Available online at www.sciencedirect.com
SCIENCE DIRECT®
Journal of Experimental Social Psychology 39 (2003) 577–584
Journal of Experimental Social Psychology
www.elsevier.com/locate/jesp

# Contrast from social stereotypes in automatic behavior☆

Thomas W. Schubert[a,*] and Michael Häfner[b]

[a] International Graduate College, University of Jena, Wildstraße 1, D-07743 Jena, Germany
[b] University of Würzburg, Germany

Received 7 May 2001; revised 27 December 2002

**Abstract**

The activation of social stereotypes can influence behavior outside of conscious awareness. It has been argued that while priming social stereotypes leads to behavioral assimilation, priming exemplars leads to behavioral contrast. Extending this theorizing, we argue that the activation of social stereotypes can also result in automatic behavioral contrast if a comparison of the self to the stereotyped group is provoked. This hypothesis is tested with speed and intellectual performance as behavioral measures. In a first study, we show that categorizing perceived others as outgroup members leads to behavioral contrast from their stereotype. The second study shows that subliminally priming the self during the activation of a stereotype to which the self does not belong leads to automatic behavioral contrast from the stereotype. These findings reverse previously found assimilation effects of social stereotype priming. Social comparison processes are discussed as a possible mediator of the results.


## Stereotypes vs. exemplars as primes of automatic behavior

A number of stunning findings from the past years have shown that behavior can be unconsciously influenced by the priming of social stereotypes. That is, the activation of social stereotypes can lead people to unintendedly act in line with traits typical for the stereotype. According to Bargh, Chen, and Burrows (1996) this should be the case, because the activation of stereotypes increases the accessibility of the associated mental representations of behavior, and accessible behaviors are more likely to be performed spontaneously. Within this field of research, two behaviors have been particularly well studied: slow behavior as a result of priming of the elderly stereotype, and intelligent (or dumb) behavior as a result of priming professors (or supermodels; for a review, see Dijksterhuis & Bargh, 2001).

However, several studies have shown that priming *single exemplars* can lead to behavioral *contrast* instead of assimilation (Dijksterhuis et al., 1998; Dijksterhuis, Spears, & Lépinasse, 2001): Participants walked faster after a single elderly person, the Dutch Queen Mother, was primed. Likewise, thinking about an extreme exemplar of the professor category, Albert Einstein, decreased intellectual performance. Dijksterhuis and colleagues proposed a model with two parallel processes to integrate these seemingly controversial findings: In a first process, "activation of a stereotype should [...] evoke assimilation in behavior" (Dijksterhuis et al., 2001, p. 287) via a perception-behavior link, with the stereotypical knowledge rendering stereotypic behavior more accessible and therefore more likely. In a second process, "the salience of an exemplar judged against this interpretative background should elicit contrast against the stereotype" (Dijksterhuis et al., 2001, p. 287), because it elicits a comparison between this exemplar and the self. In short, stereotype priming was assumed to lead to behavioral assimilation, and exemplar priming was assumed to lead to behavioral contrast.

☆ This research was supported by a scholarship of the Studienstiftung des Deutschen Volkes awarded to the first author. We thank Markus Brauer, Amélie Mummendey, Russell Spears, Sven Waldzus, and two anonymous reviewers for helpful comments on earlier drafts. Our special gratitude goes to Thomas Mussweiler for his consultation for Study 2. We also thank Katherina Wicklein, Frank Wieber, Jan Crusius, Atilla Höfling, Alex Füller, and Odile Jagsch for their assistance in the data collection.

* Corresponding author.
*E-mail address:* schubert@igroup.org (T.W. Schubert).

0022-1031/$ - see front matter © 2003 Elsevier Science (USA). All rights reserved.
doi:10.1016/S0022-1031(03)00034-9

From an intergroup perspective, it is "something of a puzzle" (Dijksterhuis et al., 1998, p. 869) that these studies found *assimilation* to stereotypes of groups which could easily be interpreted or categorized as *outgroups* of the participants (usually psychology students). Given that those stereotypes are categorized as an outgroup, theories on intergroup relations would predict that differences between ingroup and outgroup are accentuated, following the more general principle of intercategory accentuation (Brewer & Brown, 1998; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). For instance, perceivers for whom an ingroup membership is salient tend to accentuate ingroup–outgroup differences in expectations and recall, especially on dimensions central to the self-definition (Wilder & Cooper, 1986). Furthermore, Cadinu and Rothbart (1996) argued that an *oppositeness-heuristic* governs the perception and judgment of an outgroup and leads to the accentuation of ingroup–outgroup differences.

Obviously, this theorizing contradicts automatic assimilation findings. How can this contradiction be reconciled? While experimental intergroup research often goes to great lengths to introduce an ingroup–outgroup dichotomy (e.g., Hogg & Turner, 1989), priming studies avoid comparisons between the self and outgroup, and sometimes even prevent awareness of the activated category itself (Bargh et al., 1996). Thus, the stereotype content may become active without activating a self–outgroup or ingroup–outgroup distinction. While the priming of an outgroup *can* automatically activate the representation of the complementary ingroup (Wilder & Shapiro, 1984), this might only be true for chronically accessible ingroup–outgroup dichotomies. This reasoning suggests that there is a difference between priming a stereotype and priming an outgroup stereotype—the latter may actually lead to contrast in automatic behavior, and resistance against assimilation may not be so futile after all.

## Overview of the present research

To summarize, previously it has been argued that the activation of social stereotypes leads to assimilation in automatic behavior, while the activation of an (extreme) exemplar of the same social category leads to contrast in automatic behavior because it provokes a spontaneous comparison. However, we hypothesize that it is likely that *additional context features*, such as outgroup status, may provoke a social comparison even to a stereotype and consequently trigger automatic behavioral contrast.

In Study 1, we test the prediction that automatic behavioral contrast occurs after the perception of an *outgroup*. Emphasizing the fact that the perceived persons do not belong to the same category as the perceiver should automatically lead to the activation of categorical knowledge about the ingroup (Mussweiler & Bodenhausen, 2002) and result in a comparison of self and outgroup since thinking about outgroups is governed by an oppositeness heuristic (Cadinu & Rothbart, 1996). In Study 2, we investigate another possibility to provoke behavioral contrast by activating what the social stereotype can be compared to, namely the self. If during a stereotype priming thoughts about the self are independently provoked, a spontaneous comparison of the activated stereotype and the self should occur and result in contrast.

We assume that both manipulations result in a social comparison of the self to the primed category. In line with previous research we predict that comparisons will result in contrast (Stapel & Koomen, 1998; Stapel, Koomen, & van der Pligt, 1997) because they activate stereotype-inconsistent knowledge (Dijksterhuis et al., 1998, 2001; see the General Discussion for a more detailed proposal). Our goal is to show that contrary to previous theorizing, automatic behavioral contrast from social stereotypes can occur when appropriate comparative contexts are given. In both studies, we compare the manipulations to standard stereotype priming procedures, which previously were shown to lead to assimilation. Taken together, we predict automatic behavioral contrast after *perception of an outgroup* (Study 1) and *activation of the self* (Study 2).

## Study 1: On resisting outgroups

Study 1 extended the method developed by Dijksterhuis et al. (2001). In the priming phase, participants had to form impressions of 5 persons, who were either young or elderly. Behavioral effects were measured in a subsequent lexical decision task (LDT), with words unrelated to the stereotype. Slower reactions in this task indicated behavioral assimilation to the stereotype of the elderly. To test our hypothesis, in the *outgroup* conditions of Study 1 the 5 persons were categorized as outgroup members. To do so, participants were categorized using an artificial ingroup–outgroup distinction at the beginning of the experiment, and the 5 exemplars were then presented as members of that (artificial) outgroup. Measures of ingroup identification tested whether a salient intergroup context was established.

### *Method*

#### *Designs*

A *pilot study* applied a two-factorial between-subjects design, varying whether 5 elderly or 5 young outgroup members were presented to the participants (exemplar age), and whether participants were run over the Internet or in the laboratory (sample). Participants were

randomly allocated to the exemplar age conditions; the second factor was quasi-experimental. The *main study* applied a 2 (exemplar age) × 2 (categorization of exemplars) between-subjects design. The first factor was identical to the pilot study. The second factor varied whether the exemplars were categorized as outgroup members as in the pilot study, or left uncategorized. The latter condition resembled Dijksterhuis et al.'s (2001) procedure.

*Materials and procedure*

The experiment was introduced as a study on perception. The artificial group procedures followed Otten, Mummendey, and Buhl (1998). Participants were told that people could be divided in two groups following their different perception styles, called *figure-based perception* and *ground-based perception*, ostensibly differing in the way people organize their perception of the environment. Otten (2000) showed that this artificial categorization is not associated with age. As a test of their perception style, participants saw 12 ambiguous pictures, for which they had to decide which of two possible interpretations was primary for them. Allegedly based on their answers, all participants were then assigned to the *ground-based perception* group.

The next part of the experiment was introduced as an *impression formation* task. Participants were instructed to form impressions of 5 persons who were introduced as members of the outgroup with a *figure-based perception style* in the outgroup conditions or left uncategorized in the control conditions. For each person, a color photo and four short statements were shown in a slide show. Each statement remained on the screen for 4 s. Pictures and statements differed depending on the two conditions. The statements described preferences and everyday actions (e.g., *likes to party* for young persons and *likes to go for a walk* for elderly persons).

The following LDT was presented as a filler task. Ten words and 10 pronounceable non-words were presented on the screen, and participants were instructed to press as fast as possible either the *Yes* or *No* response key when a word or a non-word appeared. The first stimulus served as a practice trial and was always the same non-word. Stimulus order was randomized for each participant. Words were unrelated to the stereotypes of elderly or young persons and remained on the screen until an answer was given; the inter-stimulus interval was 2 s.

The integrity of the manipulation was checked by asking which groups the participants themselves and the exemplars were in. An open question assessed awareness of possible influences of the exemplars' presentation on the reaction times: Participants were asked what they thought what the true purpose of the experiment was, and whether they saw any connection between the person presentation and the reaction time task. Additionally, participants answered two graphical items on their perception of the intergroup context, the Overlap of Self, Ingroup and Outgroup scale (OSIO, Schubert & Otten, 2002). These items measured the perceived inclusion of self in ingroup and self in outgroup. Participants were debriefed by a written explanation of the experiment's hypotheses and manipulations.

*Participants*

*Pilot study*. Twenty two students of economics were run in groups from 3 to 5 in the laboratory; 38 participants took part over the Internet; the mean age was 24.9. Additional three participants from the lab had to be excluded from the analyses since they failed to correctly recall the group membership of the exemplars ($N = 1$), doubted the existence of the group distinction ($N = 1$), or had excessively long reaction times due to extreme shortsightedness ($N = 1$). Lab participants were paid DM 10 (about US $5) for their participation; Internet participants could win a prize of 20 DM (US $10). Of the total sample, 30 participants were female. Conditions did not differ significantly regarding distribution of gender or age. None of the participants suspected any influence of the exemplars' age on performance in the LDT.

*Main study*. One hundred and seven native speakers of German took part in the experiment, which was conducted on the Internet; one out of 20 participants won DM 20 (US $10). Fifteen participants had to be excluded form the analyses: 10 participants failed to recall their group membership correctly, or failed to recall the exemplars' group membership correctly in the categorized exemplars condition. One participant was excluded because of 7 errors in the 10 lexical decisions. Finally, four participants indicated knowledge of artificiality of the groups through expertise in social psychology.[1] None of the remaining 92 participants suspected that the age of the exemplars influenced their reaction time. Fifty one participants were female; the mean age was 27.7. Conditions did not differ regarding age or gender distribution.

*Results*

*Pilot study*

A comparison of perceived self–ingroup overlap and self–outgroup overlap indicated whether a salient intergroup situation was established. In a 2 (self–ingroup vs. self–outgroup) × 2 (exemplar age) × 2 (sample) mixed model ANOVA with repeated measures on the first factor, the repeated measures factor showed the only significant effect, $F(1, 55) = 37.58$, $p < .001$.

[1] Excluding 15 out of 107 might seem a very high data loss. However, since the experiment was run on the Internet in a much less controlled environment than usual studies, it is better to follow strict rules than to include participants who did not take part seriously.

Self–ingroup overlap was higher than self–outgroup overlap. No other effect reached significance, $F$s $< 1$.

Following Dijksterhuis et al. (2001), only reactions to words were analyzed. Altogether, 14 out of 600 (2.33%) reaction times were discarded: 7 of wrong answers and 7 which were 3 *SD*s longer than the mean (cf. Kawakami, Young, & Dovidio, 2002). The two conditions did not differ with respect to the number of wrong answers, or prolonged reaction times. Mean reaction times were computed and log-transformed. For ease of interpretation, untransformed means are reported. As expected, a 2 (exempiarage) $\times$ 2 (sample) ANOVA showed that participants were faster after the presentation of elderly outgroup members ($M = 642.14$, $SD = 87.68$), than after the presentation of young outgroup members ($M = 708.36$, $SD = 114.31$), resulting in a significant main effect of exemplar age, $F(1, 56) = 4.42$, $p = .040$. Moreover, the analysis pointed to the fact that for unknown reasons Internet participants were faster ($M = 641.04$, $SD = 92.26$) than laboratory participants ($M = 719.28$, $SD = 106.26$), $F(1, 56) = 6.99$, $p = .011$. The interaction effect was not significant, $F < 1$.

*Main study*

Again, perceived overlap served as an index of a salient intergroup situation. The only significant effect emerging from a 2 (exemplar age) $\times$ 2 (exemplar categorization) $\times$ 2 (self–ingroup overlap vs. self–outgroup overlap) mixed model ANOVA with repeated measures on the last factor was a main effect of the repeated measures factor, $F(1, 84) = 44.67$, $p < .001$. Self–ingroup overlap was higher than self–outgroup overlap.

Reaction times of wrong answers ($N = 15$) and those 3 *SD*s longer than the mean ($N = 18$) were deleted. Conditions did not differ with respect to discarded reaction times. Altogether, 33 out of 920 reaction times (3.6%) were discarded. Reaction times were averaged, log transformed, and analyzed in a 2 (categorization of exemplars) $\times$ 2 (age of exemplars) ANOVA; untransformed means are reported in Table 1. The predicted interaction was significant, $F(1, 88) = 5.15$, $p = .026$. Neither the main effect of categorization of exemplars, $F(1, 88) = 1.32$, $p = .253$, nor the effect of exemplar age, $F < 1$, reached significance. Simple main effects analyses showed a significant contrast effect in the condition with categorized exemplars, $t(88) = 1.69$, $p = .048$.[2] Reaction times were shorter after exposure to elderly outgroup exemplars than after exposure to young outgroup exemplars. In the condition with uncategorized exemplars, a marginal assimilation effect in the opposite direction was found, $t(88) = 1.52$, $p = .066$.

[2] Since we had a specific hypothesis for this mean difference, we take advantage of the possibility to use a one-tailed test for this and all other simple main effect tests in Studies 1 and 2 (cf. Maxwell & Delaney, 1990, p. 144).

Table 1
Reaction times depending on age and categorization of exemplars, Study 1

| Exemplar age | Outgroup exemplars | | Uncategorized exemplars | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Young exemplars | 722.32 | 156.76 | 629.19 | 114.38 |
| Elderly exemplars | 655.42 | 122.85 | 683.76 | 121.75 |

*Discussion*

Outgroup conditions in both, the pilot and the main study, lead participants to behave in opposition to the activated stereotypic slowness of elderly persons; that is, they reacted faster after the perception of elderly outgroup members than after the perception of young outgroup members. These results provide first evidence for automatic behavioral contrast from the social stereotype of an outgroup. As in previous automatic behavior studies, participants were not aware that the priming changed their behavior in the subsequent task.

Furthermore, comparison with a standard stereotype priming in the main study yielded a significant interaction effect, although the assimilation effect was only marginal. Thus, it can be argued that not something special about the persons, but their outgroup categorization triggered behavioral contrast. Measures of perceived self-group overlap confirmed that the minimal group paradigm created a salient group membership for the participants.

A closer inspection of the average reaction times reveals that the interaction seems to be largely driven by a difference in the young exemplars cells. We see two possible reasons for this: First, it might simply be easier to get slower then to get faster, leaving not enough room for contrast in the elderly outgroup condition. Second, perhaps the perception of young and thus similar-in-age outgroup members lead to more thorough elaboration of possible differences and thus to an enhanced accessibility of inconsistent behavioral representations. Elderly persons might indicate differences even after a superficial elaboration, without strong activation of differences beyond the mere perceptual level (remember that no explicit comparison instruction was given).

## Study 2: The self to the rescue

In Study 1, we assumed that the categorization of the target persons as members of a different group elicited a social comparison between this outgroup and the self. Another way to spark a spontaneous social comparison might be to activate what the target group is compared to, namely the self. Imagine thinking about a social category (e.g., supermodels), and then think for a moment about yourself. It seems likely that by referring to the self while independently thinking about a category

one does not belong to, a comparison is provoked (assuming that you are not a supermodel). More precisely, if the self is activated the stereotype should be compared to the self and thus lead to the activation of stereotype-inconsistent knowledge. If, on the other hand, the self is not activated, stereotype activation should result in a standard priming effect.

We noticed earlier that automatic behavior studies that prime social stereotypes usually avoid presenting the target group as differing from the self, or even activating the self. As an exception, Dijksterhuis and van Knippenberg (1999) showed that behavioral priming effects of stereotypes were *wiped out* when participants were made highly aware of themselves by seating them in front of a mirror. The authors argued that this manipulation distracted participants from the priming and thus resulted in a null effect. Conversely, our goal was to activate the self as subtly as possible. To do so, we primed it subliminally while participants thought about the primed category. Thus, references to the self intruded thinking about the category, and should thus not distract from the stereotype but induce a comparison. To conclude, while Study 1 invoked a comparison process by categorizing the targets, Study 2 aims to invoke a comparison process by activating the self. As a second extension of Study 1, explicit self-evaluations were assessed.

## Method

### Overview and design

The study was conducted in the laboratory, instructions were presented on a computer screen. Similar to the paradigm of Dijksterhuis et al. (1998), participants were either asked to think about the typical life style and characteristics of a professor or a hussy (German *Luder*). While participants thought about the assigned category they were subliminally presented with primes about either the self or others (cf. Mussweiler, 2002). These variations translate into a 2 (category: hussy vs. professor) $\times$ 2 (prime: self vs. other) between subjects design. Behavioral effects were measured in an ostensibly unrelated task by a trivial pursuit game with 20 questions (multiple choice, one out of three answers was correct). Finally, self-evaluative consequences were assessed by asking participants about how many fellow students they thought to be more intelligent than they were.

### Materials and procedure

Participants were asked to take part in a study on attention-research. On arrival to the lab, they were seated in front of a desktop computer and asked to read the instructions carefully. The instructions read that in order to test how focusing a fixation cross would affect the contents they were asked to generate, participants should fixate on this cross during the next two minutes. Moreover, the cross would change its shape from time to time in order to help them keep their attention on the cross. Participants were then informed about the category they were assigned to think about (hussy vs. professor) and instructed as follows: "Please imagine a hussy (professor)! Try to think about as many typical features, characteristics and the typical life-style of a hussy (professor) as come to your mind! While you think about the hussy (professor), please remember to fixate the cross in the middle of the screen!." The fixation cross was displayed in the middle of a black screen. After 6000 ms the cross was masked for 30 ms (with meaningless letter strings "%& = $%& = $"; cf. Jacoby & Dallas, 1981) and followed by the primes about either the self (me, I, myself, etc.) or others (his, her, their, etc.) for 18 ms. The prime was again masked for 30 ms by the same meaningless letter strings. This sequence was repeated 20 times resulting in a presentation duration of approximately 2 min. After the last trial, the program automatically moved on and participants were asked to answer a couple of questions about how difficult they found the task. On finishing this part, the experimenter asked whether participants would be so kind and help (no-one refused to do so) with the pretesting of some new stimulus material for a quiz show experiment. The quiz consisted of 20 multiple choice questions, for each of which one out of three possible choices was correct. After answering these questions participants provided personal information like age, subject, etc. Amongst those questions they were asked to evaluate themselves on a stereotype-relevant dimension, that is, they were asked to indicate what percentage of fellow students they thought to be more intelligent than they were. Subsequently, participants were thanked, debriefed, and dismissed.

### Participants

Research participants were 65 students of the University of Würzburg majoring in different subjects. As a compensation for their participation they received a chocolate bar. Participants were randomly assigned to the experimental conditions and ran in group sessions up to three people at a time.

## Results

### Behavioral measure

None of the participants suspected any influence of the first part of the experiment (thinking about a social category) on their performance in the second part. For each participant, correct answers were summed up and subjected to a 2 (category: hussy vs. professor) $\times$ 2 (prime: self vs. others) factorial analysis of variance (ANOVA). Only the predicted category by prime interaction was significant; $F(1, 61) = 5.21$, $p = .026$, all

Table 2
Mean number of correct answers as a function of the primed category and the subliminal prime, Study 2

| Subliminal prime | Hussy category priming | | Professor category priming | |
|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* |
| Self | 10.00 | 2.66 | 8.44 | 2.19 |
| Others | 8.22 | 3.49 | 9.67 | 1.76 |

other $F$s $< 1$. As Table 2 indicates, *only* when they were subliminally primed with the self did participants who thought about a hussy perform better than those who thought about a professor, $t(61) = 1.67,\ p = .050$. When other-relevant words were primed, there was a marginal effect in the opposite direction, that is, participants primed with a hussy performed worse than those primed with a professor, $t(61) = 1.56,\ p = .062$.

*Self-evaluation*

The self-evaluations were also subjected to a 2 (category: hussy vs. professor) × 2 (prime: self vs. others) factorial analysis of variance (ANOVA). Confirming our hypothesis the analysis revealed a significant interaction effect of category by prime; $F(1, 53) = 6.18,\ p = .016$, all other $F$s $< 1$.[3] *Only* when they were primed with the self did participants who thought about hussies judge themselves as more intelligent (only $M = 26.92\%$ of fellow students were seen as more intelligent) than participants who thought about professors ($M = 37.57\%$), $t(53) = 1.89,\ p = .032$. When primed with other-relevant words, there was a marginal effect in the opposite direction, that is, participants primed with a hussy perceived themselves as worse ($M = 36.13\%$ were judged as more intelligent) than those primed with a professor ($M = 27.50\%$), $t(53) = 1.61,\ p = .056$.

*Discussion*

Adding to the evidence of Study 1, the present experiment also shows behavioral contrast from a social stereotype, but caused by a different manipulation. When the self was activated during thinking about the social category, behavioral contrast was obtained, while the activation of others led to a marginal behavioral assimilation. Moreover, self-evaluative data support the notion that this effect might be caused by a social comparison process (cf. Mussweiler, in press). When the self was activated, stereotype-inconsistent knowledge was likely to be activated which itself led to contrastive self-evaluations with regard to the standard of comparison. Conversely, the activation of others rendered stereotype-consistent knowledge more accessible, thus leading to a tendency to assimilate self-evaluations and behavior to the activated stereotypes.

[3] Eight participants had to be excluded from the analysis resulting in lower degrees of freedom for this analysis. Three participants were excluded because they indicated impossible values (e.g., 1000%), the other five did not indicate any value.

## General discussion

In two studies, we found automatic behavioral contrast after priming social stereotypes. These findings show that previous models (e.g., Dijksterhuis et al., 1998, 2001) might need to be extended: Social stereotypes can elicit behavioral contrast given the appropriate comparative context. In the present studies, this context was created by two means: an explicit categorization of the stereotyped group as an outgroup, and an activation of the self that did not belong to the stereotyped group. Both manipulations produced automatic behavioral contrast. These effects were compared to stereotype priming procedures that were previously shown to result in behavioral assimilation. Even though in the present studies these assimilation effects reached only a marginal level, the predicted two way interactions reached statistical significance in both experiments.

*What about comparison produces contrast?*

We interpret these findings as outcomes of social comparison processes, although we point out that this assumption was not directly tested in our studies. Relevant process measures need to be assessed in future work. In accordance with previous theorizing (Dijksterhuis et al., 1998, 2001; Stapel et al., 1997) we argued that eliciting a comparison should result in contrast. An application of the Selective Accessibility Model by Mussweiler and Strack (2000) and Mussweiler (in press) might help to further elucidate the underlying processes. The model predicts that an *initial similarity assessment* determines the outcomes of a social comparison. If a social comparison is started with an initial hypothesis of difference between self and target, thinking focuses on evidence for this difference. Consequently, standard-inconsistent knowledge becomes more accessible, influences subsequent behavior and anchors subsequent judgments. Since outgroup status itself may directly lead to dissimilarity testing by way of an oppositeness-heuristic (Cadinu & Rothbart, 1996) judging target persons as outgroup members in Study 1 was assumed to trigger dissimilarities testing which in turn might have lead to the behavioral contrast as shown in the present data.

On the other hand, Mussweiler's model also postulates that a comparison can also test for the *similarity* of the self and a target. However, in both studies presented here, we did not realize such a situation but rather compared standard priming procedures with the above comparison conditions. Thus, we cannot directly show

that a difference-testing process mediates our findings. Alternatively, it could be that every comparison leads to a contrast (e.g., Stapel et al., 1997). However, the application of Mussweiler's model leads to the interesting prediction that a similarity-testing comparison to a target should also result in behavioral assimilation.

*The self in automatic behavior*

By demonstrating that attention to the self can result in contrasting behavior the findings add yet another process to the complex picture of the self's role in automatic behavior. Self-awareness can also distract from a behavioral prime if it is activated to an extreme degree (Dijksterhuis & van Knippenberg, 1999), and connecting behavioral presentations with the self can also facilitate behavioral effects (Hull, Slone, Meteyer, & Matthews, 2002; Wheeler, Jarvis, & Petty, 2001). Hull et al. (2002) showed that participants high in (trait) private self-consciousness showed greater assimilation to an elderly stereotype prime than participants low in private self-consciousness. From this perspective one could have predicted just the opposite of our findings in Study 2. However, to prime the elderly stereotype Hull et al. used a scrambled sentence task that was designed to prevent awareness of the elderly category itself (Bargh et al., 1996). In contrast, in our studies perceivers were aware of the primed category, and the comparison was presumably a conscious process. (Importantly, though, they were unaware of the priming's influence on their behavior.) We think that conscious or *noetic* awareness of a category is a necessary condition for a comparison process and the subsequent activation of category-inconsistent mental representations (cf. Strack & Deutsch, 2002). Only one exception seems possible: If the outgroup is closely and strongly associated with an opposing ingroup, this may activate ingroup-consistent (and thus outgroup-inconsistent) traits by way of indirect priming (Wilder & Shapiro, 1984). Hull et al. prevented noetic awareness of the category, thereby preventing a comparison to it. This might explain the seeming contradiction. In sum, if the self is not activated to such a strong degree that it wipes out any priming effect, its relation to the primed concept is of importance: it can either amplify encoding processes, or it can serve as a comparison standard and mediate automatic behavioral effects.

Our findings parallel those of Spears, Gordijn, Dijksterhuis, and Stapel (2002), who also found automatic behavioral contrast from outgroups, in a research program independent from the current work. One difference is of interest: While we used a minimal group categorization and subliminal priming of the self to provoke a comparison process, Spears et al. asked questions about the ingroup identity. It seems that whenever a stereotype activation is coupled with a strong reminder of a possible opposite of the group (rendering it an outgroup), behavioral contrast can be expected. These and our findings have implications for deriving conclusions from findings of automatic behavior. It has been argued that automatic assimilation to social stereotypes serves social regulation and smoothes interactions in the social environment (Chartrand & Bargh, 1999; Dijksterhuis, Bargh, & Miedema, 2000). However, our social environment is neither monolithic nor does it consist only of individuals. An important part of our social life is influenced by memberships in groups. Our findings show that assimilation to groups is not ubiquitous. Indeed, it seems to be against functional concerns to mimic the behavior of people who are by (group-) definition different. Instead, assimilation may be enhanced for activated ingroup stereotypes, which become a part of the self and affect self-related cognition (Smith & Henry, 1996).

Dijksterhuis and Bargh (2001) distinguished three basic causes of automatic behavior: observations of behavior performed by others, inferences drawn on the basis of observed behavior, and stereotypes that become activated due to the group membership of the observed persons. With every step, the activated concepts relate less to the actual observed behavior, and with every step, more cognition on part of the observer is involved. The evidence presented here can be seen as yet another step in this direction: A conscious comparison operates on the basis of activated stereotypes, and the activated concepts are the *opposite* of the behavior associated with the observed persons. This mechanism contributes to the flexibility of automatic behavior. When automatic behavior serves proper social functioning, it must be moderated by membership in groups, both our own membership and that of the people we encounter.

## References

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology, 71*, 230–244.

Brewer, M. B., & Brown, R. J. (1998). Intergroup relations. In D. T. Gilbert, & S. T. Fiske (Eds.), *Handbook of social psychology* (pp. 554–594). New York, NY: McGraw-Hill.

Cadinu, M. R., & Rothbart, M. (1996). Self-anchoring and differentiation processes in the Minimal Group Setting. *Journal of Personality and Social Psychology, 70*, 661–677.

Chartrand, T. L., & Bargh, J. A. (1999). The Chameleon effect: The perception-behavior link and social interaction. *Journal of Personality and Social Psychology, 76*, 893–910.

Dijksterhuis, A., & Bargh, J. A. (2001). The perception-behavior expressway: Automatic effects of social perception on social behavior. In M. P. Zanna (Ed.), *Advances in experimental social psychology: Vol. 33* (pp. 1–40). San Diego: Academic Press.

Dijksterhuis, A., Bargh, J. A., & Miedema, J. (2000). Of men and mackarels: Attention and automatic social behavior. In H. Bless, &

J. Forgas (Eds.), *The message within: The role of subjective experience in social cognition and behavior* (pp. 37–51). Philadelphia: Psychology Press/Taylor & Francis.

Dijksterhuis, A., Spears, R., & Lépinasse, V. (2001). Reflecting and deflecting stereotypes: Assimilation and contrast in impression formation and automatic behavior. *Journal of Experimental Social Psychology, 37*, 286–299.

Dijksterhuis, A., Spears, R., Postmes, T., Stapel, D. A., Koomen, W., van Knippenberg, A., & Scheepers, D. (1998). Seeing one thing and doing another: Contrast effects in automatic behavior. *Journal of Personality and Social Psychology, 75*, 862–871.

Dijksterhuis, A., & van Knippenberg, A. (1999). Behavioral Indecision: Effects of self-focus on automatic behavior. *Social Cognition, 18*, 55–74.

Hogg, M. A., & Turner, J. C. (1989). Intergroup behaviour, self-stereotyping and the salience of social categories. *British Journal of Social Psychology, 26*, 325–340.

Hull, J. G., Slone, L. B., Meteyer, K. B., & Matthews, A. R. (2002). The nonconsciousness of self-consciousness. *Journal of Personality and Social Psychology, 83*, 406–424.

Jacoby, L. L., & Dallas, M. (1981). On the relationship between autobiographical memory and perceptual learning. *Journal of Experimental Psychology: General, 110*, 306–340.

Kawakami, K., Young, H., & Dovidio, J. F. (2002). Automatic stereotyping related to the elderly: the relationship between social behavior and trait activation. *Personality and Social Psychology Bulletin, 28*, 3–15.

Maxwell, S. E., & Delaney, H. D. (1990). *Designing experiments and analyzing data*. Pacific Grove, CA: Brooks/Cole Publishing Company.

Mussweiler, T. (in press). Comparison processes in social judgment: Mechanisms and consequences. *Psychological Review*.

Mussweiler (2002). *Seek and ye shall find: Assimilative and contrastive consequences of comparison*. Paper presented at the 13th General Meeting of the European Association of Experimental Social Psychology, San Sebastián, Spain, June 26–29.

Mussweiler, T., & Bodenhausen, G. V. (2002). I know you are but what am I? Self-evaluative consequences of judging ingroup and outgroup members. *Journal of Personality and Social Psychology, 82*, 19–32.

Mussweiler, T., & Strack, F. (2000). Consequences of social comparison. Selective accessibility, assimilation, and contrast. In J. Suls, & S. C. Wheeler (Eds.), *Handbook of social comparison: Theory and Research* (pp. 253–270). New York: Kluwer Academic/Plenum Publishers.

Otten (2000).*Traits ascribed to the artificial categories ground-based and figure-based perception style*. Unpublished data.

Otten, S., Mummendey, A., & Buhl, T. (1998). Accuracy in information processing and the positive–negative asymmetry in social discrimination. *Revue Internationale de Psychologie Sociale, 11*, 69–96.

Schubert, T., & Otten, S. (2002). Overlap of self, ingroup, and outgroup: Pictorial measures of self-categorization. *Self & Identity, 1*, 553–576.

Smith, E. R., & Henry, S. (1996). An in-group becomes part of the self: Response time evidence. *Personality and Social Psychology Bulletin, 22*, 635–642.

Spears, R., Gordijn, E., Dijksterhuis, A., & Stapel, D. (2002). *Reaction in action: Intergroup contrast in automatic behavior* (submitted).

Stapel, D. A., & Koomen, W. (1998). When stereotype activation results in (counter) stereotypical judgments: Priming stereotype-relevant traits and exemplars. *Journal of Experimental Social Psychology, 34*, 136–163.

Stapel, D. A., Koomen, W., & van der Pligt, J. (1997). Categories of category accessibility: The impact of trait concept versus exemplar priming on person judgments. *Journal of Experimental Social Psychology, 33*, 47–76.

Strack, F., & Deutsch, R. (2002). *Reflective and impulsive determinants of social behavior* (submitted).

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Oxford: Blackwell.

Wheeler, S. C., Jarvis, W. B. G., & Petty, R. E. (2001). Think unto others: The self-destructive impact of negative racial stereotypes. *Journal of Experimental Social Psychology, 37*, 173–180.

Wilder, D. A., & Cooper, W. E. (1986). Categorization into groups: Consequences for social perception and attribution. In J. H. Harvey, W. Ickes, & R. F. Kidd (Eds.), *New directions in attributions research* (Vol. 3, pp. 247–277). Hillsdale, NJ: Erlbaum.

Wilder, D. A., & Shapiro, P. N. (1984). Role of out-group cues in determining social identity. *Journal of Personality and Social Psychology, 47*, 342–348.