger test that ingroup projection is based on a heuristic process would be to find the effect even in an ingroup alone condition.

Method

Participants. In exchange for €3 or course credit, 52 students of Friedrich-Schiller-University Jena participated in the experiment. Also, 4 people were excluded from the analysis because they were not German and 2 because they were able to report the prime afterward.

Procedure and materials. Participants were told that they would take part in a study on cognitive processes. Before participants started the LDT, they read on the screen that the study was conducted either by our research group in Jena or in collaboration with a research group from the University of Padova. The bottom of the screen showed only the German flag in the first condition and the German and the Italian ones in the other condition. These instructions facilitated the manipulation of the group context (either ingroup alone or intergroup). The procedure of LDT was identical to the one in Experiment 1. A prime was presented to participants for a short time (15 ms), followed by a target stimulus requiring a lexical decision. Primes comprised only two labels instead of the four labels used in Experiment 1, one superordinate category label (*European*) and a neutral prime (*XXXXXXX*). At the end of the LDT, participants were also asked whether they had seen something appearing on the screen prior to the string of letters in the LDT. The entire presentation was conducted by means of the DirectRT software package.

After the LDT, participants completed a questionnaire that comprised identification measures with the ingroup and the superordinate category, a series of typicality scales of the target groups (Italy, Germany, and Europe) on the same adjectives used in the LDT, and attitude scales toward the target groups. The items on the scales used in this study were identical to the ones used in Experiment 1. Participants were then fully debriefed, thanked, and dismissed.

Design. The design comprised three manipulated factors, namely, the type of context (ingroup alone or intergroup; between participants), the type of trait (ingroup vs. outgroup; within participants), and item valence (positive vs. negative; within participants.

Results

We first submitted participants' facilitation scores to a 2 (type of context) × 2 (type of trait) × 2 (item valence) mixed-model ANOVA.[4] Figure 2 shows the means and standard deviations of the full design.

The ANOVA showed a main effect of type of trait, $F(1, 44) = 3.93$, $p < .05$, $\eta^2 = .08$, indicating that participants reacted faster overall to an ingroup than to an outgroup trait. The main effect was qualified by two significant interactions, one between type of trait and type of context, $F(1, 44) = 4.97$, $p < .01$, $\eta^2 = .10$, and the other between item valence and type of context, $F(1, 44) = 5.41$, $p < .01$, $\eta^2 = .11$. To further

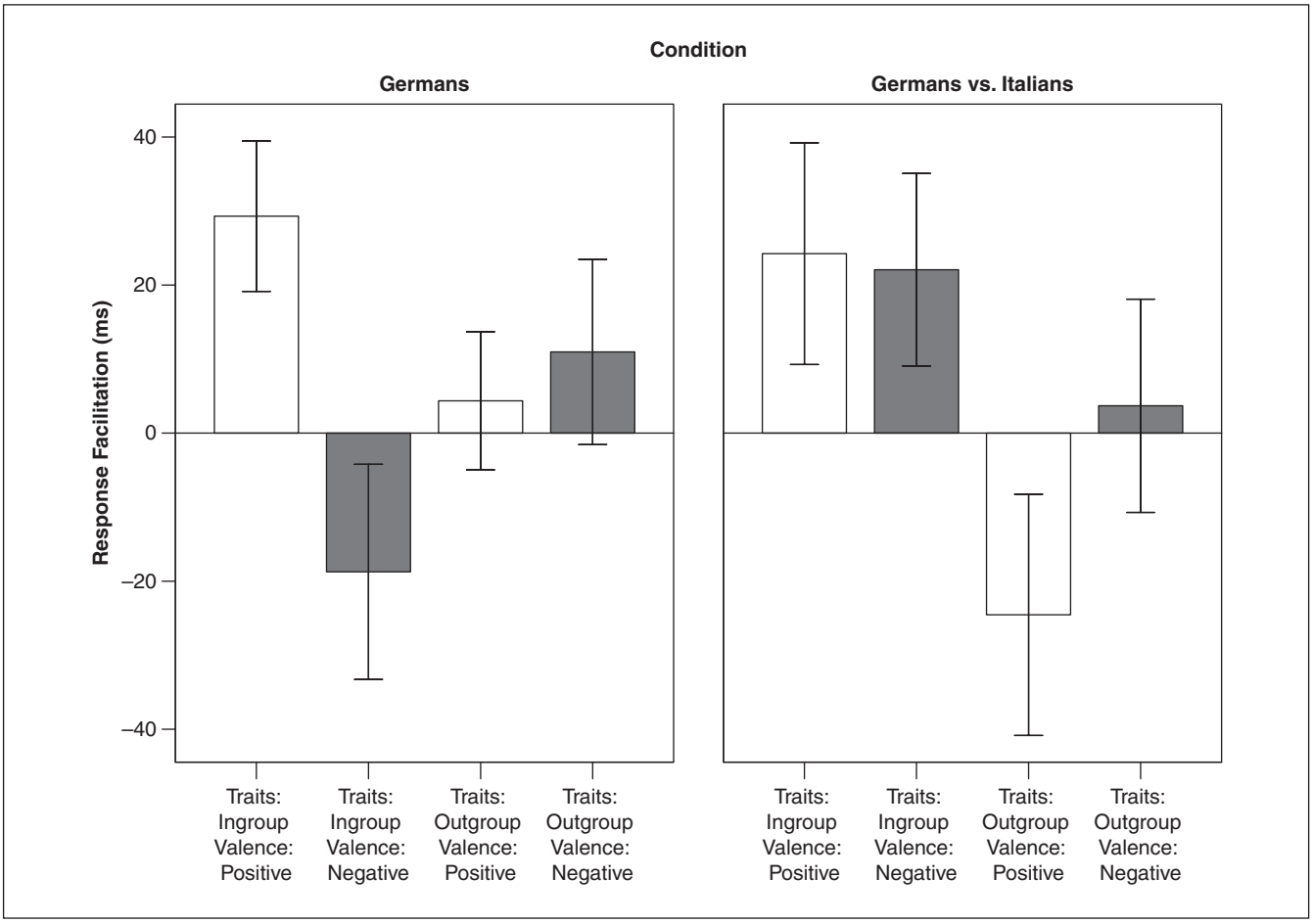

Figure 2. Experiment 2: Participants' response facilitation (in milliseconds) as a function of type of context, type of trait, and item valence
Error bars show standard errors of means.

probe the interactions, we conducted separate 2 × 2 ANOVAs for each condition.

For the intergroup condition, we found a significant main effect of type of trait, $F(1, 22) = 8.88$, $p < .01$, $\eta^2 = .29$, indicating that participants reacted faster overall to ingroup compared to outgroup traits. There were no other statistically significant main effects or interactions (all Fs ≤ 1). There was reliable facilitation in an absolute sense for both ingroup positive and ingroup negative traits, $M = 27.55$, $t(22) = 2.23$, $p < .05$, $\eta^2 = .18$, and $M = 30.17$, $t(22) = 2.22$, $p < .05$, $\eta^2 = .18$, respectively.

For the ingroup condition, we found a significant main effect of item valence, $F(1, 22) = 8.42$, $p < .01$, $\eta^2 = .28$, indicating that participants reacted faster overall when the target word was positive rather than negative. This valence effect was significantly moderated by the type of trait, $F(1, 22) = 4.62$, $p < .05$, $\eta^2 = .17$. When testing whether these average facilitation scores were different from 0, we found a reliable difference for ingroup positive traits, $M = 29.31$, $t(22) = 3.20$, $p < .05$, $\eta^2 = .32$, but no difference for the other traits ($t < 1$). We also tested for a difference between ingroup and outgroup on positive and negative traits, finding a reliable difference between ingroup positive and outgroup positive traits but not between ingroup negative and outgroup negative traits, $F(1, 22) = 4.75$, $p < .05$, $\eta^2 = .16$, and $F < 1.4$, respectively. Therefore, in the ingroup alone situation, the superordinate prime essentially activated ingroup positive traits.

Relationship Between LDT Results and Explicit Measures

As in Experiment 1, we correlated an indicator of spontaneous ingroup projection with an explicit measure of relative typicality and attitude as well as identification measures (see Table 1). Again, we found significant relations between spontaneous ingroup projection on one hand and ingroup bias and

the identification with the ingroup on the other. Again, we found no correlation between an explicit measure of relative ingroup prototypicality and any other index or measure.

Discussion

Experiment 2 tested whether spontaneous ingroup projection depends on the context. We replicated the results of Experiment 1 in an intergroup context, where participants spontaneously associated positive *and* negative ingroup traits (e.g., organized and stiff for Germans) with a superordinate category prime (e.g., European). In line with the IPM, we again found evidence of spontaneous ingroup projection and of its relation with intergroup evaluations. In contrast, when the context stressed only the ingroup, participants spontaneously associated positive but not negative ingroup traits with a superordinate category prime. Even in this condition, the overall pattern of findings does not support Machunsky and Meiser's (2009) ideas of ingroup projection as a heuristic because, again, there was no projection of negative outgroup features.

One explanation for the context dependency of the projection findings is that when the ingroup is not compared with an outgroup, the traits considered more typical (and consequently more available) are the positive ones, so projection onto a superordinate category occurs only for these traits. In a posttest to investigate this possibility, we asked 42 students of Friedrich-Schiller-University Jena to judge how characteristic for the group of Germans in general were the traits used in Experiment 2. As in Experiment 2, we manipulated the context of presentation, so that half the participants were in an ingroup alone condition (German group) and half in an intergroup condition (Germans vs. Italians). We checked which ratings on the typicality scales were significantly above the midpoint of the scale in both conditions. In the ingroup alone condition, only the mean on ingroup positive traits was larger than the scale midpoint, $M = 4.92$ (on a 1–7 scale), $t(19) = 3.93$, $p < .05$, $\eta^2 = .17$. In contrast, there was no difference from the scale midpoint for the mean on ingroup negative traits ($M = 4.11$, $t < 1$). In the intergroup condition, the ratings on both ingroup positive and ingroup negative traits were above the scale midpoint, $M = 5.59$, $t(19) = 7.92$, $p < .01$, $\eta^2 = .77$, and $M = 4.71$, $t(19) = 6.11$, $p < .01$, $\eta^2 = .54$, respectively. In other words, what was seen typical of Germans seemed to vary with the type of context: Although Germans were rated typical on the ingroup positive traits in the ingroup alone context, Germans were rated typical on both positive and negative traits in the intergroup context. Thus, our data on spontaneous ingroup projection are in line with the idea that a cognitive representation of the superordinate category is based on the available ingroup features. The data of the posttest suggest that which ingroup features are used depends on the specific comparison context. Experiment 3 was conducted to test this idea in an even more stringent way.

An important feature of group stereotypes is that they should not be seen as comprising a fixed set of attributes. Indeed, several studies reveal that what constitutes a typical feature of a group is likely to depend on the frame of reference imposed by the specific comparative context (Haslam, Turner, Oakes, McGarty, & Hayes, 1992). For example, in an intergroup comparison between Germans and Italians, Germans may have an idea about what is typically German that is different from what it would be when Germans are compared to the British (Waldzus, Mummendey, & Wenzel, 2005). In Experiment 3, we examined implicit ingroup projection while directly manipulating the comparative intergroup context.

Experiment 3

With Experiment 3, we manipulated the prototype that was made salient in a specific context for the very same group (Germans). We again predicted a spontaneous association between the superordinate category prime and the prototype of the ingroup. However, the prototype of the ingroup was expected to be the one made salient in the particular context. Specifically, we hypothesized that those traits (e.g., organized) that are deemed typical of the ingroup (e.g., Germans) in a given context (e.g., Germans vs. Italians) would be made particularly accessible by the superordinate category prime (European). In contrast, these same traits would not be as accessible in a context that renders these traits less typical for the ingroup (e.g., Germans vs. British). Henceforth, in defining the group of Germans, for the sake of clarity, we refer to "counter-Italian" traits, indicating that these traits are considered more characteristic of Germans in comparison to Italians (e.g., disciplined), and to "counter-British" traits to indicate that these traits are considered more characteristic of Germans when the British are the comparison group (e.g., easygoing).

Method

Participants. In exchange for €5 or course credit, 60 students of Friedrich-Schiller-University Jena took part in the experiment. Also, 6 people were excluded from the analysis because they were not German and 3 because they were able to report the prime.

Procedure and materials. Participants were told that they would take part in a study on cognitive processes composing two experimental tasks. Before participants started the LDT, they read on the screen that the research group in Jena was collaborating either with a research group from the University of Padova or with a research group from the University of Sussex. The bottom of the screen showed two flags, the German flag and, depending on conditions, the Italian or the British flag. These instructions facilitated the manipulation of the intergroup context (either Germans vs. Italians or Germans vs. British).

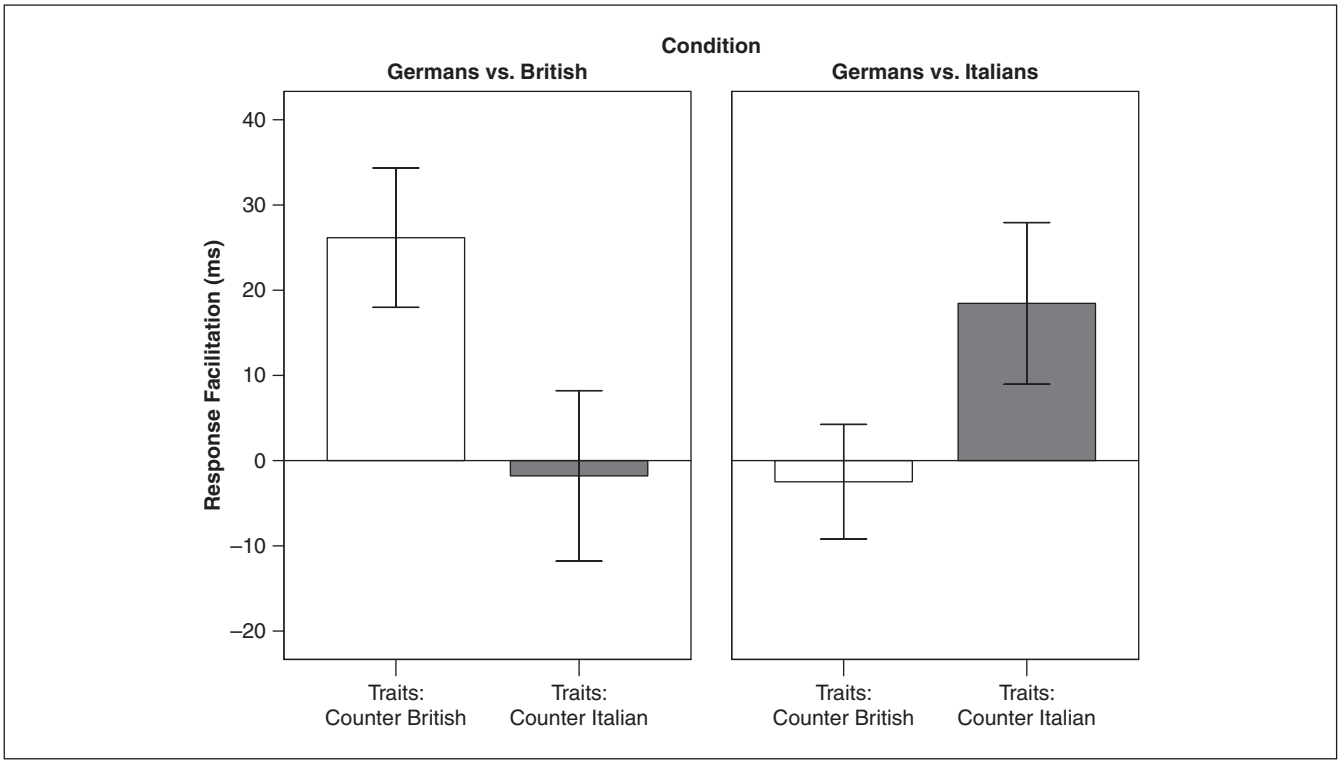

Figure 3. Participants' response facilitation (in milliseconds) as a function of type of context and type of trait
Error bars show standard errors of means.

The LDT included two subliminal prime words, *European* and *XXXXXXXX*. The target stimuli for the LDT were taken from a study by Waldzus and colleagues (2005) and comprised a series of traits that were typical of Germans when compared to Italians (counter-Italian traits: disciplined, punctual, correct, quiet, and hardworking) or typical of Germans when compared to British (counter-British: easygoing, frank, sociable, cheerful, companionable). Waldzus and colleagues selected these attributes based on a pilot study with German psychology students who rated Germans on a list attributes in comparison to Italians or the British. Germans were rated higher on all selected counter-Italian attributes and lower on all selected counter-British attributes, when they were compared with Italians than when they were compared with the British.

After the LDT, participants completed a questionnaire similar to the one used in Experiment 1 comprising identification scales (with Germany and Europe), typicality scales of the target groups (Italy/England, Germany, and Europe) on the same adjectives used in the LDT, and a series of attitude scales toward the target groups (all αs > .70). Finally, participants were fully debriefed, thanked, and dismissed.

Design. The design comprised two manipulated factors, namely, the type of context (Germans and Italians vs. Germans and British; between participants) and the type of trait (counter-Italian vs. counter-British; within participants).

Results and Discussion

We predicted that the counter-Italian German traits would be facilitated by the prime European when the intergroup context included Germans and Italians but that the counter-British German traits would be facilitated by the prime European when the intergroup context concerned Germans and British. We thus expected a two-way interaction between the type of context and the type of trait. To test this hypothesis, we submitted participants' facilitation scores to a 2 × 2 mixed-model ANOVA.[5]

The predicted interaction between type of context and type of traits was significant, $F(1, 49) = 5.16$, $p < .05$, $\eta^2 = .09$ (see Figure 3). We found a reliable facilitation score for counter-British traits (e.g., sociable; $M = 27.34$) when the intergroup context included Germans and British, $t(29) = 2.46$, $p < .05$, $\eta^2 = .17$, but no difference for counter-Italian traits (e.g., correct; $M = –1.79$). In contrast, when the intergroup context comprised Germans and Italians, the prime European facilitated decisions for counter-Italian traits, $M = 18.26$, $t(20) = 1.79$, $\eta^2 = .14$, one-tailed $p < .05$, but not for counter-British traits ($M = –2.32$).

In summary, in line with our predictions, changing the intergroup context had a strong impact on the features associated with the superordinate category. Participants in a German–Italian context showed facilitated access to counter-Italian

German traits (e.g., correct) after being exposed to a superordinate category prime. Quite a different picture emerged when participants found themselves in a German–British comparative context. These participants more easily accessed counter-British German traits (e.g., sociable) after being exposed to the superordinate category prime. The obtained pattern showed that the prime European automatically activates the prototype of the ingroup made available in the intergroup context, irrespective of the particular content of such a prototype.

Relationship Between LDT and Explicit Measures

Again, we correlated our implicit index with the explicit measures (see Table 1). Again, there was a significant relation between spontaneous ingroup projection on one hand and ingroup but not outgroup attitudes plus identification with the ingroup on the other.

General Discussion

The aim of the present research was to investigate the cognitive association between the superordinate category and the ingroup or outgroup prototype, taking into account the valence and the typicality of the subgroups' characteristics. Previous research on ingroup projection has mainly focused on discrepancy measures not disambiguating possible functions of ingroup projection in terms of relative ingroup prototypicality to serve positive ingroup distinctiveness and relative ingroup prototypicality as a manifestation of a mere cognitive representation of the superordinate category in terms of the ingroup prototype. We tested whether people use the features of the ingroup to define the superordinate category, as postulated by the IPM (Mummendey & Wenzel, 1999). Moreover, we examined whether this effect was related to intergroup evaluations.

Our results support the assumptions made by the IPM: People project the prototype of the ingroup but not the prototype of the outgroup onto the superordinate category (Experiments 1, 2, and 3). These findings show that ingroup projection is already at work at a more spontaneous, automatic level than previously demonstrated. Moreover, not only did different patterns of results emerge on implicit and explicit measures of ingroup prototypicality (Experiment 1), but we also found the effect of spontaneous ingroup projection to be context dependent (Experiments 2 and 3). For the relation between implicit and attitudes, overall, a consistent pattern emerged. More spontaneous ingroup projection corresponded to more positive ingroup attitudes, more ingroup bias, and higher identification. In Experiment 1, Italian participants were faster to associate the prime European and typical Italian rather than typical German characteristics. In contrast, for German participants we found a spontaneous association between the prime European and typical German characteristics. This experiment represents the first evidence of the existence of an association between a superordinate category and the ingroup prototype using a subliminal semantic priming paradigm. One of the aims of Experiment 1 was to disentangle possible confounds between typicality and valence. Valence had no impact on the results of our implicit measure. However, valence played an important role for explicit relative ingroup prototypicality ratings: The effect was particularly pronounced on ingroup positive and outgroup negative traits.

Previous research on the IPM did not disentangle different processes underlying ingroup projection. The present data isolated an automatic and malleable cognitive mechanism to be at work. In line with Machunsky and Meiser's (2009) idea of ingroup projection as a heuristic process, we think that ingroup projection can be seen as a cognitive process that contributes to define a weakly represented abstract superordinate category. However, their model suggests that ingroup positive traits (and possibly outgroup negative traits) are used to characterize the superordinate category. Our data indicate that positive ingroup traits are not the only ones to be generalized to the inclusive category. Our findings suggest that a cognitive representation of the superordinate category is construed in terms of the ingroup features made relevant in the comparison context. If the available ingroup features are both positive and negative, the superordinate category is seen as comprising both types of characteristics. If, however, the salient features are the positive ones, the representation of the superordinate category is mainly based on these characteristics (Experiment 2). Importantly, Experiment 3 showed that participants spontaneously associate those ingroup traits (e.g., organized for Germans) that were made relevant in the specific intergroup context (e.g., Germans vs. Italians). In contrast, the processing of these same traits was not facilitated in an intergroup context where these traits were less relevant for defining the ingroup (e.g., Germans vs. British). This pattern further corroborates the results of Experiment 2. As a set, the message emerging from Experiments 2 and 3 is entirely in line with research showing the malleability of automatic processes (see Blair, 2002).

Our data consistently showed that spontaneous ingroup projection correlated with several explicit measures. However, several previous studies found that an explicit trait rating measure of relative ingroup projection prototypicality was related to attitudes to the respective outgroup. Why did we not replicate this pattern? Two possible reasons are methodological. First, we did not ask individuals to select the traits themselves, but we chose instead the same consensual set of traits for the whole group. The particular list of traits that we selected may be less in line with individual views and therefore provide a less sensitive measure. Second, previous findings may have overestimated the relation between ingroup projection and attitudes because of the confound with valence that is inherent in the individual selection of traits. Indeed, of

the published studies on the IPM, 7 out of 15 reported a relation with attitudes, 6 did not, and 2 did not find a significant relation (Machunsky & Meiser, 2009; Wenzel et al., 2007). A third reason pertains to the social groups investigated. Possibly, we found no relations because of the low variability in attitudes between Germans and Italians; speculatively, in the presence of generally positive attitudes, implicit measures predict more ingroup love, and in the presence of rather negative attitudes, explicit measures predict more outgroup hate. This may explain why we found relations between spontaneous ingroup projection and ingroup-related, but not outgroup-related, variables. Future research should determine the boundary conditions under which explicit and implicit ingroup projection measures better predict attitudes toward ingroups and outgroups.

Although the IPM appears to imply a directional hypothesis, that is, a generalization from an exemplar or subgroup to a more inclusive group, Wenzel and colleagues (2007) recently specified that the term *ingroup projection* stands for "the perception, or claim, of the ingroup's greater prototypicality for the superordinate category" (p. 337). In other words, the main tenet of the IPM is a larger overlap between ingroup and superordinate category prototype than between outgroup and superordinate category prototype. Although our data cannot solve the problem of directionality, our findings (Experiment 2 and 3) confirm the idea that ingroup traits are projected into an inclusive category. The fact that changing the image of the ingroup via a context manipulation affected the ingroup traits associated with an inclusive category is congruent with a directionality hypothesis. We think that the best explanation for these findings is the process of projection from the ingroup onto the superordinate category as proposed by the IPM. However, this does not exclude that other processes may also be at work. For example, although a recent study has shown that ingroup projection is not merely self-projection (Bianchi, Machunsky, Steffens, & Mummendey, 2009), we can imagine that people who are highly identified with the superordinate category but not with their ingroup use superordinate features to define what their lower order ingroup is. Further research is needed to investigate the direction of inference between sub- and superordinate social categories.

One limitation of our set of experiments is the fact that only one domain was taken into account, that is, national stereotypes in relation to a supranational inclusive category. Although extremely relevant for our participants, the setting used does not permit a full generalization to other settings where different reality constraints may be at work (e.g., subgroups with a clear positive/negative stereotype). A related limitation derives from the context we chose. As a matter of fact, we always used a situation where the superordinate category was not compared with other groups (e.g., Americans). A different pattern of results is possible in a context where a contrasting group is present. For example, if Europeans are compared to Americans, perhaps both ingroup and outgroup traits will be used to define what European is. Different motives of assimilation and differentiation (Brewer, 1991) could be present, depending on the context influencing which prototype is projected onto the inclusive category. Finally, our findings nicely illustrate the existence of differences in spontaneous ingroup projection, with each group projecting their own prototype. However, in contexts defined by clear minority–majority relations, it is well possible that even minorities spontaneously associate the superordinate group with the majority (Devos & Banaji, 2005; Mummendey & Kessler, 2008). These various questions surely deserve further scrutiny.

To conclude, the present set of studies is the first to provide evidence for a spontaneous preferential association between the ingroup prototype and a superordinate category label. In a world in which experiences of migration and cultural encounters are becoming increasingly frequent, where mergers between organizations are an everyday reality, where political nations organize themselves in ever more inclusive categories (e.g., African Union), it is crucial to better understand the way people define the abstract superordinate category and the consequences this may have for their dealings with other groups in this larger category.

Appendix

Table A1. Study 1a: Target Items Used in the Reaction Time Task for Italian Participants

Typical Italian	Typical German	Irrelevant
Positive		
Elegant	Hardworking	Sincere
Warm	Efficient	Kind
Sociable	Strong	Good
Cheerful	Punctual	Trustful
Negative		
Jealous	Cold	Stingy
Lazy	Stiff	Sad
Liar	Picky	Rude
Chaotic	Hard	Violent

Table A2. Study 1b: Target Items Used in the Reaction Time Task for German Participants

Typical Italian	Typical German	Irrelevant
Positive		
Emotional	Hardworking	Inventive
Warm	Efficient	Clever
Friendly	Organized	Sporty
Hot-blooded	Clean	Companionable
Negative		
Jealous	Obedient	Weak
Noisy	Stiff	Sad
Aggressive	Pedantic	Slow
Crazy	Hard	Without style

Acknowledgments

We thank Caroline Richter for helping us in collecting data and Carola Leicht for translating the materials into German.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

Financial Disclosure/Funding

The authors received the following financial support for the research and/or authorship of this article: This research was funded by the Deutsche Forschungsgemeinschaft by a PhD fellowship to the first author (GRK 622) and a research grant to the third author (Ste 938/6-1).

Notes

1. Recent findings (Sibley & Liu, 2007) suggest this pattern of result could be culturally specific. Sibley and Liu (2007) found that both majority and minority group members in New Zealand implicitly associate their group with the relevant superordinate category.
2. Responses with errors and outliers with latencies of more than 3 standard deviations beyond each participant's mean were excluded (Experiment 1 = 1.9% errors, 2.3% outliers).
3. Relative prototypicality for the subgroups with the superordinate category was calculated as follows: $d_{sup\text{-}sub} = [\Sigma(x_{sup\cdot i} - x_{sub\cdot i})^2]^{1/2}$, with d = profile dissimilarity, sup = superordinate category, sub = sub-ingroup, xi = value for attribute i (Wenzel, Mummendey, Weber, & Waldzus, 2003).
4. Experiment 2 = 2.5% errors, 1.9% outliers.
5. Experiment 3 = 2.3% errors, 4.1% outliers.

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