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Seeing One Thing and Doing Another: Contrast Effects in Automatic Behavior

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Research on automatic behavior demonstrates the ability of stereotypes to elicit stereotype-consistent behavior. Social judgment research proposes that whereas traits and stereotypes elicit assimilation, priming of exemplars can elicit judgmental contrast by evoking social comparisons. This research extends these findings by showing that priming exemplars can elicit behavioral contrast by evoking a social comparison. In Study 1, priming professor or supermodel stereotypes led, respectively, to more and fewer correct answers on a knowledge test (behavioral assimilation), but priming exemplars of these categories led to the reverse pattern (behavioral contrast). In Study 2, participants walked away faster after being primed with an elderly exemplar. In Study 3, the proposition that contrast effects reflect comparisons of the self with the exemplar was supported.

Seventy-five years ago, the Dutch psychologist Buytendijk (1922) claimed that perception and action are completely independent. It is important to note, however, that he reserved this autonomy of action for human beings only. For animals, he asserted, perception always results in the tendency to act (or "always contains the impulse to act," pp. 180–181).

In retrospect, it can be said that Buytendijk (1922) was both right and wrong. Now that almost all people categorize human beings as animals, we can be lenient. We may dismiss his remark about human beings; reread his statement about animals; and conclude that, in light of contemporary research, his claim was remarkably visionary. Perception does in fact result in the tendency to act. In recent years, the evidence that perception directly affects behavior has accumulated rapidly (e.g., Bargh, Chen, & Burrows, 1996; Carver, Ganellen, Froming, & Chambers, 1983; Chen & Bargh, 1997; Dijksterhuis & van Knippenberg, 1998a, 1998b; Levy, 1996; see also Bargh, 1997). In what is probably the best-known experiment in this tradition, Bargh and others primed participants with the stereotype of the elderly. In line with this stereotype, the participants walked away more slowly than participants who were not so primed (Bargh et al., 1996, Experiment 2). Such effects have now been replicated a number of times with a range of stereotypes, traits, and behavioral measures. These findings point to a direct relation between social perception and social behavior. What people see partly determines, without conscious intervention, what they do.

In all previous experiments, traits and stereotypes have been used to demonstrate this link between social perception and social behavior. In the present contribution, our goal is to show that the choice of these abstract constructs reflects an incomplete representation of the units of social perception and, therefore, of the effects of social perception on behavior. We will be better able to understand and predict the behavioral products of social perception if we first fully appreciate the richness of the social perception process. In other words, the question "Where does perception lead to?" can be dealt with more fruitfully if we first ask ourselves the question "What do we perceive?"

An important message concerning social perception emanating from research in the social cognition tradition is clear: People often see or infer much more than is evident from the surface of the social stimulus. Although much research has focused on the limits of information processing, people often consciously and unconsciously go beyond the information given (Bruner, 1957). On seeing a person, one immediately infers abstract constructs such as personality traits and stereotypes (e.g., Devine, 1989; Gilbert, Pelham, & Krull, 1988; Winter & Uleman, 1984). Given this tendency to go beyond the information given, one may argue that it is justified to treat traits and stereotypes as the core constructs of social perception. It is perhaps no wonder then that until now the relation between perception and

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behavior has been investigated with traits and stereotypes as perceptual stimuli (e.g., Bargh et al., 1996; Chen & Bargh, 1997; Dijksterhuis & van Knippenberg, 1998a, 1998b; Levy, 1996).

However, social perception may often involve more than just traits and stereotypes. That is, under many circumstances the social perception process goes beyond these somewhat rudimentary inferences (Brewer, 1988; Fiske & Neuberg, 1990). To get at these constructs in the first place, perceivers have to go through the individual target bearing them, and it should not be forgotten that this unique individual also constitutes the social stimulus. Plainly put, seeing an individual sometimes also involves seeing the individual "in front of" the stereotype, so to speak. This may be particularly true when one already has a clear impression of an individual rather than having to form one on-line. A glance at a photograph of Albert Einstein above one's desk may result in the activation of stereotypes (professor), and it may result in the activation of traits (highly intelligent), but it may also evoke an appreciation of Albert Einstein the person. In other words, abstract constructs such as traits and stereotypes may be accompanied or even overruled by a concrete individual impression (Fiske & Neuberg, 1990).

Individuals are *exemplars* in the sense that they are concrete instantiations of a given category (Smith & Zárate, 1990, 1992). We focus on familiar exemplars that genuinely exemplify their category stereotype rather than deviate from it and thus where impression formation on the level of stereotypes has already occurred (Fiske & Neuberg, 1990). Our argument is thus not that such exemplars suppress stereotypic traits but rather that they make the instantiation of the relevant trait distinct (Stapel & Spears, 1996) by means of an actor–trait link (Stapel, Koomen, & van der Pligt, 1996).

This distinction between stereotypes and the traits they activate on the one hand and exemplars that may exemplify these traits on the other is crucial for social perception and resulting automatic behavior. We argue that the activation of an exemplar (such as Einstein) may well lead to different behavioral output than activation of traits (intelligent) primed either directly or by means of a stereotype (professor).

As already noted above, priming traits and stereotypes can lead to corresponding behavior in the perceiver. In other words, such priming can result in *behavioral assimilation,* thereby paralleling findings from the social judgment domain (e.g., Higgins, Rholes, & Jones, 1977; Srull & Wyer, 1979, 1980). Activated traits produce assimilation because they function as an interpretation frame and cause perceptual input to be interpreted in line with this trait construct (Higgins, 1996; Schwarz & Bless, 1992; Stapel et al., 1996). These findings are comparable with those on the effects of perception on behavior, where trait (or stereotype) priming seems to function as a general framework for action. In this case, instead of guiding the interpretation of perceptual input, the trait guides behavioral output. In both cases, highly accessible abstract constructs direct ongoing processes in an assimilative fashion.

A considerable number of social judgment studies demonstrate a different effect, however: Under appropriate conditions, the priming of exemplars has been shown to lead to judgmental contrast (see Herr, 1986; Schwarz & Bless, 1992; Stapel, Koomen, & van der Pligt, 1997). Priming the trait hostility causes a person who is subsequently judged to be seen as more hostile, but priming the exemplar Adolf Hitler causes this person to be seen as less hostile (Herr, 1986). Exemplars exert different effects because they are used as *comparison standards* (Herr, 1986; Sherif & Hovland, 1961; Stapel et al., 1996, 1997; Stapel & Spears, 1996). Priming Hitler still activates the concept of hostility, thereby eliciting a potential assimilation effect, but the engagement in a comparison induces a contrast effect that overrides the assimilative effect of the activated construct. In the example given above, a person called Donald is compared to Hitler. It is this comparison that evokes the contrast response ("Well, Donald could not be *that* hostile"), whereas the assimilative effects of the activated concept of hostility do not become apparent. However, the exemplar must be sufficiently extreme to override any assimilation evoked by the activated trait. Research by Herr, Manis, Schwarz, Stapel, and their colleagues has repeatedly shown that extreme and specific exemplars exert judgmental contrast effects (see Herr, 1986; Herr, Sherman, & Fazio, 1983; Manis, Nelson, & Shedler, 1988; Schwarz & Bless, 1992; Stapel et al., 1996, 1997). In general, it seems that a comparison (and a resulting contrast effect)[1] is rendered more likely if the primed construct constitutes a relevant comparison standard and is sufficiently extreme and concrete (e.g., Hitler).

Given that exemplars produce contrasts in judgment by evoking a comparative judgment between exemplar and the target of judgment, the next question is whether such exemplars may evoke in perceivers social comparison with themselves. After all, if primed with Hitler, people may not only make a comparison with Donald—it is also likely that, in a relevant judgment situation, they will compare Hitler with themselves (hopefully with positive results). Recent research indicates that such comparisons with the self are very probable, if not inescapable, especially if they evoke a relevant dimension of comparison. Gilbert, Giesler, and Morris (1995) showed that social comparison is a spontaneous process: Individuals do not intentionally compare themselves with others but simply do it (see also Festinger, 1954; Wood, 1989), especially when these others are distinctive and extreme (Parducci, 1992; Parducci & Wedell, 1990). Following this analysis, we expect extreme exemplars to evoke a spontaneous comparison with the self.

Now if individuals engage in a comparison, the next question to be addressed is "With what result?" Let us leave Hitler behind and return to the more palatable figure of Einstein. In comparing themselves with Einstein, most people would presumably draw the conclusion that they are not quite as smart as they generally think they are. Just as individuals contrast another person with an extreme exemplar, they will presumably contrast themselves as well. As a result, the route from perception to behavior may be quite different in the case of primed exemplars than in the case of primed traits or stereotypes. Whereas traits and stereotypes guide behavior in an assimilative

[1] For the sake of clarity, it should be noted that there are different, and indeed unrelated, processes that can lead to judgmental contrast effects. Here we discuss *comparative* contrast (e.g., Herr, 1986; Schwarz & Bless, 1992; Stapel et al., 1996), whereas the literature on *corrective* contrast (e.g., Martin & Achee, 1992; Martin, Seta, & Crelia, 1990; Petty & Wegener, 1993; Strack & Hannover, 1996)—interesting but not relevant here—is not discussed.

manner, exemplars should evoke comparison, and this may produce a behavioral contrast effect. Concretely, Einstein evokes comparison with the self, fostering the conclusion in individuals that they are relatively stupid. It is this activation of the self-related concept of stupidity that may well guide subsequent actions and help to produce behavioral contrast ("I am no Einstein, I am not smart, I am dumb").

Taken together, the findings from the social judgment and social comparison domains lead us to hypothesize that exemplars affect behavior differently than do abstract constructs such as personality traits and stereotypes. Whereas traits and stereotypes have been shown to produce behavioral assimilation, we expect exemplars to produce behavioral contrast. In what follows, we report three experiments in which we tested the hypothesis of behavioral contrast.

Study 1: Where One Supermodel Is Good for You but More Are Bad

In this first experiment, we tried to demonstrate both assimilation and contrast effects by enhancing or reducing intellectual performance. Participants were primed with stereotypes associated with a high degree of intelligence (professors) or the reverse (supermodels). Other participants were primed with exemplars from these categories (Albert Einstein and Claudia Schiffer, respectively).[2] Later, they were asked to complete a questionnaire with general knowledge questions. The number of correct answers generated was taken as an index of intellectual performance. For stereotype primes, we expected an assimilation effect. Participants primed with professors were expected to outperform those primed with supermodels (Dijksterhuis & van Knippenberg, 1998a, 1998b). In the case of exemplars, however, we expected contrast: Participants primed with Claudia Schiffer should outperform participants primed with Albert Einstein on the general knowledge questionnaire.

Method

Participants and design. Forty-two undergraduate students from the University of Nijmegen were randomly assigned to the cells of a 2 (direction of prime: intelligent vs. unintelligent) × 2 (target: stereotype vs. exemplar) between-subjects design. Participants received Fl.5 (approximately $2.50) for their participation.

Procedure and stimulus materials. On arrival in the laboratory, participants were placed in individual cubicles. They were told that they would participate in two unrelated pilot studies and that they would receive all instructions from a computer. The experimenter started the computer program and left the cubicle. The computer program randomly assigned participants to one of four priming conditions.

The priming procedure we used was originally developed by Macrae, Stangor, and Milne (1994) and has been used in a series of previous studies in the domain of perception-induced behavior (Dijksterhuis & van Knippenberg, 1998a, 1998b). Participants were asked to imagine a professor (or a supermodel, or Albert Einstein, or Claudia Schiffer) and to list the typical behaviors, lifestyle, and appearance attributes of this social target. They were simply asked to list anything that came to mind with respect to these attributes on the sheet of paper provided. Participants were given 5 min to complete this task. They were told that the goal of this study was to gather material for forthcoming experiments of the Department of Social Psychology. The choice for stereotypes of professors and supermodels was based on a pilot study in which 40 participants rated these (and other) groups on 56 traits using 9-point scales (1 = *professors [supermodels] are not at all . . .*, 9 = *professors [supermodels] are very . . .*). Professors were perceived as intelligent ($M = 7.78$) and as knowledgeable ($M = 7.56$). Supermodels were rated very low on intelligence ($M = 3.84$) and knowledgeability ($M = 3.10$).

After completion of the priming task, participants were asked to start the second task. The computer program requested that participants open the envelope that was lying on the table behind the computer. This envelope contained a booklet with 20 multiple-choice questions with four choice options. Participants were told that the Personality Department was currently developing a "general-knowledge" scale. This scale consisted of five subscales, each containing 20 questions. The subscales ranged from *very easy* (1) to *very difficult* (5). We told participants that we were testing the validity of the scale and that they would receive the most difficult subscale (prestudies showed that students answered about 50% of questions correctly, indicating that the questions were relatively difficult considering that a score of 25% would be obtained by mere guessing). Participants were asked to answer the questions by choosing one of four options. The questions were adapted from the game Trivial Pursuit (1984/1987). Example questions are "Who painted La Guernica?": (a) Dali, (b) Miro, (c) Picasso, or (d) Velásquez and "What is the capital of Bangladesh?": (a) Dacca, (b) Hanoi, (c) Yangon, or (d) Bangkok.

On completion of the questionnaire, participants were asked to return to the experimenter. Participants were debriefed carefully (Dijksterhuis & van Knippenberg, 1998a, 1998b). The first question we asked was which departments were conducting the experiments. With two exceptions, participants correctly recalled that the first experiment was conducted by the Department of Social Psychology and the second experiment was conducted by the Department of Personality. Participants were then asked whether the first task might have influenced performance on the second task. None of the participants believed the first task to have affected the second. In sum, none of the participants indicated suspicion as to the actual relation between the tasks. After the debriefing, participants were thanked, paid, and dismissed.

Results and Discussion

We counted the number of correctly answered questions for each participant (the indication of intellectual performance) and subjected these scores to a 2 (direction of prime: intelligent vs. stupid) × 2 (target: stereotype vs. exemplar) between-subjects analysis of variance (ANOVA). The only reliable effect was the predicted two-way interaction, $F(1, 38) = 7.14$, $p < .02$. This result indicates that stereotypes and exemplars evoke differential behavioral effects.

The percentages of questions answered correctly are presented in Table 1. The most important comparison is the one between participants primed with Albert Einstein and participants primed with Claudia Schiffer. Support for the predicted behavioral contrast effect was obtained—that is, participants primed with Einstein performed worse than participants primed with Schiffer, $F(1, 38) = 4.31$, $p < .05$ (mean number of questions answered correctly = 42 and 54, respectively).

As can be seen, stereotype primes evoke an assimilation ef-

[2] We are not asserting here that Claudia Schiffer is unintelligent (the very opposite is most likely the case). She was merely chosen because she is a prototypical example of the category supermodels, which pretesting revealed to be regarded as relatively unintelligent by our Dutch participants. As such, we expected our participants to perceive Schiffer as representative of the category (and thus not particularly intelligent).

Table 1
Mean Percentages of Questions Answered Correctly

	Direction of prime			
	Intelligent		Stupid	
Type of prime	*M*	*SD*	*M*	*SD*
Stereotype	50	13.5	41	10.8
Exemplar	42_a	12.1	54_b	13.3

Note. Means in the same row that do not share subscripts differ at $p < .05$.

fect. Participants primed with professors ($M = 50$) outperformed participants primed with supermodels ($M = 41$), $F(1, 39) = 2.96$, $p < .09$. The fact that this assimilation effect is only marginally significant may be attributed to a lack of statistical power. Behavioral assimilation effects with this very same paradigm have been obtained five times before (Dijksterhuis & van Knippenberg, 1998a, 1998b). In all these studies, however, the number of participants per cell was higher.

One alternative explanation for the contrast effect found in the present results concerns the possibility that this derives not from the exemplar status of the prime per se (and its properties of concreteness and distinctness), but because it is more extreme than the category. For example, it seems possible that Einstein is seen as more intelligent than the category of professors and that it is this extremity that evokes the comparative contrast.[3] In line with research on judgmental contrast, we acknowledge that a certain degree of extremity is necessary to elicit comparative contrast but think it unlikely that extremity alone is a sufficient condition for eliciting contrast in our studies. First, previous research in the judgment domain has shown that concepts and exemplars matched for extremity have produced assimilation and contrast, respectively (see Stapel et al., 1997), and although categories are not concepts, we argue that priming social categories activates trait concepts. Second, although the argument that extremity alone elicited the contrast is plausible in the case of Einstein, it is not in the case of Schiffer: The notion that she is regarded as significantly less intelligent than the supermodel stereotype is unlikely.

Study 2: Counteracting Elderly Behavior With an Elderly Exemplar

Although the previous study demonstrates the predicted contrast effect for automatic behavior when an exemplar rather than a trait is primed, the focus on the products of the intellect raises some queries about the generality of this effect. First, although scores on a general knowledge test count as behavior rather than judgment, the question remains as to whether such an effect can be demonstrated for genuinely motor action—that is, action involving bodily movement. Second, in the first study we used quite a strong and potentially blatant priming manipulation, namely, asking people to write about a category or exemplar for 5 min, a central dimension of which (intelligence) could be consciously related to the subsequent knowledge test. Demonstrating the effects with a more subtle priming manipulation in which the content of the priming task is less open to awareness therefore seemed to be desirable.

The paradigm used by Bargh et al. (1996), in which walking speed was the dependent variable, addresses some of the elements lacking in the first study. This study involved genuinely motor behavior (walking), the priming procedure was relatively subtle, and the link between this priming procedure and the subsequent behavior was very unlikely to be open to conscious mediation (the central dimension of activity or speed implied by the stereotype of elderly people was never directly primed). We felt it was still necessary to prime the construct of elderliness before activating the exemplar (the Dutch Queen Mother, Princess Juliana, age 89) in order to ensure that the exemplar would be judged along the critical stereotype-relevant dimension (namely, in terms of slowness associated with old age). This was considered less of a problem in the first study, both because the priming used there was much more powerful and because the dimension of intelligence relevant to that study is probably more chronically relevant to the self-concept than is walking speed. It is essential to our reasoning not only that exemplars evoke the traits associated with the broader categories or stereotypes of which they are a part, just as the stereotypes themselves do, but also that they make salient the actor–trait links (Stapel et al., 1996). After activating the stereotype of elderly people by means of a scrambled-sentence procedure, in the critical condition we added a short questionnaire in which participants were required to answer a few questions about the Dutch Queen Mother. The prediction was that making salient an exemplar after priming the stereotype of elderly people construct would lead to comparative contrast and thus significantly quicker walking speed on departure from the study compared with control conditions. In order to assess the robustness of the predicted effect, like Bargh et al., we conducted two replications of the same study (Studies 2a and 2b).

Method

Participants and design. Participants were 1st-year students at the University of Amsterdam (Study 2a: $N = 50$; Study 2b: $N = 37$) and were randomly assigned to conditions. They received either a (1-hr) course credit point (Study 2a) or payment (Study 2b: Fl. 10, or approximately $5) for participation in the research. The design for both Study 2a and Study 2b was a single-factor design consisting of three conditions. In the experimental condition, the stereotype of elderly people was primed by means of a scrambled-sentence task and this was followed immediately by the elderly exemplar judgment task. In one control condition, a neutral scrambled-sentence priming task was followed by a neutral judgment task of equivalent length to the exemplar judgment task. In a second control condition, the stereotype of elderly people prime was followed by the neutral judgment task. (The second control condition was included because the first control condition differed from the experimental condition with respect to both prime manipulation and judgment task, which strictly speaking could place the source of any differences in the stereotype of elderly people prime rather than in the exemplar judgment.)

Procedure. The experimental location was down the corridor from a set of elevators in a room too small to accommodate more than a few people, helping to explain why participants were being scheduled

[3] We are grateful to the editor for pointing out this possibility to us.

individually. The experimenter explained that an additional short study of a second researcher was to be completed after the first study and then briefly introduced the scrambled-sentence task, which was presented as a creativity measure. Participants had 8 (Study 2a) or 7 min (Study 2b) to complete this task before proceeding to the next piece of research. The participant then received a second very short questionnaire from a second experimenter that contained either the exemplar manipulation or a neutral judgment task of equivalent length. On completion of this questionnaire, participants were directed to the elevators at the end of the corridor, where another experimenter was centrally administering the credit points for the participants (Study 2a), or they were paid and told they were free to go—the physical layout being such that they had to leave in the direction of the elevators in order to access virtually all other locations (Study 2b). The second experimenter surreptitiously timed the participants from the point of leaving the room (which had a strip on the floor, just next to the door) to their crossing a strip on the floor close to the elevators (13.5 m from the experimental room in Study 2a and 28.5 m from the room in Study 2b; a different room was used in Study 2b). In Study 2a, the experimenter administering the course credit conducted a brief exit interview in which participants were probed for suspicion and insight into the research and debriefed. In Study 2b, participants were debriefed later by letter. Experimenters were blind to condition.

Materials and manipulations. The scrambled-sentence questionnaires consisted of 30 items, with each item made up of five words, four of which could be rearranged to make grammatical sentences (Bargh et al., 1996; Srull & Wyer, 1979). Participants were required to write out these sentences on a separate blank sheet of paper (Study 2a) or underline the words selected on the questionnaire (Study 2b; this explains the slightly shorter completion time of 7 min chosen for Study 2b). In the elderly prime condition, 25 of the 30 sentences when rearranged made salient some aspect of stereotypes of the elderly people with the proviso that they did not refer to levels of activity or speed associated with this stereotype (e.g., "ring, three, forgot, she, to" becomes "she forgot to ring," forgetfulness being stereotypically associated with the elderly people). The 5 neutral sentences were included for embedding so that the stereotype did not become too obvious. In the neutral prime condition, neutral sentences (of roughly equal abstractness and grammatical complexity to the elderly prime version) were used.

The elderly exemplar judgment task consisted of a short questionnaire about Princess Juliana, someone with whom all participants were quite familiar. It was explained in the introduction to this questionnaire that the researchers were interested in students' perceptions of the monarchy and that in this version of the questionnaire Princess Juliana was the central figure. Participants were asked to give the first answer that came to mind in each case. In Study 2a, the questionnaire contained two four-option multiple-choice questions (concerning Princess Juliana's hair color and age), one open question (concerning her hobbies), and four 7-point rating questions (concerning how religious, how physically strong, and how emotional she is and how traditional her upbringing was), whereas in Study 2b, all items consisted of three-option multiple-choice questions (concerning her age, husband's name, date of marriage, official residence, preferred music, number of children, and hair color). In Study 2a, the neutral judgment task consisted of a similar number of questions, but in this case the introduction explained that the research was concerned with students' perceptions of Benelux countries and that in this version Belgium formed the central topic. (The 3 three-option multiple-choice questions were "Which color is not in the Belgian flag?", "What is the approximate population of Belgium?", and "What is the nickname of the Belgian football team?" Judgment ratings were "To what extent is Belgium a prosperous country?", "What proportion of Belgians speak Flemish?", "How much bigger or smaller is Belgium than the Netherlands?", and "To what extent is the Netherlands dependent on Belgium?") In Study 2b, we asked seven general background questions about the participant (age, study major, place of birth, sex, city of residence, marital status, and mother tongue).

Results and Discussion

In Study 2a, there was no evidence from the exit interviews that any of the participants had any insight into the nature of the research or made any connection between the two sets of questionnaires. The mean walking times of both replications are presented in Table 2.

For Study 2a, the comparison of means showed a significant difference, $F(2, 47) = 4.68$, $p < .02$. As predicted, participants in the elderly prime–exemplar judgment condition walked faster ($M = 7.36$ s) than both those in the neutral prime–neutral judgment condition ($M = 7.92$ s), $t(47) = 2.25$, $p < .03$ (pooled variance) and those in the elderly prime–neutral judgment condition ($M = 8.09$ s), $t(47) = 2.91$, $p < .005$. The elderly prime and neutral judgment conditions did not significantly differ from each other, $t(47) < 1$. The separate variance estimate contrasts were very similar and somewhat stronger.

The means for Study 2b reveal a very similar overall pattern to Study 2a (although overall times were longer because of the longer distance covered): The walking time was quicker in the elderly prime–elderly exemplar condition (15.66 s) than in the neutral prime–neutral judgment and elderly prime–neutral judgment conditions (17.27 and 18.10, respectively), $F(2, 36) = 3.77$, $p < .04$. The planned comparison between the elderly prime–elderly exemplar and the neutral–neutral conditions was significant, $t(36) = 1.70$, $p < .05$ (one-tailed), as was the difference between the elderly prime–elderly exemplar and elderly prime–neutral judgment conditions, $t(36) = 2.69$, $p < .02$. The two control conditions did not differ from each other ($t < 1$, *ns*).

The results of both of these studies provide support for the prediction that after priming of a stereotypic category associated with slowness (elderly people), making salient a specific exemplar associated with that stereotype can cause people to contrast their behavior away from the stereotype and to walk more quickly than in the baseline control conditions. A behavioral contrast effect results if a specific exemplar associated with the elderly category is judged after the stereotype of the elderly is primed, compared with a neutral baseline condition and compared with the case where elderliness is primed followed by a

Table 2
Mean Walking Times (in Seconds) as a Function of Condition

	Study 2a		Study 2b	
Priming condition	*M*	*SD*	*M*	*SD*
Neutral prime plus neutral judgment task	7.92_a	0.57	17.27_a	2.44
Elderly prime plus elderly exemplar	7.36_b	0.76	15.66_b	1.33
Elderly prime plus neutral judgment task	8.09_a	0.78	18.10_a	3.19

Note. Means in the same column that do not share subscripts differ at $p < .05$, one-tailed.

neutral judgment task. That is, judging an elderly exemplar after having the stereotype of elderly people primed led people to walk away more quickly than in the other conditions. The absence of behavioral assimilation in the elderly prime–neutral judgment condition (i.e., compared with the other control condition) found in both studies is perhaps somewhat surprising given the evidence of assimilation effects after priming the stereotype of elderly people in the research of Bargh et al. (1996). However, in the earlier research, no neutral judgment task was used after the prime: Behavior was measured immediately. Previous research has shown that the intervention of a subsequent judgment task can easily wipe out priming effects (see Bargh, Gollwitzer, Lee Chai, & Barndollar, 1998). However, the direction of the means suggests that walking speeds were indeed slowest in this condition, and this pattern (albeit nonsignificant) is consistent with residual assimilation.

Taken together, these two studies provide further evidence for the existence of contrast effects in automatic behavior after priming of a stereotype that activates a trait and the judgment of an exemplar associated with that trait. The fact that we were able to demonstrate this behavioral contrast effect in a more obviously motor behavioral domain compared with Study 1 reassures us that this is restricted to cognitive–intellectual tasks. Moreover, the fact that the priming manipulation was more subtle and the link to the behavioral domain much less obvious than in Study 1 suggests that it is highly unlikely that this effect is the product of conscious deliberation or even demand characteristics. Although we did not measure it directly, there seems little reason to suppose that Princess Juliana was seen as more extreme in terms of her elderliness than is the stereotype of elderly people in general, suggesting that an extremity explanation may not be sufficient to explain the evidence of contrast. Finally, these two experiments provide a baseline condition (the neutral prime–neutral judgment condition) that allows us to be more confident in labeling the effect obtained a genuine contrast effect. Although the exemplar conditions in Study 1 were reliably different from each other, suggesting some degree of contrast must have collectively accounted for this difference, that design did not contain such a baseline condition.

Study 3: To Compare or Not to Compare?

The third experiment was designed to shed light on the process underlying the behavioral contrast effect. In the introduction, we hypothesized that exemplars that are sufficiently extreme may evoke a relevant comparison dimension that forms a standard of comparison with the self and that this comparison with the self should lead to behavioral contrast (e.g., "I am not intelligent"). We thus expected priming with Einstein to lead participants to compare Einstein with themselves (or vice versa) and therefore to conclude "I am stupid" (or at least less intelligent), explaining stupid behavior. Priming with professors was not expected to lead to such a comparison and hence was not expected to lead to behavioral contrast but rather to behavioral assimilation (Dijksterhuis & van Knippenberg, 1998a, 1998b).

The goal of Study 3 was to demonstrate such a spontaneous comparison process after exemplar priming and the absence of such a comparison process after stereotype priming. We used the paradigm that was used in the first experiment, and we limited the experimental design to only two experimental conditions: Participants were primed either with professors or with Einstein. After participants were primed with Einstein or professors, they performed a lexical-decision task that measured the accessibility of words designating intelligence, of words designating stupidity, and of unrelated words. These words were (subliminally) primed either with words designating the self-concept (*I, me*) or with unrelated words (*the, and*). First, we predicted that the priming of both professor and Einstein would activate the trait of intelligence, leading to faster responses to intelligence and its synonyms than to neutral words or words describing stupidity. This activation of the trait intelligence is, in the absence of a comparison process, presumed to result in behavioral assimilation. However, because this assimilation effect can be overruled by a contrast effect under conditions of exemplar priming, we expected an additional effect to occur in the condition in which Einstein was primed. This is consistent with research by Manis, Paskewitz, and colleagues that shows that assimilation and contrast effects can occur concurrently and be evoked by the same stimuli (e.g., Manis & Paskewitz, 1984a, 1984b). As argued above, participants primed with Einstein should compare themselves with Einstein and draw the (not necessarily conscious) conclusion "I am stupid." That is, where words designating stupidity are preceded by a self-concept prime, these words should become highly accessible as well and a comparison with Einstein should lead to a fast response in a "me-dumb" trial. This heightened accessibility effect should be absent when no comparison is made, that is, under conditions in which participants were primed with professors.

Method

Participants and design. Fifty-five undergraduate students from the University of Nijmegen were randomly assigned to one of two conditions: They were primed either with professors or with Einstein. Participants received Fl. 5 (approximately $2.50) for their participation.

Procedure and stimulus materials. On arrival in the laboratory, participants were placed in individual cubicles and told that they would participate in two unrelated pilot studies and that they would receive all instructions by means of a computer program. The experimenter started the computer program and left.

The experiment consisted of two stages. First, participants were primed with professors or with Einstein. This was done in exactly the same way as in Study 1. After participants were primed, the computer program announced the second phase, which participants were told concerned a word recognition experiment, the goal of which was to find out how fast people could discriminate between words and nonwords. Specifically, participants were asked to focus on the screen every time a string of *XXX*s appeared. They were told that this string would be followed by a word or a nonword and were asked to decide as fast as possible whether a letter string was an existing word or not. Participants responded by pushing either a "yes" or a "no" button and were asked to keep their hands near the buttons throughout the task.

The lexical-decision task consisted of 36 trials. In 18 cases, the target word was an existing word, whereas in the remaining 18 cases, the target words were random letter strings (e.g., *gewws*). Of the 18 target words, 6 words were associated with intelligence (e.g., *intelligent, smart*), 6 were associated with stupidity (e.g., *stupid, dumb*), and 6 were unrelated to this intelligent–stupid dimension (e.g., *spontaneous, warm*). For each group of 6 target words, 3 of the targets were primed with words designating the self-concept (*I, me,* and *my*) whereas the remaining 3 were primed with control words (*the, and,* and *a*). We

made two versions of this task, so that 3 specific words that were preceded by words designating the self-concept in one version were preceded by control primes in the other and vice versa. Participants were randomly assigned to one of these two versions. The 36 trials were presented in random order.

The trials were built up as follows. First, we presented a row of *XXX*s on the center of the screen for 1,000 ms. Subsequently, the prime appeared on the screen for 15 ms. The prime was followed by the string of *XXX*s again for 500 ms, which in turn was followed by the target word. This word appeared on the screen until participants responded. The time it took participants to respond was recorded by the computer. After participants responded, the screen would remain blank for 1.5 s after which the next trial appeared. Following the lexical-decision task, participants were thanked, paid, and debriefed.

Results and Discussion

First, we excluded all reaction latencies higher than 1,000 ms (i.e., those greater than the mean plus approximately four standard deviations) from the analyses. The remaining latencies were subjected to a 2 (condition: professor vs. Einstein) × 2 (version of the lexical-decision task) × 2 (prime: self-concept vs. control) × 3 (target: intelligence-related words vs. stupidity-related words vs. neutral words) ANOVA with repeated measures on the last two factors. This analysis revealed no effects of version of the lexical-decision task.

A 2 (condition: professor vs. Einstein) × 2 (prime: self-concept vs. control) × 3 (target: intelligence-related words vs. stupidity-related words vs. neutral words) mixed ANOVA on the reaction latencies revealed a main effect of target, $F(2, 52) = 26.84$, $p < .0001$. As can be seen from Table 3, participants responded much faster to the intelligence-related words than to the other words. This is in line with our hypothesized general priming effect. Thinking about professors or Einstein increases accessibility of the concept of intelligence.

The three-way interaction failed to reach significance, $F(2, 52) = 1.38$. However, given the strong main effect of target and the specificity of our hypothesis of social comparison, we continued to do more specific tests (Rosnow & Rosenthal, 1995). First, we performed 2 (condition) between-participants × 2 (prime) within-participants ANOVAs on the intelligence-related targets, the stupidity-related targets, and the neutral targets separately. For both the intelligence-related and the neutral words, no reliable effects emerged (Fs < 1). The analysis on the target words designating stupidity, however, revealed a reliable interaction, $F(1, 53) = 5.37$, $p < .03$. As can be seen in Table 3, participants in the Einstein condition responded faster to the stupid words when they were preceded by a self-concept prime. Planned comparisons showed that they responded faster to these trials in comparison to the participants who were primed with professors (mean reaction time = 459 vs. 490 ms), $F(1, 54) = 12.24$, $p < .002$. Also, participants in the Einstein condition responded faster to stupidity-related words preceded by self-concept primes than to stupidity-related words preceded by control primes (mean reaction time = 459 vs. 491 ms), $F(1, 54) = 10.80$, $p < .004$, and than to neutral words preceded by self-concept primes (mean reaction time = 459 vs. 485 ms), $F(1, 54) = 6.38$, $p < .02$.

Table 3
Mean Reaction Times (in Milliseconds) as a Function of Priming

Condition	Type of prime	Targets: Intelligence related	Targets: Neutral	Targets: Stupidity related
Professor	Self	464	494	490
	Control	467	490	491
Einstein	Self	452	485	459
	Control	454	488	491

These findings clearly support the idea of a comparison process. Whereas participants in the Einstein condition showed a strong association between self-concept and the notion of stupidity, participants in the professors condition did not. Thinking about Einstein apparently leads one to think of oneself as stupid, whereas thinking about professors does not have this effect. Priming professors only rendered the concept of intelligence more accessible.

One may wonder why words related to intelligence were also highly accessible under conditions in which Einstein was primed. The heightened accessibility of words related to intelligence together with the heightened accessibility of words related to stupidity after a self-concept prime seems to suggest that in the Einstein condition there are two opposite effects, one potentially leading to assimilation and the other potentially leading to contrast. In our view, this seeming discrepancy can be explained by assuming that assimilation and contrast are not necessarily mutually exclusive but can be regarded as "opponent processes" that can occur somewhat independently and in parallel (see also research by Manis & Paskewitz, 1984a, 1984b). The only precondition for assimilation to occur is the activation of an abstract construct such as a trait. Now, regardless of whether we activate a stereotype or an exemplar, these abstract constructs are likely to be activated. That is, priming professors and Einstein should both activate intelligence. In both cases, the precondition for assimilation is met. Contrast effects, or more specifically comparative contrast effects, may on the other hand be conceived of as a different and additional effect that can overrule any tendency to assimilate that is also present (see also Stapel et al., 1996, 1997). For comparative contrast effects to occur, a different precondition has to be met, namely, the engagement in a comparison process. Thus, the crucial difference between our two experimental conditions is that participants primed with Einstein engage in a comparison process eliciting the contrast effect, whereas participants primed with professors do not engage in such a comparison process, thereby allowing the effects of construct activation—that is, assimilation—to become apparent. In terms of our data, in both conditions the concept of intelligence is activated. However, in the condition in which participants are primed with Einstein, this concept does not elicit corresponding behavior because the participants have created the link "I am stupid," and this contrastive comparison is sufficiently strong to overrule the effects of activating the general construct of intelligence.

General Discussion

The relation between perception and action is not as simple and straightforward as it originally appeared to be: Perception

does affect our behavior but not necessarily always in an assimilative manner. Whereas abstract concepts have been shown to lead to behavioral assimilation (Bargh et al., 1996; Chen & Bargh, 1997; Dijksterhuis & van Knippenberg, 1998a, 1998b; Levy, 1996), in this contribution we have demonstrated that concrete exemplars can evoke behavioral contrast. Thinking about Einstein apparently lowers one's intellectual capacity, and bearing the 89-year-old Dutch Queen Mother in mind puts an extra spring in one's step.

Support for behavioral contrast effects was obtained in two very different domains. In Study 1, intellectual performance was influenced by priming exemplars designating intelligence and nonintelligence. Intellectual performance may be seen as complex behavior involving highly differentiated stages and components. In Study 2, on the other hand, we demonstrated contrast effects on genuinely motor behavior by measuring walking speed. Hence, contrast effects were obtained in two completely different behavioral domains, from higher order mental processes to lower order locomotion. We also used different procedures to arrive at contrast effects. In Study 1, participants were primed with exemplars only (although we also assume that these exemplars evoked their associated stereotypes and traits). In Study 2, we activated stereotypes prior to activating the exemplars, simulating the notion that individual exemplars are perceived against the background of already-activated stereotypes. By demonstrating contrast in this experiment, we showed that behavioral contrast produced by exemplars can counteract previously activated stereotypes.

Study 3 was designed to shed light on the underlying process. On the basis of the literature on social comparison and social judgment, we formulated the hypothesis that concrete exemplars evoke comparisons (e.g., Stapel et al., 1996, 1997). Activating Albert Einstein, in other words, elicits the comparison of this exemplar with the self. This comparison leads to a conception of the self as more stupid or less intelligent. It is this conception, we argue, that leads to stupid behavior. Of course, these ideas rest on the assumption of the comparison being made and the resulting conclusion ("Boy, am I dumb!") being drawn. Study 3 provided support for this assumption. Thinking about the exemplar Einstein indeed led to an association between the self-concept and stupidity as evidenced by facilitated response latencies, whereas thinking about the stereotype of professors did not. Indeed, as might be expected, priming professors activated the concept of intelligence. Priming Einstein also activated intelligence, but the fact that stupidity was also made accessible in combination with the priming of self-reference helps to explain why participants perform less intelligently (contrast) in Study 1.

Overall, these findings are important in being the first to demonstrate evidence of contrast outside the domain of judgment and in the realm of behavior. Although there is growing evidence for automatic behavior, previous research in this domain has always shown that behavior reflects the contents of primed constructs. The notion that automatic behavior can also go against the grain of the prevailing context suggests that automatic behavior may be more varied, and its implications more wide ranging, than previously supposed.

Although an exemplar is a potential object of comparison, this does not necessarily mean that people exposed to exemplars always engage in a comparison. So when do people compare? In the typical social judgment paradigm, an exemplar is compared with another social target (e.g., Donald), whereas here we are interested in comparisons between an exemplar and the self. The research of Gilbert et al. (1995) shows that a comparison is easy to make and may even be spontaneous. They proposed that the chances of a comparison increase when the object of comparison is (a) recently encountered, (b) explicitly judged, and (c) extreme (see also Parducci, 1992) and argued that comparisons are hard not to make under these circumstances. The conditions under which exemplars were used in our study seem to conform to these criteria, but we should not assume that just any exemplar will evoke behavioral contrast.

A great deal of automatic behavior is likely to be assimilative in nature, and this may be generally quite functional. In walking the busy streets of the city center on Saturday, one may not even think before crossing the road if one sees a large group of people doing so. If one is at a party, many of the impressions one forms through the haze are also likely to be straightforward, stereotypic, and relatively automatic. Resulting behavioral assimilation may promote convergence in accents and maybe even attitudes (see Baldwin & Holmes, 1987), producing an agreeable degree of social cohesion. The requirement of relatively individuated impressions of others for behavioral contrast points to the circumstances under which this might occur. If during the party one engages in a discussion with one or two others in the well-lit kitchen, one is presumably forming (or already has) differentiated impressions of one's discussion partners. Assuming that these are the kind of circumstances promoting contrast, this may be functional too. One is likely to perceive others as distinctive if one disagrees with them, in which case contrastive behavior should also be appropriate. Much of this behavior may be conscious and calculated, to be sure, but our experience of parties tells us that much discussion and disagreement (and nonverbal behavior) occur to some extent "on autopilot." In sum, the notion that assimilation is the result of stereotypical impressions whereas contrast is the result of more refined, individuated impressions seems to fit in with some of the requirements for appropriate interpersonal behavior.

Obviously, such behavior does not emerge in a vacuum but in interaction with other individuals or exemplars. Effects of context on automatic behavior can be framed in terms of self-categorization theory: An interpersonal or intragroup context in which discrete individuals are salient as individuals is likely to promote the contrastive effects appropriate to interpersonal differentiation in this context (Turner, 1987). On the other hand, in intergroup contexts in which group identities are more salient, behavior may conform to the norms and stereotypes of salient in-groups. However, one of the more fascinating and counterintuitive findings from research using subliminal priming is evidence that White Americans take on the characteristics that are associated with negative stereotypes of African Americans in both their judgments (Devine, 1989)—ironically, even when they favor strong intergroup boundaries (Lepore & Brown, 1997)—and in their behavior (Bargh et al., 1996; Chen & Bargh, 1997). Such findings are something of a puzzle from the perspective on intergroup relations, where one would not expect people to become like the out-group. In defining the circumstances under which such assimilation does not occur,

and contrast results, the present research helps to explain the more familiar maintenance of intergroup difference, whilst more optimistically providing a mechanism for behavioral variety and change.

To conclude, the present research integrates theorizing on contrast effects in social judgment with that on automatic social behavior to provide the first direct demonstration of contrast effects in automatic behavior. One of the more reassuring messages to emerge is therefore that automatic behavior is not a one-way street ending up in assimilation. The fact that contrast as well as assimilation can occur may help to explain the diversity of social behavior as much as do the strategies of interpersonal and intergroup differentiation that people consciously employ. The consequences of both assimilative and contrastive automatic behavior are far reaching and should be the subject of future research. We close with perhaps one of the more trivial of these implications. This concerns advice we might offer celebrities such as Mick Jagger and other stars known for their predilection for supermodels. If these people share the popular stereotype of supermodels found among our participants, they would be wise to restrict themselves to a single such partner (i.e., an exemplar) on intellectual as well as moral grounds.

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