How Social Comparison Moderates Automatic Behavior

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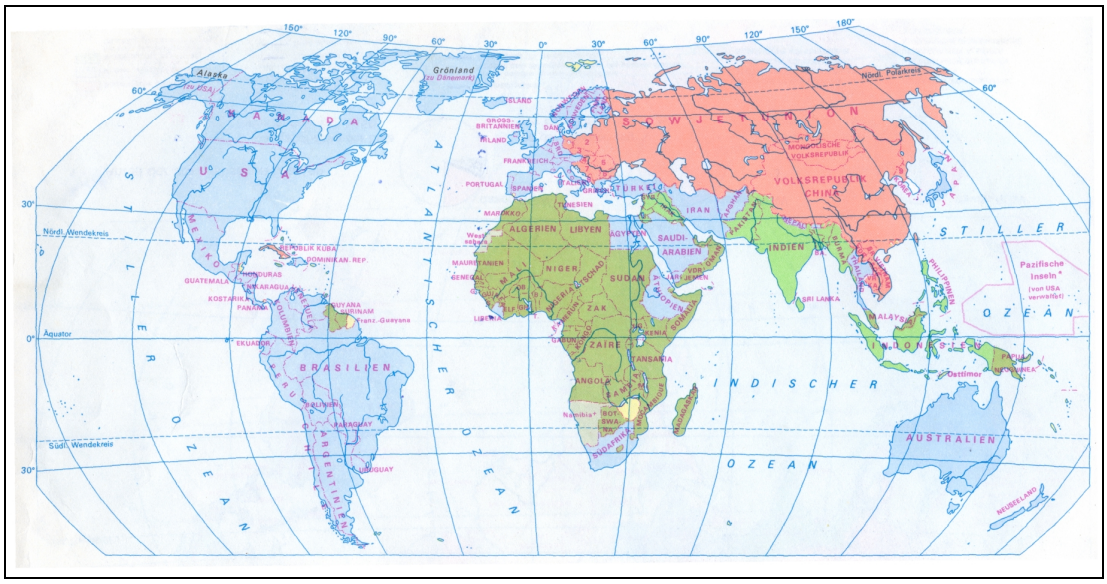

Figure 1. The world divided in distinct social categories. Taken from the school atlas of the author, printed in the German Democratic Republic, 1979.

1 INTRODUCTION

worried, Florida, old, lonely, grey, careful, sentimental, wise, stubborn, bingo, forgetful, wrinkle, rigid, traditional, bitter, conservative, dependent, ancient, gullible, cautious

elderly stereotype primes, Bargh, Chen and Burrows (1996)

This thesis brings together two topics. On the one hand, there is the phenomenon that members of social groups often try to differentiate themselves and their group from other groups. First examples that come to mind are political parties which try to emphasize the difference in their political claims, and often seem to take on certain attitudes just because they want to contradict what another party said. Another example might be youth groups, which seemingly out of an urge to distinguish themselves from other groups--or from the generation of their parents--choose clothes and music with the goal to differ. As we will see in the course of this thesis, this phenomenon is pervasive in many social contexts, and well-documented.

On the other hand, this thesis looks at behavior that occurs outside of conscious awareness and without any conscious intention. The reader is probably familiar with curious errors in everyday behavior, in which we recognize the workings of our associative mind. Freudian slips of the tongue are a nice example, in which we say something that is contrary to our conscious wishes, and yet so true that it becomes embarrassing. Another example are cases in which an environmental cue leads to the automatic execution of a habit, and we find ourselves moments later performing an action that we did not plan at all. I am sure that the reader is familiar with those situations.

So, the two topics of this thesis are intergroup differentiation and unconscious behavior. They are brought together to the hypothesis that intergroup differentiation can happen unconsciously, without a conscious plan to act like this, and sometimes even without the possibility of consciously introspecting what is going on.

While this is the main hypothesis of the present thesis, the starting point--the initial motivation to pursue the topic at hand--were experiments that reported quite the opposite. They seemed to suggest that our unconscious cognitions follow other rules than our conscious cognitions, and that we mimic and assimilate to other groups when conscious awareness is not there to guard our actions. Consider one of these

experiments: In what was probably the most impressive study in their seminal paper, John Bargh and colleagues (Bargh, Chen, & Burrows, 1996) had half of their participants think about sentences related to the stereotype of the elderly. The important words in these sentences--the associations with the elderly stereotype--are copied at the top of this section. Importantly, the participants were not aware of the unifying topic "the elderly." Afterwards, they were told that the experiment was over, and that they could leave. But while they walked to the elevator, the time it took them to get there was measured. It turned out that those who had thought about the elderly stereotype walked slower; it took them about 1 s longer for the 10 m walk. Apparently, these participants unconsciously mimicked the behavior typically ascribed to elderly people.

For me, this was an intriguing finding since it showed that our behavior could be influenced by such subtle cues. But I found it even more intriguing that the participants walked slower instead of faster! This puzzle was the starting point for this thesis. I was interested in how structures in our social environment, such as sharp divisions of people into social categories which I have experienced myself in the past (see Figure 1), our experience of membership in a group, and the categorization of self and others into a common group, shape our nonconscious behavior.

Before the layout of this thesis is explained, I would like to introduce the issue of unconscious cognition and effects. How the mind operates without consciousness, what consciousness exactly is, and what it might be good for, has been the topic of much debate in social psychology in the recent years. Instead of repeating the arguments in this thesis, I want to cite Julian Jaynes (1976, p. 22) in order to sketch a distinction which is most relevant here. It is the distinction between consciousness and reactivity:

> We are constantly reacting to other things without being conscious of them at the time. Sitting against a tree, I am always reacting to the tree and to the ground and to my own posture, since if I wish to walk, I will quite unconsciously stand up from the ground to do so. ... Reactivity covers all stimuli my behavior takes account of in any way, while consciousness is something quite distinct and a far less ubiquitous phenomenon. We are conscious of what we are reacting to only from time to time.

The major part of the present thesis will look at this reactive behavior. The question will be how individuals unconsciously react to social stimuli, and how the categorization of these stimuli decides on the form of the reaction. Furthermore, I will describe how conscious cognition can sometimes lead to unconscious behavior. In all this, I will not constantly try to prove that thinking and behavior can really be unconscious. The reader who is interested in a more elaborate discussion of this topic is referred to works from Bargh and colleagues (Bargh, 1997b; Bargh & Chartrand, 1999; Wegner & Bargh, 1998). Instead, I would like to cite Jaynes (1976, p. 23) again, who found a wonderful metaphor to question the belief that consciousness is the sum of our mental processes occurring at every moment:

> It is like asking a flashlight in a dark room to search around for something that does not have any light shining upon it. The flashlight, since there is light in whatever direction it turns, would have to conclude that there is light everywhere. And so consciousness can seem to pervade all mentality when actually it does not.

The following chapters will try to shed some light, so to speak, on what is going on in this darkness when the flashlight is not looking. The chapters are organized in a bottom-up hierarchy. In Chapter 2, very simple causes of automatic effects are considered. In the subsequent chapters, progressively complex causes are investigated. More specifically, in Chapter 2, I will cite evidence that behavior is reacting to environmental stimuli without conscious awareness, planning or decisions. To explain these findings, models of the human memory and the relation between perception and action will be discussed. While Chapter 2 focuses on non-social stimuli, in Chapter 3, I will report evidence showing that images or stereotypes of social categories can have equivalent effects, and also lead to reactive behavior outside of awareness. The study on mimicking of elderly people was a first example of the evidence discussed in Chapter 3. The theoretical and functional explanations for these effects are discussed, and implications for the domain of intergroup behavior will be sketched, with the conclusion that the current understanding of effects of stereotypes on behavior cannot be the whole picture. In Chapter 4, I will first discuss how traditional theories of intergroup relations, which have mainly ignored the distinction between reactive behavior and conscious behavior, explain and predict differences between and similarities within categories. I will then draw

on a recent theory of social comparison (Mussweiler & Strack, 2000a) in order to develop a model of reactive behavioral contrast from stereotypes. Assumptions and hypotheses of the model are summarized at the end of Chapter 4; the next chapters then go on to present my attempts to test these hypothesis empirically. In sum, the bottom up hierarchy describes increasingly complex causes of unconscious behavioral effects: First trait activation, then activation of traits by activated stereotypes, and finally modification of stereotype-activated traits by conscious thoughts.

adhere, agree, comply, conform, copy, customary, emulate, follow, habitual, imitate, maintain, mimic, obey, oblige, respect, simulate, supportive, uniform, uphold

Conformity primes, Epley and Gilovich (1999)

There is one central assumption on which all arguments in this dissertation rest: When concepts are readily accessible in memory, the likelihood of behavior according with the concept is increased. So, for example, if the concept of criticism is highly accessible in your memory, perhaps from reading a harsh review of the latest movie a few minutes ago, you might now go back to this assumption and read it a few times, scrutinizing its validity. Importantly, this assumption implies that for this kind of effect, there is no need for a deliberate decision to behave in this way. Rather, the behavior is caused directly by the event. That is, if you admired the harsh review and consciously planned to be equally critical in the future, the assumption would appear trivial.[1] In contrast, the point is that the link between knowledge activation and behavior is automatic, i.e. not conscious. It is of course still possible that you are aware of both the knowledge-activating event and the behavior. The important point is that the link between the two remains outside of conscious awareness. So, your critical behavior may be accompanied by conscious thoughts about your style of reading, but without any reference to the knowledge-activating event. In the words of Bargh and Chartrand (2000), the focus is on "passive, or unintentional, forms of cognitive mediation in an attempt to keep it distinct from motivational mediation as much as possible" (p. 253).

Given the importance of the assumption, the definitions should be as clear as possible. I shall focus on concept, accessibility, priming, and automaticity. First of all, concepts are knowledge structures in memory that serve two major purposes. Concepts are used to categorize members of a category, or, to put it differently, concepts allow perceivers to discriminate members of a category from non-members. The term category in general refers to the actual (physical) exemplars of a concept. Once members of a category have been identified, knowledge stored in a concept is

[1] Instead, the question would then be how your attitudes translate into conscious intentions and actual behavior, see Ajzen (1991).

used to understand, predict, and interact with the members of the category (Barsalou, 1992). All knowledge used to fulfill these functions with respect to a category can be called a concept. Importantly, not only physical objects (e.g., cars) can be members of a category. Likewise, events (e.g., holidays) and behaviors (e.g., running) can be regarded as categories. We have conceptual knowledge to perceive running, and also to understand its process (e.g., knowledge about force and muscles), predict its consequences (e.g., knowledge about respiration), and to act (e.g., prepare ourselves for a 10 km run). Barsalou (1992) pointed out that concepts are often just investigated with regard to the features associated with a concept, e.g. engine and needs fuel for the concept of cars. In fact, many of the experiments reported in the following two chapters use feature lists to activate a concept. However, following Barsalou, considering how the relations between the features (e.g., tanks contain fuel), and the dynamics (when fuel is burned, the car moves) are represented is crucial to understand how conceptual knowledge allows us to interact with the environment. In the following, the terms concept, and synonymously construct, will be used to refer to knowledge about categories of objects, persons and behavior in general.

The term accessible is employed in accordance to Higgins (1996). He defined accessibility as "the activation potential of available knowledge." The more accessible a mental representation is, the more likely it comes to mind later on. An event that increases the accessibility of conceptual knowledge is called priming. Priming events are events in the environment that temporarily activate an individual's mental representations, or a specific concept. In the example above, the movie review worked as the priming. Activated knowledge can then have effects on perception, the way of thinking, and on behavior (Bargh, 1997b).

At this point, it is necessary to comment on the term automatic. Priming effects are often referred to as automatic, since they seem to capture an automatic response of the individual to the environment. In the following, the term will also be used in this way from time to time, when I denote effects of priming on behavior as automatic behavior. However, a more restricted and precise definition of automatic processes distinguishes them from priming. For instance, Bargh and Chartrand (2000) suggest that "automaticity research focuses on more permanent, 'hardwired' sources of activation--that is, chronic accessibility of social knowledge structures" (p. 256), and

"generally concerns chronic individual differences in mental representations that transcend the current context" (p. 258). Automatic processes are not a homogenous group of processes, but can have separate qualities. These qualities are (1) awareness of the operation of the process, (2) efficiency of the process (i.e., does it operate when another task is performed), (3) whether the process is unintentional, and (4) controllability (Bargh, 1994). For instance, breaking when a traffic light is red may be very efficient, at least sometimes unintentional, for many people most likely controllable (i.e., they can override it), and sometimes registered in conscious awareness and sometimes not. Priming research in contrast emphasizes mainly the lack of awareness of the potential influence of the priming event (Bargh & Chartrand, 2000). This criterion is also central in the studies that will follow.

As said above, priming can have effects on perception, thinking, and behavior. Of these three areas, this thesis is especially concerned with influences of knowledge accessibility on behavior. In principle, priming events can have indirect and direct effects on behavior. Indirect effects are mediated by previous effects on perception, thinking or evaluation. If for instance a priming event (e.g., a movie) activated "dangerous," you might afterwards interpret ambiguous behavior by a stranger as threatening, and behave accordingly (Higgins, Rholes & Jones, 1977; Neuberg, 1988). Thus, the priming has an indirect effect on the way you behave. A second example of indirect effects on behavior may be mediations by mindset priming. If a priming event activates a deliberative mindset, i.e. dwelling extensively on the pros and cons of a specific action, subsequent actions may be preceded by a longer period of deliberation and thinking (Gollwitzer, Heckhausen, & Steller, 1990). Here, again, behavior is influenced by a priming effect on cognitive processes. When a priming activates a goal, this goal may in turn guide actions which are then mediated by the primed goal (Bargh, 1997b). Finally, primed evaluations of an object or person may lead to behavior, exemplified in approach-avoidance behavior (e.g., Neumann & Strack, 2000a). In all these cases, behavior is influenced by priming in an indirect way, mediated by conceptualization, mindsets, motivation, or evaluation.

Direct effects of priming on behavior, however, are assumed to be a result of the following mechanism: Mental representations of behavior (e.g., motor actions, scripts) become more accessible as an effect of the priming, and because of this increased accessibility these behaviors are then more likely to be performed. So, a

movie containing violent scenes may prime scripts of physical aggression, which can then guide later behavior. Since the priming events are (in most cases) perceptions of events in the environment, this direct route is called perception-behavior link (Bargh et al., 1996). The next section reports evidence for such direct effects of perception on behavior (for an overview, see Table 1 of the Appendix), before theoretical models are discussed.

2.1 Evidence for Automatic Behavioral Effects of Construct Priming

In what now is a classic study, Darley and Batson (1975) gave half of their male participants a copy of the parable of the Good Samaritan, and told them that they would have to give a talk about the parable. The other half of the participants expected to give a talk about effectiveness in their future jobs. In the terms of priming research, the Good Samaritan parable activated the topic of helpfulness, while the job effectiveness condition did not activate helpfulness, but task-relevant behavior. These participants then had to change buildings, and on their way each of them encountered a "victim," actually a confederate of the experimenter, who was sitting on the floor, apparently sick and not moving. When primed with the parable, 53% helped the "victim"; when preoccupied with task-relevant behavior, only 29% helped. Although this difference was not significant due to a low N, a later reanalysis by Greenwald (1975) concluded that the results were actually favorable of the hypothesis that reading the parable increased helping behavior.

The same topic was again tackled by Macrae and Johnston (1998). In their studies, the priming did not involve reading a text, but unscrambling 15 sentences of which 10 either contained words related to helping or not (a so-called scrambled sentences priming). After the priming, the experimenter staged a situation in which she dropped some pens while carrying a pile of books; helping behavior was indicated if the participants picked up the pencils. Almost all of the participants primed with helpfulness picked up the pencils within 10 s (93.7%), but fewer of the other participants did so (68.7%).

These findings indicate that the likelihood of helpful behavior can be increased by previous occupation with the topic in the form of verbal information. Similar findings indicate that other forms of behavior can be influenced in a similar manner. A scrambled sentences priming with words related to rudeness can cause participants

to interrupt a conversation earlier (Bargh et al., 1996). Similarly, unscrambling sentences with aggression-related content can increase the number of shocks delivered to a learner in a standard aggression paradigm (Carver, Ganellen, Froming, & Chambers, 1983). Epley and Gilovitch (1999) used scrambled sentences to prime the concepts of conformity or nonconformity, and studied how much the participants afterwards agreed with confederates whose attitudes were different from their own. Compared to a no-priming control group, the conformity priming increased agreement with the confederates, but a non-conformity priming did not work in the opposite direction.

Apart from scrambled sentences primes, other priming procedures have been used as well. Dijksterhuis and van Knippenberg (1998) had their participants think about either the concept of intelligence or the concept of stupidity for 5 minutes. Subsequently, they had to answer Trivial Pursuit questions. Participants who had thought about intelligence answered more questions correctly than those who had thought about the concept of stupidity. Wilson and Capitman (1982) gave their male subjects a prose passage describing a student's life, including a boy-meets-girl passage which supposedly activated a social script related to friendliness and dating (Schank & Abelson, 1997). After reading the passage, they were brought in contact with an attractive female confederate; those who read the prose passage beforehand behaved more friendly towards her then those who did not.

2.2 Explanations for Behavioral Effects of Construct Priming

These findings are certainly intriguing. How can we explain that "action can unfold when the 'lights are off and nobody's home'" (Macrae & Johnston, 1998, p. 402)? Explanations rest on several assumptions. First, actions and action tendencies are represented mentally, and are associated with concepts. Second, they become active when associated concepts are activated, and can then influence overt behavior, unless they are overridden by other processes. Third, this works not only with low-level motoric behavior, but also with more complex representations such as "intelligent behavior." The following sections review these assumptions in detail.

Motor representations in memory

Before literature on explanations for automatic behavior is reviewed, it is worth to discuss the mental representation of action. Importantly, note that this discussion is

not meant to be a comprehensive review of the literature on motor representation, but rather a cursory look at three recent theories which seem interesting candidates to explain the background of behavioral priming.

It has long been noted that concepts not only include knowledge about the perceptual characteristics of a category, but also knowledge about actions that can be performed with exemplars of the category. So, our concept of chairs not only includes knowledge about their appearance, but also about sitting on them (Carver et al., 1983; Rosch & Mervis, 1975). But how is this knowledge represented, and what role does it play in our thinking about them? Standard theories of knowledge and cognition typically assume that the perception of external objects and events produces sensoric codes which are then transformed and abstracted in amodal codes. The actual "hard work" of cognition, categorization, reasoning and the like, are thought to operate on this level. Only after the cognitive system has come to a conclusion, i.e. a plan of how to act, the result is transformed back into motoric codes which then guide bodily movements and actions. Recently, some theorists have challenged this view, arguing for a closer connection between perception and action.

As a first example, Barsalou (1999b), building on earlier thinkers like Hume and Kant, argued that no amodal mental representations exist at all. In his view, our mental representations are perceptual symbols. Perceptual symbols are described as brain states that arise during the perception of an object and are then captured in memory. Once captured, they can be reproduced later, leading to a perceptual simulation. Furthermore, perceptual symbols extend beyond vision and include other sensory modalities, such as proprioception and introspection. Barsalou (1999b) gives a detailed account on how such systems can implement propositions and abstract concepts, and what evidence exists for them (and for the existence of amodal representations on the other hand). The important point here is that in such a conceptual system, motoric codes play a prominent role in the perception and categorization of objects and persons. According to this theory, thinking about a concept means simulating its perceptual consequences, making visual characteristics prominent and activating motoric responses typically associated with the concept. Thus, when one has the task to recall or verify properties of an object (Barsalou, in press), the concept is typically perceptually simulated, and the activation of properties depends on the perceptual characteristics (e.g., size and occlusion).

Likewise, typical motoric responses to an object in a specific situation should become active. Since priming procedures often involve understanding of written language, and since language can be viewed as preparation for situated action (Barsalou, 1999a), there is good reason to assume that mental representations of motor responses become active just from understanding written references to the primed concept.

A similar theory of memory was proposed by Glenberg (1997). Building on Lakoff and Johnson's work on cognitive linguistics (Lakoff, 1987; Lakoff & Johnson, 1999), he postulates that mental representations and memory are embodied: they arise from and refer to bodily interactions with the world. Understanding a concept means activating potential actions related to it. More specifically, understanding language such as priming sentences means constructing a mental model which represents agents and their actions. Each new sentence is then understood by "meshing" actions suggested with the pattern of actions already established. Glenberg argues that long term memory stores action patterns. Fulfilling the function of implicit, effortless memory, stored action patterns are then meshed with interaction possibilities afforded by the environment (Gibson, 1979). Meshing is constrained by possibilities of the human body. In sum, Glenberg explains the human cognitive system as an action-representing and action-planning device, in which increased action readiness as in the cited priming studies indicate absolutely normal cognitive processes.

In social psychology, a similar proposal was brought forward by Carlston (1994). In his Associated Systems Theory (AST), specialized ("low") levels of functioning in the perceptual and behavioral domain feed into more general or abstract ("higher") levels, similar to traditional theories of brain function. AST posits that this vertical dimension exists in four primary mental systems: a visual/sensory system, an action system, an affective system, and a verbal/semantic system. At more abstract levels, these four system begin to overlap. If we consider only the first two systems, the representation of a person is assumed to involve the visual appearance of the person, habitual behavioral responses to the person, and behavioral observations of the person. Most important for the present topic, the more abstract representations in each of these domains are linked in such a way that the activation of a lower level activates the respective more abstract representation, and vice versa. In AST, it is conceivable that the perception of a person primes both the performance of a habitual

response to the person and the mimicking of an observed action. While Carlston developed AST primarily for the modeling of person perception, he acknowledges that it can easily be generalized to social stereotypes.

Taken together, there is a strong tendency to assume that mentally represented motoric codes are not only involved "late" in cognition, after some central executive module which works in an abstract and amodal medium has decided what to do. Instead, prominent theorists suggest that motoric codes are involved in the perception and understanding of the environment, and that they are activated along with more perceptual features even when no specific actions are planned. All this is apparently in the service of situated action which needs to be adapted to the environment: "Thinking is for doing" (Bargh et al., 1996; Clark, 1996; Fiske, 1992; James, 1890).

Activation of Motoric Codes: An Associationistic or an Ideomotor Process?

Theoretical accounts of the perception-behavior link (e.g. Bargh et al., 1996; Macrae & Johnston, 1997) typically invoke a mixture of a spreading activation account and an ideomotor account. To my knowledge, the automatic behavior literature has in the past not clearly distinguished between these two accounts (e.g., Bargh et al., 1996; Chartrand & Bargh, 1999). The two accounts differ in the assumptions about the underlying mental representations, but basically lead to equivalent predictions for the present purposes. The first account extends the prominent view of sensorimotor theories by allowing "shortcuts" established by spreading activation between perception/conception and action. The second account, building on the ideomotor principle (Lotze, 1852; James, 1890), goes further and argues that action already plays a role in perception, and follows naturally from conception. The following section explains the two accounts in more detail.

Traditionally, overt behavior is seen as the outcome of several stages of cognitive processing, which starts with perception (stimulus preprocessing followed by feature extraction) and is only then followed by response choice and response production (cf. Hommel, Müsseler, Aschersleben, & Prinz, in press). Take as an example the Affective Aggression Framework proposed by Anderson, Anderson and Deuser (1996); in their model, the behavioral choice (and the actual behavior) is an outcome of appraisals or even re-appraisals of the situation. Cognitive cues from the environment (e.g., weapons) may influence the appraisal by increasing the accessibility of hostile thoughts and aggression scripts, but they are not supposed to

have any direct influence on behavior. A spreading activation account of the perception-behavior link builds on these more traditional models which view action as an outcome of a linear process, but allow "shortcuts" between the various stages. The spreading activation accounts of behavior, which have been mainly developed for the explanation of impulsive aggressive behavior (e.g., Berkowitz, 1984, 1993, 1997; Carver, 1997; Carver et al., 1983), postulate that the perception of a violent act or a stimulus associated with violence (e.g., a weapon), and the subsequent activation of the interpretive schema "aggression" leads to the activation of other aggressive concepts, including behavioral scripts. This activation is thought to occur "automatically and without much thinking" (Berkowitz, 1984, p. 410).[2] The basic idea therefore is that mental representations activated in the course of perception (interpretive schemas) directly activate mental representations of motor responses (behavioral scripts), bypassing a conscious stage of response choice. Thus, the only difference to a traditional linear stage model is the automatic link between stimulus extraction and response selection. This spreading activation account exemplifies a renaissance of associationistic concepts in the social cognition literature (Berkowitz & Devine, 1995).

A more radical explanation, which actually goes back to theorizing from the early days of psychology, uses the idea of the ideomotor principle. It was first proposed by Lotze (1852), and similar ideas have been championed by a number of influential theorists of psychology, most notably James (1890; for notes on the history of this concept, see also Bavelas, Black, Lemery, MacInnis, & Mullet, 1986; Macrae & Johnston, 1997). Similar to the spreading activation account, the ideomotor principle predicts that merely thinking about an action initiates the action to some degree.

Following his discussing of involuntary reflexes and involuntary facial expressions of emotions, Lotze (1852, p. 293) wrote:

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[2] Berkowitz (1993) formulated it as follows: "Negative affect and/or external stimuli having an aggressive meaning prime an aggressive inclination plus aggression-related feelings, ideas, and memories" (p. 71). Anderson, Benjamin and Bartholow (1998) demonstrated that indeed both weapon names and pictures of weapons increased the accessibility of violent actions as measured by speeded pronunciation of verbs denoting violent actions (e.g., destroy, harm, torture).

> Mimicking movements are initiated by imaginations of movements, without a noticeable decision of the will being involved. The spectator accompanies the throwing of a billiard-ball, or the thrust of the swordsman, with slight movements of his arm; the untaught narrator tells his story with many gesticulations.... These results become the more marked the more we are absorbed in thinking of the movements which suggest them; they grow fainter exactly in proportion as a complex consciousness, under the domination of a crowd of other representations, withstands the passing over of mental contemplation into outward action.[3]

James (1890), in his chapter on ideomotor action, concluded: "We may then lay it down for certain that every representation of a movement awakens in some degree the actual movement which is its object" (p. 526). The difference to the spreading activation account is the assumption that perceiving and acting rely on a common mental representation, or a "common coding" (Prinz, 1990; Hommel et al., in press). The respective theory developed by Prinz and colleagues posits that additionally to the previously mentioned levels of sensoric and motoric codes, which may still be connected by direct links that constitute overlearned stimulus-response-connections, there exists another level on which external events and actions are represented in a common medium. This common medium is the "language" of external (distal) events, that is, actions are represented in the form of their distal sensory consequences. Greenwald (1971, p. 484) gives a concise summary of the ideomotor principle: "(a) Actions are represented in the central nervous system in the form of images of their sensory consequences and (b) such feedback images serve the function of initiating performance of their corresponding actions" (see also Greenwald, 1970). This allows for an even more direct connection between perception and action. Hommel et al. (in press) argued that this common coding of perception action developed for "matching perception and action planning--on top of the old system for mapping and response selection" (p. 82).

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[3] The first sentence was translated by myself; the translation of the remainder is taken from James (1890, p. 525). It is interesting to note that James demoted the active nature of imagination by translating the original passage "the more unrestrainedly we immerse ourselves in the contemplation of movements" (dt. "je unbefangener wir uns in die Anschauung der Bewegungen vertiefen") into the passive form "the more we are absorbed..."

In such a system, the observation of an action involves the same codes that are also used in performing that action. As a consequence, perceiving an action increases the likelihood of and facilitates similar behavior at a later time. There is now considerable evidence for both increased likelihood and facilitation of actions after seeing them performed by another person. Chartrand and Bargh (1999) demonstrated that mannerisms performed by an interaction partner are likely to be unconsciously mimicked. They exposed their participants to confederates who either repeatedly rubbed their face or shook their foot during a task performed together. The participants mimicked this behavior without intention and awareness (try this with your colleagues during your next meeting). Thus, observing a behavior increased the likelihood of performing the same behavior (see also LaFrance, 1985; Chapter 4). Fadiga, Fogassi, Pavesi, and Rizzolatti (1995) demonstrated that the direct observation of a movement facilitates imitating movements. They measured electromyographic potentials while the participants observed the movements performed by the experimenter. Muscles involved in the actions performed by the experimenter were also activated in the observer. Furthermore, this was true both for participants who after some trials actually had the task to imitate the observed actions, and for participants who were never required to imitate (for further evidence on mimicry, see Hommel et al., in press). This basic mimicry mechanism has been proposed to underlie emotional or mood contagion (Hatfield, Cacioppo, & Rapson, 1993; Neumann & Strack, 2000b), speech perception (Fadiga & Gallese, 1997), and the convergence in the physical appearance of spouses over the years (Zajonc, Adelmann, Murphy, & Niedenthal, 1987). Finally, recent neurological investigations found a possible candidate for a neurological substrate of this mimicry behavior. This evidence suggests that in monkey brains, there are "mirror neurons" which fire at both the performance of a specific action and the observation of the same action performed by another monkey or human. These mirror neurons could be a neurological basis for the common coding principle. Evidence from positron emission tomography suggests that a similar region exists in the human brain (for overviews, see Fadiga, Fogassi, Gallese, & Rizzolatti, 2000; Fadiga & Gallese, 1997). Interestingly, the direct observation of an action is not necessary for imitative behavior when the dynamics of the action can be inferred from action outcomes. Starch (1911) demonstrated that the inclination and size of handwriting is unconsciously and unintentionally imitated when the handwritten text is copied.

But note that in all these cases, an actually observed behavior and not an only mentally activated concept was mimicked. Therefore, the results are not directly relevant to the more general topic of this thesis, since its emphasis is rather on semantic priming effects. So far, the ideomotor principle research concentrated mainly on perceived actions performed by other persons.

The same is true of earlier research on behavioral contagion (Wheeler, 1966) and social facilitation (Thorpe, 1956; Bandura & Walters, 1963): They are only indirectly relevant to the present hypothesis, since the behavior under investigation was almost always observed directly, and not activated indirectly through other means. Consider first behavioral contagion: Wheeler (1966) defined it as a situation in which an initial restraint against a behavior is reduced by observing a model performing the same behavior. Importantly, for behavioral contagion it is necessary that the observer was instigated to the behavior before observing the model. Social facilitation, in contrast, was defined by Wheeler as a situation in which a person had neither restraints against nor a tendency toward a behavior which is then observed in a model. While Wheeler explains behavioral contagion by a reduction of fear, social fascilitation is explained by a mix of overcoming of inertia, classical conditioning and "cognitive behavioral-chaining." The latter mechanism is described similar to the ideomotor principle. In all these cases, the behavior is the result of the immediate observation of a model.

In contrast to all these theories--ideomotor accounts, behavioral contagion, and social fascilitation--, the spreading activation account concentrates on concepts activated mainly by language. To use the ideomotor principle as an explanation for construct priming effects on automatic behavior, it must be assumed that not only the perception of others, but also the understanding of language (e.g., scrambled sentence primes) invokes action representations. This is in fact precisely the argument brought forward by Glenberg: "We understand language by creating embodied conceptualizations of situations the language is describing." (1997, p. 12), and it is compatible with recent formulations of the ideomotor principle (Hommel et al., in press).

It is my contention that the ideomotor account promises more precise predictions because it takes into account the actual situation of the individual (predicting situated action). The spreading activation account is confronted with the problem that the concept of spreading activation itself is much debated. Hardin and Rothman (1997)

pointed out that "current evidence from the cognitive literature suggests that activation does not spread very far, if at all" (cf. Glenberg, 1997).[4] For the present purposes, it can be summarized that current cognitive theories assert that the activation of a construct can facilitate and increase the likelihood of behavior associated with that construct. Associationistic models (e.g., Berkowitz, 1984) argue that this occurs because of activation spreading from perceptual representations of the concept to associated motoric representations. Ideomotor principle models (e.g., Hommel et al., in press) imply that the mental representations involved in the perception process are also those used for action, and that their previous activation facilitates the subsequent enactment. In both cases, the prediction not only states that an effect on overt behavior occurs, but also specifies the direction of the effect. It is predicted that the behavior is assimilated to the activated construct, that is, that corresponding and not opposing behavior is performed.

Hierarchical Arrangement of Behavior Representations: From Complex to Simple

Already the early conceptions of "automatic behavior" assumed that not only simple movements, but also quite complex behavior can be produced automatically. Lotze (1852) wrote: "We do not think that this development of movements [by mimicry] is restricted to trivial and negligible actions of ordinary life. Compound arrays of movements which may even include a crime may make themselves happen in this manner..." (p. 294f). Evidence discussed above implies that priming of a more abstract concept such as "intelligence" can result in better performance in a knowledge task. How is it possible that something that psychologists have difficulties to define can be primed with effects on performance? A first clue is the procedure used for the priming. Construct associations embedded in scrambled sentences typically refer to low-level vivid behavioral examples of the primed constructs. Thus, a rudeness prime in fact primes bothering, disturbing, intruding, and interrupting (Bargh et al., 1996). As for the example of the intelligence prime

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[4] According to Glenberg (1997), priming effects between words of a text (i.e., that an earlier word primes the understanding of a word following later) reflect the ease of constructing a coherent mental model, or, in the words of Glenberg, "priming reflects ease of integration (mesh) of concepts, not spread of activation along permanent links" (1997, p. 14). Glenberg even proposes that the concept of "mesh" can replace "association": "The notion of mesh can, like an association, be used to relate concepts, but the nature of the relation is deeper: when patterns [of actions] mesh, they modify each other because they must conjoin in a way that respects constraints of bodily action." (1997, p. 18).

(Dijksterhuis & van Knippenberg, 1998), the priming consisted of asking the participants "to think about the concept of intelligence ... for 5 min and to list synonyms and behaviors characteristic of this trait" (p. 872). It seems that in this case, the participants themselves provided the link from the abstract prime to the instantiating behavior. It is therefore debatable whether an abstract concept was primed at all.

Nevertheless, it is worth to add that similar results from a mere (perhaps repeated) priming of the word "intelligent" would not be unreasonable. First, Dijksterhuis and van Knippenberg (1998) pointed out that more abstract concepts are associated with lower level behavior in hierarchical structures, and that activating the top node of such a structure could activate subordinated nodes: "The activation of the trait intelligent ... may lead to the activation of a set of concrete behavioral representations stored under it (e.g., to concentrate on a problem, to adopt an analytical approach, to think systematically about possible solutions)" (p. 867). A further hint is given by the previous discussion of Barsalou's (1999b) and Glenberg's (1997) theories on the form of mental representations. How can we understand the concept of intelligence at all if not by instantiating it in the form of associated behaviors? In their theories, activating a concept such as intelligence means activating associated perceptual and behavioral features which fit (mesh with) the current situation. For instance, the abstract concept of "anger" is represented in terms of the appraisal of an initiating event, the experience of affective states, and behavioral responses (Barsalou, 1999b). Barsalou (1999a) noted that "whereas more concrete concepts index well-specified objects, actions, and properties in situations, abstract concepts index complex configurations of information distributed over multiple modalities and over time" (p. 19 of the manuscript). Finally, research from the stereotype domain indicates that merely priming the stereotype label (e.g., "Blacks") can activate the whole set of traits associated with the stereotyped group (Lepore & Brown, 1997).

In sum, both the actual priming procedures and the theoretical arguments suggest that abstract concepts are instantiated in the form of concrete behaviors. Either through providing concrete behaviors in scrambled sentences primings, through self-generated behavioral examples, or through situated instantiation, priming abstract concepts leads to the activation of concrete behaviors.

2.3 Moderators

If the thesis of automatic behavior is accepted, the immediate question is: But we do not perform every action that we think of; oftentimes, we indulge in fantasies of what we would like to do, but cannot. A first hint was given by James (1890), who continued his quotation cited above with "[every representation of a movement] awakens it in a maximum degree whenever it is not kept from so doing by an antagonistic representation present simultaneously to the mind" (cf. Lotze, 1852). Thus, contradicting representations held simultaneously may cancel each other out. Furthermore, after reviewing evidence from developmental psychology, Greenwald (1970, p. 88) concluded that "an initial direct link between image and action [in childhood] is eventually brought successfully under inhibitory control.... Because ... humans, starting at age 2, if not earlier, are capable of some degree of voluntary inhibition of performance, ... it should not be expected that ... thought-of-action [does inevitably lead to] performance of action."

Thus, the basic argument is (a) that contradicting mental representations can "reverse-prime" and thus cancel automatic behavior, and that (b) those contradicting mental representations can result both from other rather unattended sources such as environmental stimuli, competing instructions, etc., and from more deliberate thinking which sets alternative standards. Again, Lotze (1852, p. 295) already brought forward a similar argument:

> In an instant in which the sufficient reagent of other representations, the sufficient vividness of a resistance-instigating emotion or the clarity of a disagreeing mental contemplation are lacked, an action can follow from its imagination, without being caused or accompanied by a decision of the acting person.

Here, he added a third inhibitory mechanism, namely the negative emotional valence of the imagined action; a modern version of this argument will be discussed below. But first, I will review evidence on the other two moderators.

Conflicting Mental Representations

Macrae and Johnston (1997) presented evidence for the inhibition of automatic behavior by both conflicting environmental cues and conflicting goals. Their result that a helpfulness priming increased helpful behavior in the form of picking up

dropped pencils was already cited in this chapter. Additionally, the experiment included 2 conditions in which the dropped pencils were leaking and smeared with ink. In this condition, the helping behavior decreased dramatically. In a second study, all pens were normal, but half of the participants were informed that the session was running behind schedule, and that they had to hurry. Similar to the sight of the leaking pen, this information decreased helping although helpfulness was primed. Almost equivalent were the results reported by Darley and Batson (1975), in which the helpfulness "prime" (the Good Samaritan parable) was crossed with a second factor, consisting of how much the participants were in a hurry. Of those who read the parable, 80% helped when they were not hurried, 50% helped when they were somewhat hurried, and only 25% helped when they had almost no time (but note that the reliability of these results suffer from a very low N).

A comparable moderation of a behavioral prime was reported by Wilson and Capitman (1982). They observed behavioral assimilation to a primed boy-meets-girl script when the opportunity to do so was given immediately after reading the prime. But an intermediate task or a waiting time, both taking about 5 min, cancelled the priming effect out.[5] In sum, it seems that primed behavior which is actually performed under "perfect" conditions is inhibited either when (a) environmental stimuli suggest negative consequences, and (b) when competing goals favor alternative actions. Both determinants can apparently moderate between an automatic behavioral assimilation to the primed concept and a null effect.

Valence of Activating Cue

A further moderator, which seems to be even more powerful because it can reverse the priming effect, was suggested by Hertel and Fiedler (1998; see also Hertel & Kerr, in press). Extrapolating from research showing that valence is used as a cue for approach vs. avoidance behavior (for a recent overview, see Neumann & Strack, 2000a), they argued that assimilation should only be found for positively valued concepts. Negatively valued concepts, on the other hand, should result in performance of opposite behavior, that is, behavioral contrast. Accordingly, they

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[5] The priming material used by Wilson and Capitman could also be interpreted as a goal-priming. However, the interference by a 5 min waiting time supports the notion that behavior instead of a goal was primed, since goal primings tend to prevail longer and even to grow until satisfied (Gollwitzer & Moskowitz, 1996).

primed either positive or negative connotations of either competition or of cooperation, and measured behavior in a resource allocation task where money had to be distributed between self and a stranger. This manipulation indeed had effects in the expected direction, but only for participants who were somewhat undecided and inconsistent in their decisions. The authors concluded that "provided subjects are not committed to consistent strategies, the tendency to cooperate can be increased when positive valence is attached to the semantic category of cooperation or when negative valence is attached to the semantic category of competition" (p. 59f). Participants who had a clear predisposition (in general one towards cooperation), priming had no effect. Actually, this supports the hypothesis of the previous paragraph, namely that a conflicting goal inhibits priming influences on behavior.

The Irony of Conscious Control

However, the strategy of holding a conflicting goal is not always a successful strategy against priming influences. In his theory of ironic processes of mental control, Wegner (1994) argued that a monitoring process checking for unwanted behavior can actually produce the unwanted behavior if the individual is under additional mental load. In one study, participants had to hold a pendulum with the instruction not to let it move, and especially not in the direction of an axis drawn on a sheet of paper underneath the pendulum. This instruction and the depicted axis can be seen as a behavioral priming, but the participants have the conflicting goal not to act accordingly. Half of the participants had the additional task of counting down from 1000 by 7s, which put them under mental load. These participants indeed moved the pendulum more in the forbidden axis than those who had no additional task. A follow-up study with a more complex design (Wegner, Ansfield, & Pilloff, 1998) confirmed that the instruction not to move it in this axis produced movement in this axis when additional load was given; when the participants were simply told to hold the pendulum steady, load did not increase movement.

2.4 Interpretations: Side Effect or Functional Feature?

Before we proceed, it is necessary to discuss the importance of the reported phenomenon. First of all, it must be clearly stated that it is not claimed that automatic behavior explains the whole amount of behavioral variance, and I will not try to determine how much variance it can explain (but see Bargh, 1997a, b). Consider the

example of human aggression: While it seems that priming aggressive scripts can result in more overt aggressive behavior, even an aggressive behavior influenced by priming can be moderated by accompanying conscious deliberation which is not controlled by the priming, e.g. how the behavior will be received. Moreover, as soon as the connection between prime and action impulse receives attention, the link presumably breaks. On the other hand, underestimating the power of external cues would mean to overestimate the amount of conscious deliberation people invest in planning their actions. Consider a quote from Bandura (1973, p. 137f):

> Aggressive actions are not automatically and rigidly controlled by external cues. This ... has a bearing on the controversy of whether the mere presence of aggressively valenced cues, such as a gun, enhances expression of other forms of aggression.... Stimulus prompts of this sort will facilitate aggression if presented in ways that convey permissive or expectant reactions toward such behavior, but not if they are introduced in a manner that makes the behavior either personally or socially unacceptable.

In the light of recent research, Bandura's conclusion might be slightly modified: Aggressive actions are not "automatically and rigidly controlled," but their likelihood may be automatically increased.[6] But Bandura's critique reveals an important point about today's research on automatic behavior. So far, in order to demonstrate these effects, researchers have carefully created situations in which the primed behavior was an adaptive reaction to the environment (cf. Bargh, 1997a). How behavioral priming determines behavior if this is not the case still remains to be answered, but initial findings (Macrae & Johnston, 1998) suggest that the impact of the priming is dramatically decreased.

Finally, what has been largely ignored so far is an explanation of how such a direct link between perception and action in the field of social behavior can be functional and adaptive in the sense that it supports everyday functioning. If automatic behavior is <u>not</u> a bizarre side-effect of cognitive structures developed for other purposes, then it must be demonstrated and explained how automatic behavior makes sense in

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[6] Of course, a proponent of automatic processes could question whether the perception of stimulus prompts as conveying permissive or expectant reactions is necessarily conscious and whether it might be influenced by primed constructs!

everyday life. It seems to me that current theoretical formulation cannot account for that. Consider an experiment discussed by Berkowitz (1997, originally published by Geen & Berkowitz, 1966). Male participants were provoked by a confederate before they saw a boxing fight scene. The provocateur had either the same name as the loser of the boxing fight, the same name as the victor, or a name not mentioned in the film. To participants in a control condition, a car race film was shown instead of the boxing film. In a subsequent task, the participants had the possibility to punish the confederate with shocks, supposedly as an evaluation of his task performance. Berkowitz reported that "the aggressive [boxing] movie led to a significantly greater number of shocks delivered to the provocateur target than did the neutral film only when that person had the same name as the victim of the observed aggression" (1997, p. 90), and interpreted this finding as supporting his spreading activation account of aggressive behavior. Although a boxing film should have primed aggressive behavior irrespective of the names, this was not the case. It seems that behavioral priming is tailored to the situation in ways purely associationistic models can hardly account for.

One final note seems in place before we proceed to additional manipulations of trait construct accessibility. It is interesting to note that all effects reported here are postconscious effects of perception on behavior. That is, the primes were always processed consciously, and unfolded their effect after the conscious processing. In contrast, preconscious priming effects result from subliminally presented primes. The only published study I am aware of that tested such an effect was reported by Neuberg (1988). He primed competitiveness with subliminally presented words before the participants played a prisoner's dilemma game. Interestingly, the first move of the participants was not affected by the prime, only the second move, which was a reaction to the alleged interaction partner. Thus, the subliminally presented primes influenced the perception of the partner, and only indirectly the behavior. It is indeed curious that to date no study reported a direct effect of subliminal trait primes on action.[7]

[7] However, in a recent talk Ap Dijksterhuis (2001) reported that subliminal priming of the word "relax" was found to decrease the heart rate of participants. This can be considered an automatic behavior effect after subliminal construct priming.

2.5 Summary

In this chapter, a number of studies were cited showing that behavior can be influenced by previous (verbal) activation of a construct. When the construct provided a potential reaction to a situation, action according to the construct was more likely to be shown than when the construct was not primed. These effects were extinguished when environmental cues decreased the functionality of the behavior, and when conflicting goals rendered conflicting concepts accessible. Furthermore, a negative valence of the priming event seems to be able to reverse the effect. Reviews of recent theories of human memory and the literature on the perception-behavior link suggested that this effect is due to close, if not common, representations of perception and action codes.

helped, assistance, aided, supported, provided, encouraging, facilitated, promoted, fostered, furthered

Helpfulness primes, Macrae and Johnston (1998)

It is not an easy task to define what a stereotype is. In general, the emphasis is on "cognitive components ... of category-based reactions--that is, reactions to people from groups perceived to differ significantly from one's own" (Fiske, 1998, p. 357). Thus, stereotyping is distinguished from prejudice which is the affective component, and from discrimination which is the behavioral component of category-based reactions. The notion of stereotypes is related to the more general term in cognitive psychology, that of concepts, which are seen as knowledge structure about categories, the actual physical exemplars of a concept. Conceptualizing categories serves three fundamental tasks: comprehension, prediction and action (Barsalou, 1992). Similarly, stereotypes are employed to comprehend similarities and differences between persons (category members) in the environment, to predict their future actions, and to plan interactions with them. Importantly, while Fiske (1998) emphasized that stereotypes are about other groups, others have argued that we also hold stereotypes about our own groups, that is, self-stereotypes (Turner, Hogg, Oakes, Reicher, & Wetherell, 1987).

3.1 Stereotypes as a Source of Accessibility

How could a stereotype affect automatic behavior? One way could be that behavioral representations are activated by strong and automatic links to traits represented in a stereotype. Although there is still much debate about how exactly stereotypes are represented mentally (Smith, 1998), one prominent view is that they "consist, in part, of constellations of interrelated trait concepts" (Bargh et al., 1996) or a "well-learned set of associations" (Devine, 1989, p. 6). Importantly, many researchers have argued that a stereotype is automatically activated in the presence of an exemplar of or symbolic cue to the group (Bargh, 1997b; Devine, 1989). That the activation of a stereotype can indeed be automatic rests on evidence from studies in which the priming was delivered subliminally, that is, for a time period too short for conscious processing. There is now good evidence that a trait associated with a certain stereotype (e.g., hostile) is activated if the respective label of that stereotype and

other related traits are activated (e.g., Blacks + lazy, Devine, 1989), or if the respective label of that stereotype is activated (e.g., Blacks) and the person has a stereotype which strongly associates the trait with the stereotype (Lepore & Brown, 1997). Note, however, that there is still a strong controversy about the boundary conditions of this effect, and whether it occurs for conscious perception of members of the stereotyped group (Devine, 1999; Gilbert & Hixon, 1991; Bargh, 1999).

If a stereotype automatically activates traits related to the stereotype, the question is whether the same behavioral effects as observed for direct trait priming (reported in the previous chapter) can be observed for stereotype priming. That is, can a trait be primed indirectly, leading to the automatic performance of the respective behavior? In their seminal 1996 paper, Bargh et al. developed this thesis and presented supportive evidence, which is now backed up by numerous studies. The evidence will be presented in the next sections; the studies will be sorted by whether social behavior or behavior which is not part of social interactions was primed (for an overview, see Table 2 of the Appendix). Before the studies are reported, however, it is necessary to point out that in each and every study, care was taken to assure that the participants were not aware of the link between priming and the subsequent measure of behavior. In general, the two tasks were presented as different studies combined for convenience. In some cases, the priming was actually performed subliminally. If the participants would perceive the two tasks as related to each other, it would not be clear how exactly the results should be interpreted: They could either mean conscious imitation, or compliance with an experimental demand. The priming procedures used can best be contrasted from non-priming procedures with an example. Zuckier and Pepitone (1984) were interested in the effect of social stereotypes or roles on the so-called base rate fallacy, the tendency to ignore additional information in judgments of probabilities. More specifically, they wanted to investigate whether participants with a scientific approach use base rates more appropriately than individuals with a clinical or person-oriented approach. To manipulate these roles, they explicitly instructed their participants to adopt a scientific (or clinical) thinking style while working on the task. Thus, this kind of study reveals whether individuals can intentionally imitate a certain stereotyped group, and whether a certain behavior is associated with its stereotype, but not whether the activation of knowledge associated with the stereotyped group has the

same effects irrespective of conscious intentions. (And yes, imitating scientists can indeed reduce the base rate fallacy.)

3.2 Evidence For Behavioral Assimilation After Stereotype Activation

Automatic Behavior Not Related to Social Interactions

One of the most impressing pieces of evidence is surely the effect of an elderly stereotype prime on walking speed presented by Bargh et al. (1996). After working on scrambled sentences which included words related to the elderly stereotype (e.g, worried, Florida, old, lonely), but not synonyms of slow, the participants were observed on their way out of the laboratory. On average, it took them 1 s more for the 10 m way to the elevator, compared with another group of subjects who had scrambled sentences without references to the elderly: The participants mimicked the slow behavior typically ascribed to elderly people. Bargh et al. (1996) replicated this result in a second study. However, Dijksterhuis, Spears, et al. (1998) could not replicate this result when an additional judgmental task was introduced between scrambled sentences priming and behavior measurement. Thus, it seems that the behavioral priming effect is wiped out by an activation of other mental representations (compare the section on moderators in Chapter 2 for similar findings with non-social primings).

Effects of elderly priming on behavioral speed were also found by Dijksterhuis, Spears and Lépinasse (in press). They presented photos of 5 elderly persons or photos of 5 young persons, and measured the speed in a subsequent lexical decision task (LDT), in which participants had to decide whether a string presented on the screen was a correct word or not (the words were unrelated to the stereotype of the elderly; thus, pure behavioral speed was measured). Participants who saw photos of elderly persons reacted more slowly in the LDT. A similar procedure was used by Kawakami, Young and Dovidio (in press). In three studies, in the elderly priming conditions the participants had the task to categorize 32 persons presented on photos into either young or old (16 of the persons were clearly elderly). More specifically, for each person the participants answered the question "old?" by pressing YES or NO. The control conditions varied: no task at all (Study 1), finding a white dot on the picture instead of categorizing into young and elderly (Study 2), or categorizing into male and female (Study 3). After the priming task, the speed in a LDT was

measured; neutral target words served as a measurement of behavioral assimilation, while elderly stereotype-related words served as a measurement of stereotype activation (see below, section on mediators). In each study, a significant behavioral assimilation to the elderly stereotype, expressed through slower reactions on neutral words, was found.

Another effect of an elderly prime was reported by Dijksterhuis, Aarts, Bargh, and van Knippenberg (2000). Participants had to perform a LDT. For half of the participants the target words were preceded by subliminally presented elderly primes (e.g., old, gray, bingo). For participants who had a lot of contact with the elderly in their daily life, this had the effect that they remembered less of the presented target words. The authors interpreted this as an automatic assimilation to the stereotypic elderly trait forgetfulness (see also Dijksterhuis et al., in press, Study 2, and Dijksterhuis, Bargh & Miedema, 2000, for similar results). Interestingly, the effect seems mainly to be due to impaired recall, not impaired encoding, since making participants aware of a possible influence after the encoding extinguishes the effect (Dijksterhuis, Bargh, et al., 2000; see below).

An exception in the row of findings of elderly priming are the results reported by Levy (1996). In her first study, the participants were themselves elderly. They were not primed with the elderly stereotype in general, but with subsets: either positive aspects related to wisdom, or negative aspects related to senility. The priming consisted of subliminally flashing related words on a computer screen, outside of awareness. Before and after the priming, memory performance was assessed. Results indicate an assimilation in the direction of the primes, and also increased accessibility of these concepts when judging other elderly persons. Interestingly, in a second study young participants were subjected to the identical priming procedure, but they did not show the same assimilation. If anything, they exhibited a slight contrast on two of the memory indices. I will come back to this study in the final section of this chapter.

While the elderly stereotype is probably the best-researched stereotype concerning its effects on automatic behavior, it is by far not the only one. In a series of studies, Dijksterhuis and van Knippenberg (1998) and Dijksterhuis, Spears, et al. (1998) investigated the impact of stereotype priming on intellectual performance. Intellectual performance was measured by the number of correct answers in a Trivial

Pursuit-like knowledge test. The stereotype priming consisted of the task of thinking for 5 minutes about the stereotype. For the stereotype of professors, "participants were asked ... to imagine a typical professor ... for 5 min and to list the behaviors, lifestyle, and appearance attributes of this typical professor" (Dijksterhuis and van Knippenberg, 1998). Results indicated that those primed with professors outperformed those not primed or primed with secretaries (Study 1), and that the priming of soccer hooligans can decrease intellectual performance (Study 3). Furthermore, it was shown that the duration of the priming is important; no effects were found with the priming lasting 2 min, while there was a strong effect after 9 min. Similar effects on intellectual performance were found by Dijksterhuis and van Knippenberg (1999, Study 2), Dijksterhuis, Spears, et al. (1998, Study 1), and Musch and Klauer (2001).

Other stereotypes have also been demonstrated to elicit automatic behavior. Macrae, Bodenhausen, Milne, Castelli, Schloerscheidt and Greco (1998) subjected their participants to a reading task, in which they simply had to read 20 words written on a sheet of paper. The test had either no title, the title "Shimuhuru Word Reading Test," or the title "Schumacher Word Reading Test." The last title was supposed to activate the stereotypically fast formula 1 driver Michael Schumacher, and indeed: the participants read the 20 words faster in this condition than in the other two conditions.

Automatic Social Behavior

Of course all these behaviors could be part of social interactions, but they are not clearly social behaviors, such as aggression and conformity. Interestingly, these two domains of social behavior can apparently also be influenced by stereotype priming. In the USA, Blacks are in general stereotyped as hostile, and the activation of the stereotype can lead to the interpretation of ambiguous behavior as hostile (Devine, 1989). Bargh et al. (1996) and Chen and Bargh (1997) showed that subliminal priming with faces of Black Americans can lead to increased expression of anger and aggression after a frustration (a computer failure in Bargh et al., 1996, and a difficult task in Chen and Bargh, 1997). Importantly, these participants expressed their anger towards White interaction partners.

Punks are frequently stereotyped as anarchistic. Pendry and Carrick (2001) showed their participants either a photo and some additional information about a young punk,

or about a bank accountant. This served as the stereotype priming. In a subsequent and allegedly unrelated task, the participants were brought in conflict with the opinion of four confederates in an Asch paradigm. Those primed with a bank accountant conformed more with the confederates, while those primed with the punk stayed truer to their (objectively correct) opinion.

3.3 Evidence on Moderators

Given these impressing findings, one immediate question is: What determines whether these effects actually occur? What properties of the person or the situation can moderate automatic behavior? The next sections review the moderators that have been reported in the literature to date.

Strength of Association Between Stereotype and Trait

The explanation underlying effects of stereotype priming is that the stereotype activates its associated traits, which themselves influence behavior. Thus, one can hypothesize that if a certain trait is not part of a stereotype for some persons, then these persons would not show behavioral effects of stereotype activation. One reason for the lack of stereotypic knowledge could be infrequent contact with the stereotyped group. Along this reasoning, Dijksterhuis, Aarts, et al. (2000) confirmed in 2 studies that less contact with the elderly led to less behavioral assimilation in terms of poor memory performance. Only participants primed with the elderly stereotype and familiar with the association to forgetfulness showed performance impairment. Furthermore, in the second study they found that contact indeed strengthened the association of the elderly with forgetfulness, and that this associative strength mediated the effect of contact on actual memory impairment. Thus, for traits mainly learned through contact with the stereotyped group, contact can increase associative strength and behavioral assimilation. In other words, contact with the stereotyped group is a personality variable that moderates behavioral assimilation. Furthermore, on a more general level one can summarize: Whether a behavioral effect occurs, is moderated by the individual associating a trait (or a behavior) with a stereotype. Thus, association of a behavior with a stereotype is also a moderating personality variable.

Duration of Prime

It was already mentioned that the duration of the priming has a moderating role on behavioral assimilation. Imagining a stereotypic professor or a stereotypic hooligan for only 2 minutes does not produce a behavioral effect as compared to a no prime control group. At least 5 min, but better 9 min of stereotype activation seem to lead to more reliable effects in these cases. However, the fact that subliminal priming with faces (Bargh et al., 1996, Chen & Bargh, 1997) can also have effects, shows that general verdicts on this issue are difficult.

At this point, a remark on the priming procedures is appropriate. Some of the theoretical arguments and procedure descriptions may be read as if priming is a rather passive process, which involves not much thinking by the participants. After some disappointing null results in my own research, I think however that this is a fallacy. Solving 15 scrambled sentences or thinking 5 minutes about a stereotype and writing down associations involves a lot of thinking, and activates very complex and vivid pictures, although in the scrambled sentences procedures participants are in general not aware of the underlying theme. That a few subliminal primes, be it faces (Bargh et al., 1995; Chen & Bargh, 1997) or words (Dijksterhuis, Aarts, et al., 2000; Dijksterhuis, Bargh, et al., 2000) can also result in measurable automatic behavior should not be extrapolated to the realm of postconscious priming effects. I strongly suspect, although I am not aware of relevant research, that priming the identical words with the awareness of the participants would not lead to the same effects. Since some of the studies later reported in this thesis found null-effects attributable to this fallacy, I will come back to this topic.

Awareness of Prime Influence

For effects of priming on judgment tasks, awareness of a possible influence of the priming event on the judgment is a well-known moderator (e.g., Wegener & Petty, 1995). Similarly, making participants aware of a possible influence of priming on behavior can lead to the extinction of the priming effect, as Dijksterhuis, Bargh, et al. (2000) demonstrated. They showed that memory impairment as a result of elderly priming decreased when participants were made aware of the link between prime and behavior. Importantly, this effect could not be attributed to a mere increase of motivation, since in the second study participants did not improve when they were not primed but nevertheless told that they were influenced by an elderly stereotype.

Accuracy Motivation

Stereotype activation in the course of impression formation can be interpreted as a tendency to focus on abstract, general knowledge, ignoring the details of the specific persons. Thus, a motivation to be accurate can counteract the activation (and application) of stereotypes. Dijksterhuis et al. (in press, Study 3) found that when participants were urged to be as accurate as possible during the perception of several elderly persons (the stereotype activation procedure), no assimilation occurred.

Self-awareness

What role does consciousness play in automatic behavior? Can it stop and inhibit automatic effects, as Baumeister and Sommer (1997) suggested in response to a target chapter by John Bargh? In principle, there seem to be a strong and a weak version of this hypothesis. The strong version would imply that directing the awareness on the self leads to conscious self-regulation which overrides priming effects; this could be inferred from objective self-awareness theory (Duval & Wicklund, 1972; for a recent review, see Fejfar & Hoyle, 2000). The weaker version would imply that private self-awareness works as a distraction, focusing the attention on a different domain of stimuli and decreasing the impact of a priming event. Two experiments by Dijksterhuis and van Knippenberg (2000) focus on this latter version. They operationalized the impact of intervening consciousness in the form of private self-awareness, manipulated by the presence of a mirror in which the participant saw themselves (Duval & Wicklund, 1973). Since self-awareness is merely conceptualized as a distraction, the authors' term "self-focus" seems more appropriate then private self-awareness. The reasoning is that heightened self-focus activates alternative behavioral options even if the cue is not competing "in the sense that its behavioral consequences have to be opposite to that of the stereotype. All that is needed is one cue with an activation level that is higher than that of the stereotype, because a dominating cue will inhibit the activation of all others." (Dijksterhuis and van Knippenberg, 2000, p. 60). Increasing self-focus was manipulated by confronting the participants with a mirror during both phases, stereotype activation and behavioral measurement. In two studies, the effect of this moderator was tested with respect to a politician priming of long-windedness and a professor vs. hooligan priming of intellectual performance. In both studies, the prime had an effect when self-focus was low, i.e. politicians priming led to longer essays written by the

participants in a subsequent task, and professor priming led to better performance in a knowledge task. However, when the presence of a mirror led to a high self-focus, the priming effects were simply extinguished, and there were no differences between the priming conditions.

This finding is especially intriguing since there is one other priming study that has found contradicting evidence. Baldwin and Holmes (1987) activated for their female participants either their representation of two college friends or of two older members of their family. Baldwin and Holmes conceptualized this manipulation as a priming of private audiences, which activates respective aspects of the self-concept. So, the activation of two college friends activates a more relaxed, modern part of the self-concept including norms and attitudes, while the activation of two elderly members of the family activates more traditional-minded parts of the self-concept. The priming of these private audiences consisted of a guided visualization of these persons for several minutes. After the priming procedure, the participants had to evaluate a sexually permissive story. It was assumed that the college friends differed in their attitudes towards this kind of stories from older family members. While the participants read the story, half of them were made self-aware by a mirror placed in the cubicle. What can be expected as a result? It was just explained that Dijksterhuis and van Knippenberg (2000) assumed that self-focus dominates any kind of priming. Thus, they would probably predict that a possible effect of the private audience priming should be extinguished. Baldwin and Holmes, however, argued that the self-awareness manipulation would increase the audience manipulation since it facilitates the activation of this self-other schema.

Indeed, the sexually permissive story was liked more by those who thought about friends from campus than by those who thought about elderly family members. However, this effect was significant only for those who were made highly self-aware. Thus, these results completely contradict Dijksterhuis and van Knippenberg (2000). Apparently, the moderating role of self-focus differs between primes of unrelated social categories and self-relevant private audiences. This idea will be followed up in the next chapter.

Activation of Salient Exemplar

The evidence reviewed so far showed that priming a stereotype leads to behavioral assimilation by increasing the accessibility of stereotype-related behavioral

representations. The strategies to activate a stereotype focused on the rather "high level" representation of the stereotype, and mostly abstracted from single exemplars of the category. However, additional to the general representation of a category per se, activating a stereotype can also mean activating one single exemplar of this category. A number of studies investigated whether it makes a difference if the abstract category or a particular exemplar is brought to the participant's mind.

The central argument underlying these studies builds on work by Stapel and colleagues (e.g., Stapel & Winkielman, 1998). They argue that a single exemplar can serve as a comparison standard, which is not expected from a broader social category: "Distinct information constitutes a separate entity with clear object boundaries and, therefore, is more likely to be used as a comparison standard than is indistinct, abstract information...." (ibid., p. 637). More specifically, it is assumed that activating a distinct single exemplar leads to a comparison between self and this exemplar, and that in this comparison process concepts opposite of the standard become accessible. Thus, in contrast to the aforementioned extinguishing effect of self-focus per se, which makes other mental representations accessible, a comparison is hypothesized to result in increased accessibility of stereotype-opposite behavioral representations and thereby in behavioral contrast.

This model was first formulated by Dijksterhuis, Spears, et al. (1998), and was further scrutinized by Dijksterhuis et al. (in press). Importantly, they see the stereotype priming process and the reverse-priming comparison process as operating in parallel:

> In order to explain behavioral contrast, our model proposes two parallel processes whereby both the stereotype and the exemplar of that stereotypic category are activated and exert opposing effects. Activation of the stereotype should, other things being equal, evoke assimilation in behavior as well as judgment with respect to the stereotype. The salience of an exemplar judged against this interpretative background should elicit contrast against the stereotype, which can outweigh the assimilation effect. (p. 5 in the manuscript)

Thus, it is not the case that exemplar activation is the "opposite" of stereotype activation. Rather, while stereotype activation is expected to lead only to assimilation, exemplar activation is additionally expected to lead to an active

comparison process in which the self is conceptualized in terms opposite to the exemplar.

What evidence supports this model? In a first study using the trivial pursuit dependent measure, Dijksterhuis, Spears, et al. (1998) compared the effect of priming a category--professors vs. supermodels--with the effect of priming single exemplars--Albert Einstein vs. Claudia Schiffer. Indeed, while participants primed with professors performed better than those primed with supermodels, participants primed with Claudia Schiffer outperformed those primed with Albert Einstein. Thus, exemplar priming resulted in behavior opposite to that typical for the exemplar. The priming consisted of thinking about the category or exemplar for 5 min and listing typical features. In a similar vein, the second study of Dijksterhuis, Spears, et al. (1998) compared priming the stereotype of the elderly (with scrambled sentences, cf. Bargh et al., 1996) with priming the stereotype plus activating a single exemplar, in this case the Dutch Queen Mother. Indeed, participants walked faster in the latter condition, indicating a contrast instead of assimilation.

Similarly, Dijksterhuis et al. (in press) provided evidence that the assimilative effect of elderly priming on speed in a LDT can be counteracted by a single exemplar. Since these studies will serve as the basis of some studies to be presented in the empirical part of this thesis, they will be described here in more detail. In the most relevant Study 1, Dijksterhuis et al. asked their participants to form impressions of persons displayed on the computer screen. The persons were either young or elderly, and they were accompanied by additional information, altogether 20 sentences. These 20 sentences were either distributed over 5 elderly (or young) female persons in the category condition, or all were displayed as belonging to only 1 elderly (or young) female person. The reasoning was that in the 5 exemplars condition, "the representation ... should be more abstracted and thus more stereotypical than the representation of the single individual" (p. 9 of the manuscript). In the 1 exemplar condition, the impression formation was expected to result in a rather distinct impression, which could serve as the standard of a spontaneous comparison. The results showed that indeed the assimilation process, which was significant in the 5 person condition, was extinguished in the 1 person condition; the contrast, however, failed to reach significance. In the second study, these 2 conditions (single exemplar, either young or old) were repeated, and this time a significant contrast was found, i.e.

shorter reaction times after impression formation of an elderly person. A second factor manipulated whether the participants were additionally put under cognitive load, with the reasoning that additional cognitive load would undermine the constructing of a distinct impression, resulting again in a mere abstract stereotype activation. Indeed, in this condition no contrast, but an assimilation was found, i.e. longer reaction times after impression formation of an elderly person.

However, the evidence on whether contrast necessarily follows from the perception of a single salient exemplar is not as clear as it might seem from these studies. First of all, other studies have used exemplars as primes and found assimilation. Macrae et al. (1998, see above) titled their reading test "Schumacher Reading Test" and found increased reading speed. The participants of Pendry and Carrick (2001) read about a single typical punk or bank accountant on the basis of a photo and alleged biographical information. Although this procedure resembles that used by Dijksterhuis et al. (in press), they found assimilation. In the mimicry study by Chartrand and Bargh (1999), participants faced a single other person and still mimicked her. Furthermore, the stereotype priming procedure used by Dijksterhuis and van Knippenberg (1998) asked the participants to imagine "a typical professor ... and to list attributes of this typical professor"; it seems possible that at least some participants indeed thought about one and only one typical professor they knew, which would also be the activation of a single exemplar. Finally, while the assumption that exemplar-opposing attributes become associated with the self (see below, section on mediators) was confirmed by Dijksterhuis, Spears, et al. (1998, Study 3), evidence by Mussweiler and Strack (2000b) suggests this is not always the case. They found on the contrary that after comparing themselves with Nicki Lauda or Bill Clinton on the dimension of physical abilities, exemplar-consistent attributes were associated with the self (see also next chapter).

Thus, this evidence needs a balanced summary. First, there is evidence that a single exemplar can lead to a spontaneous comparison process. In this process, exemplar-contrary knowledge becomes associated with the self (cf. Dijksterhuis, Spears, et al., 1998, Study 3). Furthermore, behavioral contrast occurs instead of assimilation. This is an important finding, since this is the only moderator so far that cannot only extinguish automatic behavioral assimilation but actually reverse it. Second, the necessary and sufficient conditions when a single exemplar leads to a comparison are

still unknown. While Dijksterhuis and colleagues argue that a distinct exemplar alone is sufficient, other studies seem to suggest that the extremity of the exemplar might play a role: Albert Einstein and arguably also Claudia Schiffer may be extreme examples of their categories. When, as in Study 1 by Dijksterhuis et al. (in press) the extremity is controlled, contrast findings may no longer be discernable (for a similar argument, see Mussweiler & Strack, 2000a).

3.4 Evidence on Mediators

Stereotype Activation

In the introduction to this chapter, it was mentioned that the current model by Bargh et al. (1996) explains behavioral priming from stereotype activation as mediated by trait activation. In short, the idea is that the professor stereotype activates the trait intelligent, which itself activates behavioral presentations, e.g. efficient problem solving strategies. Kawakami et al. (in press) took a closer look at this thesis, reasoning that such a mediation should not be necessary theoretically, if one assumes that stereotypic associations include "not only personality trait concepts, but also physical characteristics, expectations, objects, and attitudes" (p. 9 in the manuscript). To use the example, professors could directly be represented as using efficient problem solving strategies. They concluded that in contrast to the mediated process assumed by Bargh et al., "category priming may activate a behavior automatically and directly" (ibid.). This reasoning is compatible with the arguments brought forward by Carlston (1994, see also above). He argued that for both person and stereotype representation, personality traits should be distinguished from behavioral observations made about the target.

To investigate a possible mediation empirically, Kawakami et al. primed the category of the elderly, and measured both behavioral assimilation and stereotype activation by using different target words (either neutral or traits) in a LDT. Thus, slower reactions overall would indicate behavioral assimilation, faster reactions to stereotypic traits would indicate stereotype activation, and a mediation analysis can regress the behavioral assimilation on the stereotype activation. In three studies using different control groups, they consistently found (a) behavioral assimilation and (b) stereotype activation, but no clear indication of mediation. Only in one of the studies, behavioral assimilation was partially mediated by trait activation. Furthermore, when

the activation of the specific trait slow was looked at, no mediation was found. Kawakami et al. concluded that "automatic activation of stereotypic traits is not a necessary mediator for automatic social behavior" (ibid., p. 35 of the manuscript).

Changes in the Self-concept

It was already mentioned in the section on comparison induction by salient exemplars, that there is some evidence on the assumed mediator of contrast effects. In brief, Dijksterhuis, Spears, et al. (1998) assumed that the comparison with a salient exemplar (e.g., Einstein) leads to a comparison process in which exemplar-opposing traits (e.g., dumb) become more accessible. More specifically, they assume that these traits become associated with the self-concept. This hypothesis was tested by first priming participants with Albert Einstein or professors, and then assessing the association of traits related to intelligence or stupidity with the self-concept in a LDT. This was achieved by using a subliminal sequential priming procedure with self-concept primes ("I") before the traits (for similar measures, see Bargh & Chartrand, 2000). The results showed, apart from very fast answers on intelligence in all conditions, a facilitation of stupidity traits by self-concept primes only in the Albert Einstein priming condition. Thus, while both professor and Einstein priming made intelligence traits more accessible, only the Einstein priming associated the self-concept with stupidity. As important as this finding is, we must note however that it was not followed by a measure of intelligent behavior. Thus, it can only be concluded that Einstein priming both decreases intellectual performance and results in a self-concept change, but not that the self-concept change actually leads to the poor performance. Considering the previously reported findings by Kawakami et al., it could well be that the behavioral effect is not mediated by the knowledge activation as measured in the sequential priming.

3.5 Summary, Interpretation and Puzzling Predictions

In just a few years, an impressive amount of evidence on automatic behavioral effects of stereotypes has been collected. The bottom line of these studies is: Activation of a stereotype can lead to the automatic and unintended mimicking of behavior typical for the stereotyped group. The stereotype activation procedures are divers, ranging from thinking about typical members of the stereotyped groups without further material, forming an impression about typical members on the basis

of photos, solving word puzzles related to various aspects of the stereotype, categorizing individuals as members of the stereotyped group, to subliminally flashed faces and stereotype-related words. Likewise, the dependent measures range from basic bodily behavior (walking and typing speed) to indices of cognitive performance (knowledge and memory tasks) to social behavior (conformity). Some boundary conditions both with respect to the person and the situation are also clear: It is necessary to really engage in thinking about the stereotype (at least when the priming is part of a conscious processing), and the link between stereotype and behavior or trait must be cognitively available (cf. Higgins, 1996) from previous learning episodes. The priming effect breaks down when the stereotype activation is interrupted by accuracy motivation in person perception, when self-awareness directs attention to other representations, or when the primed individuals become aware of the priming effect, have correct naive theories on its direction and are motivated to counteract it.

It is less clear whether the stereotype activation directly primes behavioral representations (i.e., elderly persons walk slow), or activates them only indirectly via mediating trait constructs (i.e., elderly persons are slow, which implies slow walking speed). Furthermore, there is contradicting evidence on the reversal of the priming effect by presentation of salient exemplars. While Dijksterhuis and colleagues argued that such a presentation results in the induction of a comparison and a subsequent contrast, other studies not concerned with this issue found behavioral assimilation to activated exemplars of a stereotyped category.

This issue is especially important since all cited studies except one (Levy, 1996) have one irritating feature: The participants in these studies were always students, and they were not members of the category activated by the prime, but still they assimilated. Thus, Caucasian students assimilated to Blacks, young students assimilated to the elderly stereotype, students assimilated to Punks, etc. Only Levy (1996) argued and found that young participants should not assimilate to the stereotype of a group of which they are not a member. In her view, such primes activate a self-stereotype, and only this should have assimilative effects. However, the remainder of the evidence seems to suggest that her findings with young participants could be an exception. Indeed, if one compares the studies of Dijksterhuis, Aarts, et al. (2000) and Levy (1996), it is remarkable that both used

young participants, primed them subliminally with elderly stereotype words, and measured memory performance. However, Dijksterhuis and colleagues found assimilation, while Levy found no assimilation, and on two indicators slight contrast. One clue to the apparent contradiction are the primes used in the two studies. While Dijksterhuis, Aarts, et al.'s primes seem to be of rather neutral valence (e.g., old, grey, conservative), Levy's primes were rather negative in the senility condition (e.g., alzheimer's, senile, dementia, diseased), or not strongly related to actual memory performance (e.g., guidance, wise, alert). Thus, it may be that in Levy's studies, the concepts were more chronically accessible and applicable for the elderly participants, while the younger participants were either repelled by the negative valence (cf. Hertel & Fiedler, 1998), or not affected by the faint associations to memory performance.

In sum, the current evidence on automatic behavior suggests that we assimilate to every stereotype knowledge activated in an abstract manner, irrespective of whether the stereotyped group is our ingroup, an irrelevant group, or an outgroup. So, what is the message of these studies? They basically deny that automatic effects of social environmental cues are moderated by the structure of the social environment. Humans are conceptualized as "mackerels with moderators" (Dijksterhuis, Bargh, et al., 2000), who assimilate to all social concepts primed by the environment unless these primes are extinguished by conscious attention or a prominent single exemplar. What is lacking from this analysis is a functional background. Why would our automatic behavior not follow such important rules as to mimic only those who are close to the own person, and not those who are different? The implicit assumption is that our "reptilian weenie wrapped in a neocortical bun," how Dijksterhuis, Bargh, et al., citing Gilbert (1989), call the older modules of our brain, cannot distinguish between us and them (or simply defaults to us). Furthermore, it is implied that the motivation to establish group differences, which is so well-known from everyday life, is not supported by automatic processing. Only a rather interpersonal contrast from a distinct exemplar of the other group seems possible.

The body of empirical evidence cited in this chapter is without any doubt impressive and interesting. However, these implications reveal a shortcoming of the present research: It largely ignores a functional and pragmatic perspective. From such a perspective, it would be necessary to ask how automatic behavior is tuned to the

structure of the social environment, to categorizations of people into us and them. It seems that this analysis is also true of the precise operationalizations employed in these studies. The conditions under which all these studies were conducted--making a stereotype accessible without inducing a salient distinction between us and them--probably excluded social structure from the experiment, and perhaps favored assimilation to stereotypes of strangers. The next chapter will scrutinize this idea, and propose a model that tries (a) to explain the contradicting findings on contrast after exemplar activation and (b) to predict when a stereotype activation results in assimilation and when in contrast.

4 HOW SOCIAL COMPARISON AFFECTS CONSTRUCT ACCESSIBILITY

challenge, confront, counter, defy, deviate, differ, different, disagree, disobey, disrespect, ignore, individual, independent, oppose, opposite, rebel, refute, reject, unique

Nonconformity primes, Epley and Gilovich (1999)

Virtually all studies presented in the previous chapter reported assimilation effects. That is, the participants mimicked behavior typical for a group they did not belong to. This sounds puzzling, and from the perspective of intergroup theories it indeed is, as the following review confirms.

4.1 Intercategory Accentuation

The presence of at least two clearly identifiable social categories is a defining feature of intergroup behavior (Brewer & Brown, 1998). In classic theories of intergroup relation, perception and accentuation of differences between categories has always been a central topic. Allport (1954) saw these processes as the basis for prejudice between groups. Similarly, Campbell (1956) argued that stereotyping of a group does not only result in the diminishing of differences within the group, but also leads to the exaggeration of differences between groups:

> One important aspect of the general syndrome of social stereotyping is enhancement of contrast or the exaggeration of relative differences between social groups. Thus if on intelligence tests in New York City schools Jewish students test slightly higher than white Christian students, and Negro students slightly lower, these small differences are exaggerated in social stereotypes about the students into the judgments that Negroes are 'dumb' and Jews are 'smart.' (p. 350; cited after McGarty, 1999, p. 25)

One important contribution to the understanding of these phenomena in social stereotyping came from work on judgments of physical stimuli. In a classic study, Tajfel and Wilkes (1963) showed that the judgement of the length of lines varied depending on their classification. When the lines were classified such that the classification was correlated with the judged dimension length, the differences between the lines at the boundary of the categories were overestimated, compared to

judgments in the absence of a classification or to the "true" differences. In the words of Tajfel, there was "a significant increase of the apparent differences between the stimuli at the point of transition from one class to another" (Tajfel, 1981, p. 103). Applied to the example of Campbell, this would mean that a perceiver of the intelligence tests would perceive the difference between the best Black student and the worst Jewish student to be higher than it actually is (assuming that the best Black student is actually worse than the worst Jewish student).[8]

This reasoning was applied to the domain of social stereotypes and remained a central topic in theories on intergroup relations. Tajfel (1981) wrote: "When a classification is correlated with a continuous dimension, there will be a tendency to exaggerate the differences on that dimension between items which fall into distinct classes, and to minimize these differences within each of the classes" (p. 133). He added that the stereotypes about groups are of course much more complex than stereotypes about lines. First, social classifications are frequently correlated with valued dimensions, which creates additional motivations to hold on to stereotypes which indicate a superiority of the own group. Furthermore, a "reality check" of social stereotypes is not as easy to carry out as with physical stimuli, and the self-fulfilling nature of stereotypes may reverse the causal direction between difference and perception, for instance when hostile behavior towards a person stereotyped as aggressive leads to more aggressive behavior.

Two theories of intergroup behavior incorporating these assumptions are Social Identity Theory (Tajfel & Turner, 1979) and Self-Categorization Theory (SCT, Turner et al., 1987). I will focus here on SCT. In general, the two sides of the same coin--interclass differentiation and intra-class assimilation--are conceptualized together, although the theoretical and empirical focus has often been on the latter (cf. Brewer & Brown, 1998).

Intra-class Assimilation and Self-stereotyping

SCT has applied the assumption of intra-class assimilation to two major phenomena (among others): perceptions of homogeneity, and depersonalization of the self. Concerning the first phenomenon, it has been shown that a salient social

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[8] However, note that according to McGarthy (1999, p. 73), there were apparently numerous

categorization not only leads to increased perception of homogeneity in another group (outgroup homogeneity), but also to increased perception of homogeneity in the own group (Simon, 1992; Haslam, Oakes, Turner, & McGarty, 1996). Concerning the second phenomenon, depersonalization is seen as a special case of intra-class assimilation within the ingroup. It is argued that a discounting of differences within the group leads to an increased application of the ingroup stereotype to the self. In this process, the stereotype becomes a self-stereotype, and the self is depersonalized. Individuals who perceive themselves as members of a group "come to perceive themselves more as the interchangeable exemplars of a social category than as unique personalities defined by their individual differences" (Turner et al, 1987, p. 50). This process is assumed to underlie major group phenomena, including group cohesiveness, emotional contagion and empathy, collective action, shared norms and social influence. Recent evidence by Smith and colleagues (Coats, Smith, Claypool, & Banner, 2000; Smith, Coats, & Walling, 1999; Smith & Henry, 1996) suggests that such a coupling between self and ingroup may be rooted at a very basic level. Evidence from reaction times of self-descriptions showed that confirming an attribute for the self (e.g., I am intelligent) is facilitated when this attribute is also stereotypical for the ingroup. Importantly, this effect was relatively automatic, that is, the participants were not instructed to keep their ingroup in mind while answering the task.

Inter-class Differentiation Between Social Groups

There is plenty of evidence from explicit measures that the differences between ingroups (and the depersonalized self) and outgroups are accentuated. On evaluative dimensions, members of a distinct ingroup assimilate their self-evaluations to ingroup members and contrast it from outgroup members (Brewer and Gardner, 1996). Further evidence on perceptual and cognitive accentuation of between-category difference was reviewed by Krueger (1992). He found both that true differences were exaggerated, and that illusory differences were perceived although in reality there were none. Haslam and Turner (1992) reported that the perceived similarity of self and an outgroup member depended on whether the context (the

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failed attempts to replicate the results of Tajfel and Wilkes (1963).

frame of reference) suggested that the in- and the outgroup formed an entity or not. High dissimilarity was perceived only when the differences between in- and outgroup were higher than those to the rest of the frame of reference. In other words, the perception of the other person was assimilated towards the own position when perceiver and target person shared the same category membership, but the perception was contrasted away from the own position when the target person belonged to a different social category. These results can be predicted from SCT's meta-contrast principle (cf. Campbell, 1958). According to this principle, the perception of a category is inferred from its prototype. The prototype is the exemplar of a category which differs the least from the other exemplars of the category and at the same time differs the most from the exemplars of the outgroup. It can be demonstrated that by introducing an extreme outgroup, the prototype of the ingroup shifts. This shift is assumed to underlie intergroup accentuation, since it determines the conceptualization of the remaining ingroup exemplars (McGarty, 1999; Oakes, Haslam, & Turner, 1994; for review of further results on accentuation, see Spears, Jetten, & Scheepers, in press; Turner, Oakes, Haslam, & McGarty, 1994; Wilder & Cooper, 1981; Wilder & Thompson, 1988).

While these effects take place in perception and conception, differentiation can also happen on a behavioral level. Tajfel and colleagues (Tajfel, Billig, Bundy, & Flament, 1971) assumed that a "'generic' outgroup attitude ... foster[s] or reinforce[s] a tendency to behave differentially towards outgroups and ingroups even when such a behaviour has no 'utilitarian' value to the individual or to his group" (p. 151). They concluded from their seminal study using the minimal group paradigm that an ad hoc intergroup categorization activates such a 'generic' social norm, leading to a deliberate strategy of creating difference between the groups even if this difference conflicted with gaining absolute profit for the ingroup. In such a minimal group paradigm, special conditions are created in which an artificial and initially meaningless categorization is imposed on the participants. For this special setting, Cadinu and Rothbart (1996) argued that an oppositeness-heuristic governs the perception and judgement of an outgroup and leads to the accentuation of ingroup-outgroup differences.

In sum, differences between categories are a pivotal point in theories of intergroup relations. Social categorizations are assumed to (initially) depend on the perception of differences between the groups of people (Oakes et al., 1994). When categorizations become active and applied to the social environment, they are expected to govern further perception and conception, leading to emphasized or even exaggerated differences between the (social) self and the outgroup (stereotype). As a result of social categorization into opposing groups, group members should rely on their ingroup stereotype for the formation of attitudes and behavioral norms. In the end, difference between groups is assumed to be created (a) as a mere result of categorization, and (b) to achieve positively valued distinctiveness (Tajfel & Turner, 1979; Brewer, 1991) and (c) to anchor one's judgement and behavior in the consensus of those who are similar, and not those who are different (social reality testing, Turner, 1991).

Admittedly, the central role ascribed to between-category differences has caused a complex picture: sometimes differences have a causal role, sometimes they are seen as outcomes (for an attempt to integrate these processes, see Spears et al., in press). Furthermore, as McGarty (1999) observed, the research on accentuation effects is patchy, and "the evidence for the categorization effects that were originally outlined by Tajfel and Wilkes (1963) is far less clear than one would expect for phenomena that are believed to be so pervasive" (p. 79). It does not help that intergroup theories like SCT rarely specify the exact processes behind the accentuation. That is, how exactly does the accentuation in a stereotyped self-concept come about? Is this process a rather cognitive process which changes the accessibility of certain parts of the self-concept? Is this process accompanied by deliberate and strategic cognitions, or does it just happen, without an intention? The same goes for accentuation of differences between groups. Is there a motivation to increase the differences, and if not, then how does it work?

However, the point that so many scientists believe in inter-category accentuation is important here since it suggests that it is a plausible view, and that naive perceivers will often adapt the same point of view. In the model following below the hypothesis adopted by a perceiver plays a pivotal role, and based on the theories cited above it seems safe to conclude that perceivers will often assume that they differ from

outgroups. However: it is obvious that the findings of automatic assimilation to stereotypes, which were reviewed in the previous chapter, contradict this general assumption. One has to ask: Are strategies of intergroup differentiation restricted to the domain of conscious thought? Does differentiation from them depend on deliberation and intention? If this would be the case, and intercategory accentuation would be limited to conscious judgement and behavior, the predictive power of intergroup theories like SCT would be severely limited.

The clue to this puzzle may be a decisive difference in the procedures between studies on stereotype assimilation and studies on intergroup relations: While experimental procedures in intergroup research often go to great lengths to introduce a dichotomous ingroup-outgroup situation (e.g., Hogg & Turner, 1989), the priming studies do not invoke an actual dichotomy between the self and outgroup. Thus, the stereotype content may become active without activating an ingroup-outgroup distinction at the same time. This reasoning suggests that the engagement in social comparison may be a moderator between assimilation and contrast, and resistance against assimilation may prove not to be so futile after all.

4.2 Social Comparison and Knowledge Accessibility

The following chapter will introduce a model that ties together several points discussed so far. First, I will discuss a theory that tries to specify how the difference resulting from a comparison process can be explained on a cognitive level. Next, I will propose how the contradicting results on behavioral contrast after exemplar presentation, discussed in the previous chapter, can be explained with this mechanism. Bringing both perspectives together, I will then apply the model to the comparison of self to an outgroup, and argue that the same mechanism should also lead to automatic behavioral contrast after the perception of an outgroup. Finally, some additional studies will be discussed that lend initial support to this hypothesis.

The Selective Accessibility Model

The starting point is the selective accessibility model by Mussweiler and Strack (2000a). Consider first the so-called anchor effect (Tversky & Kahnemann, 1974), a very robust phenomenon in the domain of judgmental errors. When you are asked by a friend whether his used car is worth more or less than, say, 3000 DM, you will very likely give a smaller estimate than if he would have asked you whether it is worth

more or less than 8000 DM (Mussweiler, Strack, & Pfeiffer, 2000). Why? Because one typically adopts a "positive test strategy," and retrieves evidence from memory to assess whether the anchor (e.g., the price of 3000 DM) might be true. The given value serves as a comparison anchor, and the thinking uses typically this anchor as the starting point. The judgement process starts with the assumption that the car is indeed worth only 3000 DM, and if the anchor is not set too low, you will very likely find at least some evidence for this, e.g. a troubling noise sometimes heard in the car. By thinking about this evidence, it becomes more accessible, and will finally be part of your final judgment. In the words of Mussweiler et al. (2000), you selectively increase "the accessibility of anchor-consistent semantic knowledge about the target" (p. 1143). If you would have started from a higher estimate, you would first have thought about evidence that the car is really that expensive, and thus evidence of this kind would have become more accessible, resulting in a higher estimate.

Thus, the selective accessibility model combines two assumptions: First, the anchor serves as the starting point of thinking, and one typically uses a positive test strategy assessing whether the anchor is true. Second, during this testing, anchor-consistent knowledge becomes more accessible.[9] This knowledge then influences the outcome, similar to a semantic priming effect. Importantly, this effect even works when the initial anchor is finally rejected (Mussweiler & Strack, 1999). The same reasoning can be applied to a comparison in the social domain (Mussweiler & Strack, 2000b). If you compare another person and yourself, you will in many cases first think about similarities between this person and yourself. Thus, evidence that you and this person are similar (standard-consistent knowledge about the self) becomes accessible, which can determine the comparison outcome.

Whether the anchor is initially accepted or whether it is rejected right away is called the initial hypothesis. In the cases just described, the initial hypothesis is that the given anchor is true, and that the car is indeed worth only 3000 DM, or assuming that you and the other person are similar. Accepting an initial similarity hypothesis may in many cases be simply an outcome of understanding the proposition. By

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[9] Social comparison as understood here is a conscious process, even if it may be relatively spontaneous and efficient (Gilbert, Giesler & Morris, 1995). Jaynes (1976) has described selectivity or excerption as a central feature of consciousness. In principle, it is an analog of visual attention being directed at external objects (cf. Barsalou, 1999b).

understanding a proposition, its truth is acknowledged, mentally represented, and in many cases not checked or rejected (Gilbert, 1991). It is by this process that similarity becomes in many cases the default for the initial hypothesis. Only recently, Mussweiler and Strack (1999, 2000a) have extended their reasoning to cases in which the initial hypothesis does not assume similarity between the two compared objects, but difference. So far, three determinants of a difference hypothesis have been tested: (1) adopting the strategy of thinking about the opposite, (2) a manipulation of the comparison direction, and (3) a mindset of looking for differences.

In a study with real car-dealers, Mussweiler et al. (2000) were able to show that the anchoring effect for the price of car, as described above, could be reduced (although not completely extinguished) when the dealers were asked for reasons why the anchor value might be inappropriate. Thus, they were asked to generate anchor-inconsistent knowledge, or to consider the opposite of the anchor. Another approach was taken by Mussweiler (2001). He built on previous findings indicating that the direction of comparison determines the initial similarity assessment (Tversky, 1977). Typically, one feels that others are more similar to oneself than one is similar to others. Mussweiler reasoned that this initial similarity assessment could influence the comparison process by determining the initial hypothesis--similarity for a comparison of others to self, but difference for a comparison of self to others. Indeed, he found assimilation in self-descriptions to a comparison target (the anchor) in the first case, but contrast in the second case (for a more elaborate discussion and an own study on this topic, see Study 4).

Finally, it seems that one can also prime a mindset of looking for either similarities or differences. Mindset primings activate motivations or goals "by having the participant first engage in that goal or intentionally use the mental procedure in question" (Bargh & Chartrand, 2000, p. 265). Thus, mindsets are "short-term habits," activated by recent engagement in this sort of behavior. To activate a similarity- or difference-searching mindset, Mussweiler (in press) first gave his participants two pictures with the task to either list differences or similarities between the two pictures. In a second and allegedly unrelated study, they had to compare themselves to a person described in a short text. The participants either assimilated (similarity-mindset) or contrasted (difference-mindset) their self-evaluation to or from the

comparison target, presumably because the mindset influenced their initial hypothesis and the retrieval of evidence.

Another factor which was investigated in a recent research program by Galinsky and Moskowitz (2000; Galinsky, Moskowitz, & Skurnik, 2000) might be added to this list. They assert that surprising outcomes, negative events and counterfactual scenarios (e.g., the plane that you just missed explodes after takeoff) can induce a mental simulation mindset. Such a mindset increases the probability that one thinks about alternative and converse realities when exposed to a proposition. In this research program, thinking about counterfactual scenarios has been shown to induce such a simulation mindset and to influence several cognitive phenomena, with the common denominator that a concept was evaluated in the light of its opposite. It seems possible that a mental simulation mindset can lead to a spontaneous consideration of an anchor's opposite.

In sum, the selective accessibility model argues that the initial hypothesis of a comparison process determines its judgmental outcomes due to changes in the accessibility of knowledge about the anchor and the target. Determinants of the initial hypothesis will also influence the comparison outcome. The assumed mediator, selective accessibility, affords a combination of the selective accessibility model and the research on automatic behavior: Social comparisons, according to the model, selectively increase knowledge structures, presumably also of representations of behavior. Since automatic behavior is assumed to depend on the accessibility of behavioral representations, it could be determined by such processes. Mussweiler and Strack (2000a) also drew this conclusion. They argued that applying insights from automatic behavior research "to the realm of social comparison suggests that comparing oneself with a given standard may automatically trigger behavior that is consistent with the knowledge that has been rendered easily accessible during the comparison process." (p. 263).

When the influences of social comparison on accessibility of knowledge and finally automatic behavior are discussed in this thesis, one point is important to note: The social comparison process is assumed to be conscious, whereas the effect on behavior is assumed to be unconscious. When the social comparison renders knowledge accessible, any automatic behavior following it can be understood as a

priming effect, with the only difference that the initial stimulus is not an environmental stimulus, but a mental process.

Selective Accessibility and the Exemplar-induced Contrast

In the previous chapter, I discussed the conflicting evidence of automatic behavioral contrast after presentation of a single exemplar. Contrast was found when an extreme exemplar (e.g., Einstein, Dijksterhuis, Spears, et al., 1998) was presented, or when a single exemplar was presented for a long time with an impression formation instruction (Dijksterhuis et al., in press). No contrast was found when the exemplar was presented rather casually (Macrae et al., 1998), when it was presented for a longer time without the instruction to form an impression (Pendry & Carrick, 2001), or when the person was merely co-present, without direct interaction (Chartrand & Bargh, 1999).

From the perspective of the selective accessibility model, behavioral contrast depends on both the activation of a dissimilarity hypothesis, and testing of this hypothesis. It seems reasonable to assume that both variables of the perceiver (e.g., a goal) and variables of the target (e.g., extremity) can determine whether a dissimilarity hypothesis is tested. Concerning the research presented by Dijksterhuis, Spears, et al. (1998), one therefore has to ask what caused the dissimilarity hypothesis presumably tested by the participants, if not the distinctive exemplar status. One possibility is that the extremity of the exemplar targets (Albert Einstein, Claudia Schiffer, the Dutch Queen Mother, aged 89) led to the initial dissimilarity hypothesis (cf. Mussweiler & Strack, 2000a; see also Herr, 1986). A direct comparison of the results presented by Dijksterhuis, Spears, et al. (1998, Study 3) and Mussweiler and Strack (2000b, Study 1) is very instructive on this issue. In the first case, participants described Albert Einstein, which presumably activated an implicit comparison. A subsequent sequential priming measure (Bargh & Chartrand, 2000) showed associations between self-concept and stupidity-related words (i.e., a standard-inconsistent trait, for a more detailed description, see the previous chapter). In Mussweiler and Strack's study, participants compared themselves either to Bill Clinton or to Nicki Lauda concerning their physical fitness, and exactly the same measurement technique showed associatons between self-concept and standard-consistent traits (i.e., unathletic after comparison to Clinton and athletic after comparison to Lauda). Thus, while thinking about Einstein's intelligence led to an

association of the self with Einstein-inconsistent traits, thinking about Clinton's fitness led to an association of the self with Clinton-consistent traits. The difference between Einstein in the domain of intelligence and Clinton in the domain of fitness is clear: Einstein is far more extreme.

This reasoning is extremely important for the present argument, because it provides a plausible alternative to the prediction of Dijksterhuis and colleagues that a single exemplar leads to comparison and contrast. I shall therefore summarize the argument: First, we saw that the perception of a single exemplar does not inevitably lead to contrast. Second, on the basis of the selective accessibility model I argued that neither exemplar status nor comparison per se leads to contrast, but the testing of a dissimilarity hypothesis. Third, at least for the contrast results after Einstein/Schiffer-exemplar priming there is a valid alternative explanation, namely that not the exemplar status, but the extremity caused the dissimilarity hypothesis. Therefore, the assumption that exemplar status is a necessary and sufficient cause for contrast should be dropped. Instead, factors that moderate between a similarity and a dissimilarity hypothesis should be investigated. If it is one of similarity (or if no comparison at all is engaged in, see below), standard-consistent knowledge becomes more accessible. If it is one of dissimilarity, standard-inconsistent knowledge becomes more accessible, and behavioral contrast should occur.

This hypothesis has far-reaching implications: When after the perception of exemplars both assimilation and contrast can ensue, the same can be expected after the perception of social groups. More specifically, it suggests that comparisons with social groups can also result in an automatic behavioral contrast if they are started with a dissimilarity hypothesis. The following section explores this hypothesis, and discusses possible moderators of the initial comparison hypothesis.

Selective Accessibility as a Result of Intergroup Comparison

The review of intergroup research presented above suggests the following conclusion: it is a fundamental assumption that individuals expect to differ from outgroups, and perceive themselves as different from outgroups. Perception and judgment of the relation between self and an outgroup seem to follow an oppositeness-heuristic (Cadinu & Rothbart, 1996). If thinking about an outgroup in processes like perception and understanding focuses on differences, the same can be expected for social comparisons: When perceivers compare themselves to the

stereotype (or an exemplar) of a group that is categorized as different, it can also be expected that the comparison focuses on differences between themselves and the stereotype. Thus, we can assume that the comparison to an outgroup is started with an initial hypothesis of dissimilarity if the distinction between (social) self (and ingroup) on the one hand and outgroup on the other hand is salient, that is, if there is an activated ingroup-outgroup categorization.[10] Under these conditions we can expect that the comparison process mainly consists of searching for evidence that the self differs from the outgroup stereotype. If this is true, knowledge that is inconsistent with the stereotype of the outgroup should become more accessible during the comparison process, and result in automatic behavioral contrast. Dijksterhuis et al. (in press) actually acknowledged this possibility in a footnote, but argued that "an individual exemplar is much more likely to act as a comparison standard than is a group of individuals . . . . Group comparisons are only likely if there is a clear intergroup comparison context where the individual is defined at the group level, and where there is some antagonistic relation between the groups." Thus, the present reasoning is in accord with the general idea of Dijksterhuis et al.'s model (see also more recent evidence below).

A complementary second process may also contribute to this contrast. Mussweiler and Bodenhausen (in press) argue that the comparison to an outgroup is primarily based on categorical knowledge about the outgroup. They furthermore argue that a comparison based on categorical knowledge of an outgroup also activates categorical knowledge of the self. In other words, the comparison standard is conceptualized in terms of its category, from which the self is excluded. This leads to an increased accessibility of the negation of the comparison standard's category--that is, the ingroup stereotype.

Finally, we can speculate about a third complementary process. Ingroup-outgroup categorizations are an important part of our everyday life. A major part of our social environment is structured not by interpersonal relations and bonds, but by membership in groups. We often have to deal with outgroups in terms of real intergroup conflicts (e.g., regional social identities or nations, competing companies,

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[10] The term salient is used here as denoting activated and influencing the conceptualization. This usage is borrowed from self-categorization theory, and it differs from other meanings such as "perceptually prominent" (Higgins, 1996).

opposing political parties, rival soccer teams). The frequent thinking about ingroup-outgroup differentiation might lead to a general schema or the availability of a mindset (Bargh & Chartrand, 2000) of expecting and looking for differences between groups. Such a mindset might be activated by the simple activation of a social categorization in ingroup and outgroup, and then directly imply a dissimilarity hypothesis. One result of Brewer and Gardner (1996) points in this direction. They primed the concepts we or they with a short prose passage in which the agents were referred to with we or they. Subsequently, in an allegedly unrelated study, participants had to judge whether a number of ambiguous statements were similar to their own attitude. The we prime facilitated similarity judgments, while the they prime facilitated dissimilarity judgements. In a similar manner, the perception of an outgroup status could work as a prime of perceiving and assuming dissimilarities. This could be described as priming a mindset of looking for differences.

Taken together, all these arguments converge on the hypothesis that social comparison with a group categorized as an outgroup can be expected to lead to increased accessibility of the outgroup stereotype's opposite. Since the starting point of the present argument was the perception of a group in which the perceiver is not a member, I shall summarize the predictions referring to such a situation. When a social group is perceived, the results in terms of knowledge activation depend on the presence of a salient ingroup-outgroup categorization. If the perceived group is categorized as an outgroup, several results can be expected. First of all, a subsequent comparison of the self to the outgroup stereotype should search for differences between the self and the outgroup. These comparisons can be spontaneous (Gilbert, Giesler, & Morris, 1995), or externally triggered, for instance by an instruction to compare. Second, the categorization as an outgroup may lead to the activation of an opposing ingroup (Wilder & Shapiro, 1984) and its stereotype (Mussweiler & Bodenhausen, in press). Third, all subsequent thinking about the outgroup might follow a general we-they schema which expects similarities with the ingroup and differences from the outgroup (Brewer & Gardner, 1996). In sum, stereotype-inconsistent knowledge should become activated as a consequence of a salient categorization of the stereotyped group as an outgroup, by means of difference-testing social comparisons, activation of an opposing ingroup stereotype, and a mindset of looking for differences. In these processes, outgroup-inconsistent knowledge should become (a) more accessible by itself, and (b) associated with the

self-concept. This increased accessibility can be expected to include behavioral representations, which should result in behavioral contrast.

So, why did non of the studies on stereotype priming report findings of contrast? I think simply because none of them did activate a salient ingroup-outgroup categorization. The groups used in this research--professors, soccer fans, supermodels, punks, bank accountants, elderly people--do probably not spontaneously activate a salient ingroup-outgroup distinction. This is so because there was no history of an antagonistic relationship between the groups. This idea is supported by a study of Wilder and Shapiro (1984, Exp. 1), who looked at the spontaneous activation of an ingroup in the presence of a symbolic cue to an outgroup. In their study, they asked their students to answer a "Who am I" test, while in the same room the experimenters placed one of three cues: either a banner of a rival university baseball team (a relevant outgroup with a history of conflict), a banner of a professional baseball team (an irrelevant outgroup), or a banner of the ingroup (a university). The test indicated a salient ingroup both when the ingroup was cued and when the relevant outgroup was cued, but not when an irrelevant outgroup was cued. Thus, an antagonistic ingroup-outgroup relation seems necessary for a spontaneous (difference-testing) comparison to arise. If this argument is accepted, the immediate question is: But why did the White participants in the study by Bargh et al. (1996) assimilate to the Black's stereotype after being flashed with Black faces? Isn't it fair to assume that they would activate an antagonistic relation? I can only speculate at this point: Perhaps a comparison needs conscious perception, or, in the words of Neumann and Strack (2000b), a noetic awareness of the activated category. That is, a comparison might depend on a propositional construal and a conscious categorization.

The reasoning that an antagonistic relationship and a noetic awareness of the outgroup category are possible antecedents of a difference-testing comparison is compatible with proposals from Gilbert et al. (1995). They wrote: "Contextual stimuli are most likely to become the objects of comparison when (a) they have been recently encountered, (b) they are explicitly judged, and (c) their values are especially extreme." (p. 234). Thus, social categories are likely to become comparison objects for the self when there was a history of comparisons, when an explicit judgement is made, and when the stereotype is extreme on a particular

dimension. These principles also fit nicely into the salience model developed by SCT, which tries to predict when exactly a particular categorization is applied to the social environment (e.g., students vs. professors), and not another social categorization (e.g., men vs. women), or even a social categorization at another level of inclusiveness (e.g., we are all scientists). Determinants assumed by SCT are perceiver readiness (similar to accessibility, and related to recent encounters and history of comparisons), and structural fit, which is, amongst others, determined by extremity. However, at this point of my theoretical argument I will not go into further detail at this point, but rather regard a salient ingroup-outgroup distinction as the decisive factor, whatever its reasons might be. Instead, I will first illustrate the plausibility of the present hypothesis with some empirical data collected by others.

Evidence For a Moderation of Automatic Behavior by Ingroup-Outgroup Distinctions

There is indeed empirical evidence supporting the hypothesis that a salient outgroup elicits automatic behavioral contrast. First, in an ingenious experiment, Wilder and Shapiro (1984, Exp. 2) showed that an outgroup prime leads to behavior consistent with the complementary ingroup stereotype, resulting in a contrast effect. Using a rather complicated procedure, they first introduced an ingroup and an outgroup with opposing behavioral norms. These groups were artificial and received color names (e.g., "blue group" as the name of the outgroup). In a subsequent task, they tested which of the norms determined the behavior. To do so, they activated the stereotype of the outgroup with an unobtrusive priming: The instructions were printed on paper which had the same color as the outgroup's name (i.e., the paper was blue). Wilder and Shapiro found that the participants primed with an outgroup cue assimilated to the associated ingroup norm, not the outgroup norm. Note that this result is completely opposite of the previously reported findings by Bargh et al. (1996) and Dijksterhuis and colleagues. From their results, one would have expected behavior according to the primed outgroup stereotype (the blue group). But this was not the case; instead the process is similar to an indirect or mediated priming, in which the outgroup prime activates an ingroup presentation which then guides behavior. Wilder and Shapiro concluded that "subjects were not simply influenced by the past behavior of the salient out-group. Rather, subjects were influenced by the past actions of the in-group associated with the salient out-group." (1984, p. 347). What

limits the possible conclusions from this study is that both ingroup and outgroup were made salient shortly before the effect was measured, which may be a necessary condition.

There is another supporting piece of evidence from a study on mirroring of body posture, which provides another example of unconscious effects of the perception-behavior link (see also Chapter 2; Chartrand & Bargh, 1999). In a study on postural mirroring between two cooperating or competing dyads, LaFrance (1985) found that members of competitive outgroups were less mirrored than ingroup members. This supports the idea that unconscious behavioral regulation is moderated by intergroup relations.

Recently, in a project that developed in parallel to, and independently from this present thesis, Spears, et al. (2001) came to very similar conclusions. They also argued that the comparison with an outgroup should elicit behavioral contrast, and supported these assumptions in two studies. In a first study, they used a coloring task in which the participants had to color figures printed with black lines. The decisive measure was how much the participants overshot the black lines when they colored the figures, which can be interpreted as messy. After a pretest to establish an individual baseline for each participant, a scrambled sentence prime had to be solved which allegedly described either daily situations from members of the ingroup (psychology students) or from those of the outgroup (economics students). Both groups were coupled with the trait neatness. Thus, either the ingroup or the outgroup was stereotyped as neat by the scrambled sentences. Next, participants again had to color some figures. It turned out that while the ingroup stereotyping had no effect (probably due to a ceiling effect), participants primed with a neat outgroup became messier in their coloring--a contrast effect. In a second study, Spears, et al. provided evidence that contrast is a result of comparison by first showing assimilation, then inducing a comparison, which finally resulted in contrast. Participants were first primed either with a description of business people rushing from one meeting to another, or with a description of relaxed tourists travelling across Europe. After this priming, participants had to fill out an exit questionnaire. The time taken to complete it was the first measure. After this questionnaire, the participants received another questionnaire which consisted of a measure of identification with their ingroup, the University of Amsterdam psychology students. Participants were instructed to wait

and left alone, but the experimenter did not show up again. How long the participants waited was the second measure. Thus, both times served as indicators how much the participants assimilated or contrasted to a rushing or relaxed group. Indeed, while those exposed to business people rushed through their exit questionnaire (i.e., they were faster than those primed with tourists), they waited longer than the others for the experimenter after being reminded that they were in fact psychology students. Importantly, in both studies the participants were not aware that the priming manipulation or their comparison process influenced their behavior. Thus, the two studies provide evidence that a reminder of the outgroup status of a comparison target, either during the stereotype activation or after the stereotype activation, can lead to contrast in automatic behavior. I will come back to these studies in the general discussion.

A Model of Moderation of Automatic Behavior by Social Comparison

In the previous sections, I have discussed theoretical arguments and some initial empirical evidence that automatic social behavior after stereotype activation can be moderated by ingroup-outgroup categorizations. In the following, I specify a model of Automatic Behavioral Contrast (ABC model) summarizing these arguments.

(1) It is assumed that the activation of a social category's stereotype activates mental representations of behavior typically ascribed to the stereotyped category. By priming mental representations involved in the execution of these actions, stereotype activation can lead to an increased likelihood of spontaneous execution of this behavior, or facilitation of the execution of this behavior when it is a potential reaction to an environmental event (Bargh et al., 1996; Dijksterhuis & van Knippenberg, 1998).

(2) It is assumed that the activation of a social category's stereotype can also lead to a social comparison of the self to this category. Such a comparison can be spontaneous, when the distinction between ingroup and the social category is chronically accessible (Wilder & Shapiro, 1984), or when the category's stereotype is extreme (Herr, 1986). It can also be a result of additional environmental features, such as a reminder of an opposing ingroup (Spears et al., 2001), or an explicit instruction to compare (Mussweiler, 2001).

(3) It is assumed that the comparison process renders additional knowledge accessible, including behavioral representations. This knowledge activation has the same consequences as knowledge made accessible by the stereotype activation in (1). Thus, the comparison process functions as a priming event. Knowledge activated by the stereotype activation and knowledge activated by the comparison process can add up or cancel each other out. The two processes work in parallel.

(4) It is assumed that an initial similarity assessment determines whether the comparison process searches for evidence that self and activated stereotype are different or similar. Thus, the comparison may either test for difference or for similarity (Mussweiler & Strack, 2000a). This initial similarity assessment is hypothesized to depend on the following variables:

   a) A salient ingroup-outgroup distinction that categorizes the perceived group as an outgroup is hypothesized to induce a test for difference.

   b) Possible antecedents of a salient ingroup-outgroup distinction are, among others, antagonistic relations (Wilder & Shapiro, 1984) and extremity of the outgroup's stereotype (Mussweiler & Strack, 2000a).

   (Other causes of a test for difference are possible, but will not be discussed here.)

   c) Importantly, the membership in the activated category (i.e., an ingroup) is hypothesized to lead to a test for similarity.

(5) Modifying the assumptions of Dijksterhuis, Spears, et al. (1998), it is hypothesized that the activation of an exemplar will only lead to behavioral contrast when a test for difference is initiated, and that exemplar status alone is not a sufficient cause for such a test for difference. It is hypothesized that additional causes can be that the exemplar is categorized as an outgroup member (see 4a) or that the exemplar is extreme on the comparison dimension (see 4b). Furthermore, when the exemplar is a member of a shared category, a test for similarity is hypothesized (4c), if an additional ingroup-outgroup context is salient.

These hypotheses can be summarized as a two-stage model, in which an exit can occur after the first stage and in which the second stage is moderated. The activation

of a stereotype leads to increased accessibility of associated behavioral representations and thereby to assimilation in automatic behavior. This activation is the first stage of the model. As the second stage of the model, the perceiver can engage in a social comparison to the activated stereotype. Whether this comparison renders stereotype-consistent or inconsistent knowledge accessible, is moderated by the initial hypothesis tested in the comparison. Ingroup-outgroup categorization and extremity are expected to determine the initial hypothesis. (In fact, extremity is a cause of a salient ingroup-outgroup categorization.)

Note that I do not assume that the self-concept is involved in every stereotype activation. In contrast to this assumption, one could speculate whether the two-stage model is in fact only one stage, and that a similarity test or assimilation is the default. However, this assumption would have difficulties integrating the effects of non-social environmental primings (i.e, do we test for similarity of the self to all objects encountered?). Furthermore, the two-stage model has the advantage that it can explain parallel effects of assimilation and contrast which may cancel each other out (for a similar argument, see Dijksterhuis, Spears, et al., 1998). Therefore, a two-stage model in which the self-concept is involved only in the second stage is preferred.

There is one further speculation which I do not propose as a special hypothesis, but which is interesting enough to keep in mind while looking at the empirical evidence reported in the next chapters. While in the first stage knowledge becomes accessible as an effect of environmental events, in the second stage knowledge becomes accessible in association with the self. Thus, only knowledge from the second stage becomes associated with the self. Remember the contradicting results on the effects of self-focus reported in the section on moderators in Chapter 3: While Dijksterhuis and van Knippenberg (2000) found that increased self-focus extinguished priming effects of stereotype activation, Baldwin and Holmes (1987) found that effects of a significant other priming were increased by self-focus. The term significant other already denotes that the referring knowledge is significant to the self. Apparently, self-focus does not override priming events of this kind. I think that only knowledge activated in the first stage is overridden by a self-focus, but that the association with the self allows self-focus to increase priming effects of knowledge activated in the second phase, because self-focus increases the activation of self-relevant knowledge. Thus, knowledge made accessible by stereotype activation and knowledge activated

by a comparison process may have similar effects; the effect of moderators on the two kinds of accessible knowledge however could be different.

4.3 Overview of the Present Research

The following experiments will test the hypotheses stated in the ABC model. The studies mainly differ in two regards: firstly, in the activated stereotype, and secondly in the procedures used to induce a salient ingroup-outgroup distinction. The first four studies investigate the behavioral effects of the elderly stereotype in settings with a salient social categorization. Studies 1 and 2 employ an artificial ingroup-outgroup distinction to categorize elderly persons as outgroup members. Study 3 will use a comparison instruction, without an additional artificial categorization. Study 4 will follow up on this procedure, manipulating the direction of comparison. Study 5 then turns to the professor stereotype, and investigates its behavioral effects on different groups of participants. Finally, Study 6 investigates hypothesis (5) stated above. It will test whether the contrast from a distinctive exemplar can be extinguished by its membership in an artificial ingroup.

5 CONTRAST FROM MINIMAL GROUPS

5.1 Study 1: Automatic Contrast From Exemplars of Artificial Outgroups

The theoretical model developed in the previous chapter hypothesizes that under certain conditions, a social comparison with a stereotyped group renders concepts accessible that are inconsistent with the stereotype of that group. More specifically, increased accessibility of stereotype-inconsistent concepts is predicted if the stereotyped group is categorized as an outgroup. Take as an example the stereotype of the elderly: a social comparison of the self to an outgroup that consists of elderly people should render elderly-inconsistent behavior accessible. The results cited in the first chapters of this thesis provided convincing evidence that highly accessible behavioral representations will lead to a facilitation of the respective behavior. Therefore, one can expect that if stereotype-inconsistent representations become accessible during the comparison process, stereotype-inconsistent behavior will follow automatically. This should result in a behavioral contrast: The behavior of individuals who compare themselves to the stereotype of an (out)group is predicted to differ automatically from the stereotype, while the behavior of those who do not compare themselves is predicted to assimilate automatically to the stereotype. Applied to the example, it follows that if elderly-inconsistent behavior becomes accessible during the comparison, behavior after the comparison will not assimilate to the stereotype of the elderly, but that it will be contrasted in the opposite direction.

Study 1 was conducted as an initial test of this hypothesis. The main purpose of Study 1 was to show that automatic behavioral contrast can be observed at all, before the moderating mechanism is studied in more detail. Study 1 consists of two experiments, 1a and 1b, which were identical in their design and materials, and differed only in the setting in which they were conducted. The paradigm of the studies extended the method developed by Dijksterhuis et al. (in press). In their studies, participants had to form an impression of 5 persons, who were either young or elderly. This constituted the priming. Afterwards, behavioral assimilation was measured in the form of behavioral speed in a lexical decision task (LDT), with words unrelated to the stereotype. In the studies to be reported shortly, the same method was applied.

However, in line with the argument presented above, in the present studies the 5 persons were categorized as outgroup members. This was achieved by introducing a social categorization which was new to the participants and in fact artificial, similar to a minimal group paradigm (Tajfel et al., 1971). Numerous studies have shown that this paradigm creates a salient and situationally meaningful ingroup-outgroup distinction, sufficient for activating differential responses to ingroup and outgroup members (Brewer & Brown, 1998). In the studies reported here, the participants were allegedly tested for their "perception style" and then assigned to one of the two groups. After this categorization, 5 persons were presented as part of an impression formation task. These 5 persons were either young or elderly. The 5 persons were introduced as members of the (artificial) outgroup. Importantly, in the condition where the members were elderly, the participants did not perceive the group of elderly people as an outgroup on the basis of them being elderly. Instead, the outgroup status was created first, and the presented persons served as exemplars of the outgroup and therefore as a basis for stereotype induction. The advantage of using this procedure was that no previously existing stereotype or chronic salience of a social categorization could collide with the manipulation.

The two studies reported here test these conditions in a one-factorial design, with one half of the participants perceiving elderly outgroup members and the other half perceiving young outgroup members. The purpose if these studies is to investigate whether behavioral contrast can be observed empirically. The two studies are identical in their design, and their results will be combined meta-analytically. (In Study 2, the same materials will be used, but with the addition of a second factor, namely whether the 5 persons are again categorized as outgroup members, or whether they are not categorized at all.) The central prediction is that categorizing exemplars as outgroup members results in behavioral contrast, that is, faster reactions after the perception of elderly outgroup exemplars than after the perception of young outgroup exemplars.

Additionally, ingroup identification, measures of the intergroup context, and stereotyping of in- and outgroup were assessed. It is expected that age or categorization of persons do not have an effect on ingroup identification. The measures of intergroup context were taken to check the power of the artificial categorization to create a salient ingroup-outgroup distinction. With respect to

stereotyping, it is expected that the age of the exemplars has a direct impact on the stereotype of the outgroup, and that it has a weak effect on the ingroup stereotype by way of explicit contrast. The study also explores whether the outgroup stereotype mediates the behavioral contrast.

Method

Overview and Design

Studies 1a and 1b applied a one-factorial design, varying whether 5 elderly or 5 young outgroup members were presented to the participants. In the beginning, participants were categorized in a minimal-group way. Following this assignment to an ingroup, five ostensible members of the outgroup were presented. Participants then completed a lexical decision task measuring their mean reaction time, which was presented as an unrelated filler task. Finally, stereotypes of ingroup and outgroup were assessed.

Participants in Study 1a

Study 1a was run in the laboratory. 25 students of economics took part in the study. They were paid DM 10 (about US$ 5) for their participation. One participant failed to recall the group membership of the exemplars correctly, and one participant doubted the existence of the group distinction. Both were excluded from the sample. Furthermore, preliminary analyses indicated that one participant had excessively long reaction times (i.e., a mean reaction time which was over 3 SDs above the mean of the sample, and 3 of the 10 reaction times longer than the mean reaction time of the sample). He was also excluded from all further analyses.[11] Of the 22 remaining participants, 12 were female (one missing value). Except one, all were aged between 17 and 25, one was older than 25, but younger than 30 (one missing value). Estimated mean age was 20.7. The two conditions did not differ significantly regarding mean age and distribution of gender. None of the participants suspected an influence of the exemplars' age on performance in the LDT.

[11] It has to be noted that this participant was in the condition with elderly outgroup members. His inclusion in the analyses decreases the significance level of the reported effect to a marginal effect.

Participants in Study 1b

Study 1b was run as an Internet study. Participants worked on their own computers; advertisements were placed in appropriate newsgroups and distributed on the local campus. As an incentive, participants could take part in a lottery, where 1 out of 20 won 20 DM. Forty-two native speakers of German took part in the study. Four participants were excluded due to the following reasons: Three participants failed to recall their own or the exemplars' group membership correctly. One further participant indicated that he was distracted by a telephone call during the reaction time task. 18 of the remaining 38 participants were female (one missing value); 63.1% were aged between 15 and 30, 34.2% were aged between 31 and 45 (one missing value). Estimated mean age was 27.2. The two conditions did not differ significantly regarding mean age and distribution of gender. None of the participants suspected an influence of the exemplars' age on performance in the LDT.

Materials and Procedure

The experiment was introduced as a study on perception. In the laboratory Study 1a, participants were run in groups from 3 to 5. In the Internet Study 1b, participants took part from their individual computers. As in all studies presented in this thesis, the experimental procedure was programmed in JavaScript, and data were collected using software from Müller and Funke (1998).

The minimal group categorization followed the procedures applied by Otten, Mummendey and Buhl (1998). Participants were told that in general, people could be divided in two groups following their different perception styles. The two perception styles were called figure-based perception and ground-based perception, and ostensibly differed in the order in which people organized their perception of the environment. Previous research has shown no indication that this artificial categorization is associated with age in any way (Otten, 2000). As a test of their perception style, participants were shown 12 ambiguous pictures and perceptual illusions (e.g., drawings by Escher), 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 told that they would be presented 5 members of the outgroup with a figure-based perception style, with the instruction to form impressions of them.

Color photos of 5 persons and additional information in the form of 4 short statements about each person were shown (see Figure 2). Pictures and statements were presented in the form of a slide show on the computer, with each statement remaining on the screen for 4 s, and thus each picture remaining on the screen for 16 s. Pictures and statements differed depending on the two conditions. The pictures were selected in a pretest with an independent sample (N=26), where the 5 elderly persons were judged to be significantly slower than 4 of the young persons, $t(25)=6.23$, $p<.001$. (One more picture of a young man was added afterwards.) 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). Within each set, combinations of pictures and statements were randomized for each participant.

Figure 2. Photos of elderly and young target persons used in Studies 1 and 2.

The following lexical decision task was presented as a filler task. 10 words and 10 pronounceable non-words were presented on the screen, and participants were instructed to decide as fast as possible whether a word or a non-word appeared by pressing either Y or N. The first stimulus served as a practice trial and was always the same non-word. The order of the remaining stimuli was randomized for each participant. The words were completely unrelated to the stereotype of the elderly or young persons. The stimuli remained on the screen until an answer was given, and the inter-trial interval was 1500 ms.

To assess the stereotypes of ingroup and outgroup, participants then rated each group on 12 adjectives. These were selected in a pretest, where an independent sample of 22 participants rated 20 preselected adjectives on a scale from very typical for the

elderly to very typical for young people. For 12 adjectives, the mean ratings differed significantly from the midpoint of the scale, $ts(22)>2.61$, $ps<.017$. Five adjectives were typical for young people: spontaneous, flexible, open-minded, unworried, emotional. Seven more adjectives were typical for the elderly: calm, slow, ruminative, stingy, serious, experienced, forgetful.[12] Participants first rated the ingroup and then the outgroup on these 12 adjectives, with scales from does not apply at all (1) to applies very much (5).

Finally, a number of complementary variables were assessed. The integrity of the manipulation was checked by asking which groups the participants themselves and the exemplars were in. Awareness of possible influences of the outgroup members' presentation on the reaction times was assessed by an open question: Participants were asked what they thought the true purpose of experiment actually was, and whether they saw any connection between the person presentation and the reaction time task. Ingroup identification was measured with 4 items (e.g., My perception style fits my experiences and I identify with the members of the group "ground"). Additionally, the participants answered 3 graphical items of the perception of the intergroup context, the Overlap of Self, Ingroup and Outgroup scale (OSIO, Schubert & Otten, 2000). These items are adaptations of the Inclusion of Other in Self scale (Aron, Aron, & Smollan, 1992). The two items for overlap of self and ingroup and overlap of self and outgroup depict two circles, a small circle for the self and a larger circle of the group. On the 7 pictures forming each item, the two circles are increasingly closer together, with maximal distance on the first picture (1) and total inclusion of self in the group in the last picture (7). The item for overlap of ingroup and outgroup depicts two circles of equal size, which approach each other from maximal distance to almost total overlap (see Figure 3).

[12] In German: spontan, flexibel, aufgeschlossen, sorglos, emotional, ruhig, langsam, nachdenklich, sparsam, ernsthaft, erfahren, vergesslich.

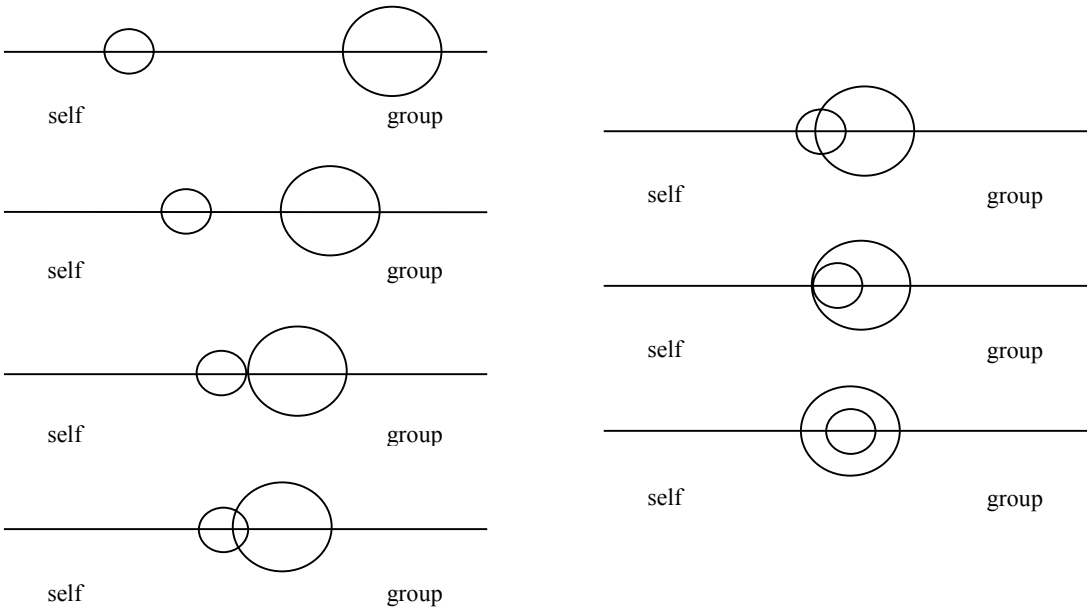

Figure 3. Self-group overlap item, used for assessment of self-ingroup and self-outgroup overlap.

Finally, mother tongue, gender, and age were assessed. For the assessment of age, participants were offered categories instead of a direct question.[13] Participants had to select their age from categories, beginning with younger than 15, and then counting upward in 5-year steps (i.e., between 15 and 20, etc.). The mean age of the sample was estimated from these values by multiplying the number of participants in each category with the midpoint of each category, divided by the total number of participants. After the experiment, participants were debriefed by a written explanation of the experiment's hypotheses and manipulations.

Results in Study 1a

Ingroup Identification and Overlap

Identification was measured with an internal consistency of Alpha=.85; it did not differ between the two conditions, $t<1$. A comparison of self-ingroup overlap and self-outgroup overlap served as an indicator whether a salient intergroup situation was established. In a 2 (self-ingroup vs. self-outgroup) x 2 (exemplar age) MANOVA with repeated measures on the first factor, the repeated measures factor showed the only significant effect, $F(1,20)=12.49$, $p=.002$. Self-ingroup overlap,

[13] This reason for not asking the exact age was that study 1b was run on the Internet, where those questions are often declined.

M=4.82, SD=1.56, was higher than self-outgroup overlap, M=3.41, SD=1.44. The second main effect and the interaction were not significant, Fs<1. Likewise, exemplar age had no effect on the perceived overlap between ingroup and outgroup, t<1.

Reaction Times

Following Dijksterhuis et al. (in press), only reactions to words were analyzed. Reaction times of 2 wrong answers were deleted. Furthermore, 3 reaction times which were 3 SDs longer than the mean were deleted. The two conditions did not differ with respect to the number of wrong answers, or prolonged reaction times. Altogether, 5 out of 220 (2.27%) reaction times were discarded. For each participant, a mean reaction time score was computed and log-transformed due to a skewed distribution (Bargh & Chartrand, 2000).[14] For ease of interpretation, untransformed means are reported in Table 1. As expected, participants were faster after the presentation of elderly outgroup members, M=676.17, than after the presentation of young outgroup members, M=755.21, t(20)=1.82, p=0.042 (one-tailed), d=0.78.

Stereotypes

The adjective ratings were combined into ratings of the ingroup's and the outgroup's "elderliness." The 12 adjectives, with typically young adjectives reverse scored, were internally consistent with Alpha=.67 for the ingroup and Alpha=.88 for the outgroup stereotype. Taking the means, two scores were computed that indicated how "typically elderly" ingroup and outgroup were described (see Table 2). The two scores correlated marginally negatively with r=-.41, p=.058. A 2 (ingroup vs. outgroup) x 2 (exemplar age) MANOVA with repeated measures on the first factor showed no significant effects, Fs<1 for the within-subjects factor and the interaction, and F(1,20)=1.49, p=.237 for the condition main effect. A simple effects analysis confirmed that the exemplar age had no generalizing effect on the stereotype of the outgroup, p=.636. In a regression of the reaction time on the stereotype scores, neither stereotype predicted the mean reaction time, ps>.5.

[14] In all analyses presented for Studies 1 and 2, untransformed means yielded virtually identical results.

Results in Study 1b

Ingroup Identification and Overlap

The four identification items had an internal consistency of Alpha=.73. The two conditions did not differ with respect to ingroup identification, $t<1$. Like in Study 1a, a 2 (self-ingroup vs. self-outgroup overlap) x 2 (exemplar age) MANOVA confirmed that self-ingroup overlap, $M=4.73$, $SD=1.35$, was significantly higher than self-outgroup overlap, $M=3.42$, $SD=1.37$, $F(1,35)=27.39$, $p<.001$, with no other effect approaching significance, $Fs<1$ (lower dfs because of one missing value for self-outgroup overlap). Likewise, ingroup-outgroup overlap did not differ between the conditions, $t<1$.

Reaction Times

Only reactions to words were analyzed. Reaction times of wrong answers ($N=5$) were deleted. Furthermore, 4 reactions times 3 SDs longer than the mean were deleted. The two conditions did not differ with respect to the number of wrong answers, or prolonged reaction times. Altogether, 9 out 380 (2.37%) reaction times were discarded. For each participant, a mean reaction time score was computed and log-transformed due to a skewed distribution. For ease of interpretation, untransformed means are reported in Table 1. As expected, reaction times were longer in the condition with young outgroup exemplars, $M=665.12$, than in the condition with elderly outgroup exemplars, $M=628.53$, but the difference was not significant, $t(36)=1.16$, $p=.136$ (one-tailed), $d=0.399$.

Stereotypes

The stereotype scales had internal consistencies of Alpha=.70 for the ingroup stereotype and Alpha=.91 for the outgroup. Two scores were computed that indicated how "typically elderly" ingroup and outgroup were described by averaging the ratings, with typically young attributes reverse-scored, resulting in a range from 1 to 5. The two scores correlated negatively with $r=-.67$, $p<.001$. A 2 (ingroup vs. outgroup) x 2 (exemplar age) MANOVA with the repeated measures on the first factor showed a marginally significant main effect of the within-subjects factor, $F(1,36)=2.86$, $p=.099$, a significant main effect of the exemplar age, $F(1,36)=10.57$, $p=.003$, and a significant interaction, $F(1,36)=9.13$, $p=.005$ (see Table 2). Simple effects analyses showed that elderly outgroup exemplars were generalized to the whole outgroup and made its stereotype more typically elderly, compared to the

condition with young outgroup members, p<.001. In contrast and as expected, the ingroup was stereotyped as less typically elderly when elderly outgroup members were perceived; however, this difference was only marginally significant, p= 0.063 (both tests one-tailed). Neither ingroup nor outgroup stereotype significantly correlated with the mean reaction time, r=.28, p=.20, and r=.14, p=.51, respectively.

Table 1. Reaction Times Depending on Age of Outgroup Exemplars, Study 1a and 1b

	Study 1a		Study 1b	
Exemplar Age	M	SD	M	SD
Young exemplars	755.21	113.17	665.12	100.86
Elderly exemplars	676.17	84.17	628.53	86.94

Table 2. Stereotyping of Ingroup and Outgroup in Studies 1a and 1b

		Study 1a		Study 1b	
Exemplar Age	Target	M	SD	M	SD
Young exemplars	ingroup	2.97	.40	3.18	.43
	outgroup	3.13	.74	2.41	.54
Elderly exemplars	ingroup	2.79	.51	2.95	.46
	outgroup	3.01	.48	3.16	.64

Note. Higher scores indicate that stereotypes are closer to the elderly stereotype.

Meta-analysis Combining Studies 1a and 1b

In both pilot studies, on a descriptive level reaction times were shorter when participants perceived elderly outgroup exemplars. However, the effect was only significant in the first pilot study. Since both studies applied identical materials and procedures, one way of combining the results is a meta-analysis across both samples. Thus, the effects sizes of exemplar age on reaction time found in Study 1a and 1b were combined meta-analytically. The mean effect size d equaled 0.51, and was

significant with Z=1.89, p=0.015 (one-tailed),[15] indicating faster reactions after perception of elderly outgroup exemplars.

Discussion

The results of Study 1a confirm that the categorization of persons as outgroup members can elicit a behavioral contrast from their perceived characteristics. Although the participants perceived 5 persons within a procedure almost identical to that of Dijksterhuis et al. (in press), they subsequently showed the opposite of the 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. Furthermore, participants were not aware that the perception of the outgroup members changed their behavior in the subsequent reaction time task. The reaction times in Study 1b showed the same pattern, that is, faster reactions after perception of an elderly outgroup. However, in Study 1b this difference was not significant. In order to get a reliable judgement of the combined evidence of both experiments, their reaction time results were combined meta-analytically. This meta-analyses indicated a significant combined effect across the total sample of 60 participants. Contradicting previous arguments and results from Dijksterhuis et al. (in press), it was found that the perception of 5 persons of similar age did not result in an assimilation to their abstract stereotype, but in an automatic behavioral contrast, due to these 5 persons being categorized as members of an outgroup.

In both studies, the data on ingroup identification and overlaps of self, ingroup, and outgroup showed that the two conditions did not differ with respect to degree of ingroup identification, or perceived overlap. The only significant effect on these measures was the finding that perceived overlap of self and ingroup was higher than perceived overlap of self and outgroup. This is the hallmark of a significant ingroup-outgroup differentiation, which presumably led to the automatic behavioral contrast. Note that this ingroup-outgroup differentiation occurred for an artificial social categorization, created on the basis of an alleged perception style which was

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[15] It is possible to estimate the reliability of the reaction time measure by computing an internal consistency for the ten reaction times combined in the mean scores. These Alphas equaled 0.78 for Study 1a and 0.77 for Study 1b. When the meta-analysis was corrected for this estimated reliability of the reaction time score, the combined effect size increased to d=0.58, Z=2.12, p=0.008 (one-tailed).

completely new to the participants. The participants received very scarce information about the categories; in fact, the outgroup exemplars served as the main source of information. Thus, the minimal nature of the artificial categorization was probably an important factor for the contrast outcome, since it presumably led the participants to focus strongly on the limited information available to them.

Concerning the stereotypes of ingroup and outgroup, it was expected that especially the stereotype of the outgroup, but also the stereotype of the ingroup would be influenced by the age of the presented outgroup exemplars. The findings concerning the stereotypes are rather puzzling. In Study 1a, there was apparently no significant induction of an outgroup stereotype from the presented outgroup exemplars. In Study 1b, the pattern was as predicted, with a strong induction of the outgroup stereotype from its exemplars, and a weak effect in the opposite direction on the ingroup stereotype. More specifically, it was found that after the perception of elderly outgroup exemplars the whole category was stereotyped as if all category members would be of a similar age. On the other hand, it seems that for the ingroup, the opposite was assumed, such that it became stereotypically younger in the presence of an elderly outgroup. However, this process seems to be rather independent from the behavioral contrast effect, which was stronger in Study 1a, both concerning significance level and effect size. It may be that the participants in the laboratory situation in Study 1a were less willing to induce the outgroup stereotype from the exemplars on the explicit measures since they were aware of their co-participants, who were of their own age. Participants on the Internet, however, had no access to knowledge of other participants other then themselves and the presented exemplars, and may have therefore relied more on the information given. At the same time, more heterogeneous environments across the participants of the Internet study may have caused error variance in the reaction time data of Study 1b, which may have led to the weaker effect.

The combined results from both studies provide clear evidence that behavior can be automatically contrasted from an outgroup. Although the participants saw several members of a group, they did not assimilate their behavior to the group when it was an outgroup. The social categorization was made salient before the exemplars were perceived, and presumably triggered a spontaneous comparison process during the perception of the exemplars.

It should be noted that these two studies have (at least) two shortcomings. First of all, it is not clear which cell of the design drove the effect. The wording of the discussion focused on the elderly outgroup members. Due to the lack of a baseline, it could also be that not much happened in the elderly cells, while the contrast in fact took place in the condition with young outgroup exemplars (leading to longer reaction times). However, this would not change the main point, that outgroup contrast was observed. The second shortcoming is that the contrast cannot be attributed only to the social categorization, since the design did not vary this factor. It could have been that our presented exemplars were so extreme or distinct that they created a contrast by themselves, and that the outgroup status did not matter. Therefore, in the following Study 2 the outgroup categorization itself was varied.

5.2 Study 2: Moderation by Comparison

The combined evidence of the two experiments in Study 1 suggested that the participants contrasted from the group of persons that was categorized as an outgroup. One question remains: Did they contrast from this group because it was categorized as an outgroup? Or were there additional factors that lead to the contrast, instead or perhaps in addition to the outgroup categorization? The best way to tackle this question is to test both contrast and assimilation conditions in one experiment. This was done in Study 2.

The design of Study 2 used the materials and extended the conditions of the Study 1 experiments by adding a second between-subjects factor. Thus, the first factor again varied whether pictures of 5 young or 5 elderly persons were presented. In addition, the second factor varied whether the 5 persons were categorized as outgroup members (outgroup condition, equivalent to Study 1), or whether they were not categorized at all (control condition). Thus, Study 2 tested for both behavioral assimilation and contrast in one design. The central prediction was that uncategorized persons would elicit assimilation, replicating the conditions of Dijksterhuis et al. (in press), while outgroup members would elicit behavioral contrast (replicating Study 1). Overall, an interaction effect is predicted. Additionally, ingroup identification and measures of the intergroup context tested whether a salient intergroup context was established, and explicit measures again assessed stereotypes of ingroup and outgroup.

Method

Overview and Design

The study applied a 2 (exemplar age: young vs. elderly) x 2 (categorization of exemplars: outgroup vs. uncategorized) between-subjects design. The first factor followed exactly the procedures of Study 1. The second factor varied whether the exemplars were categorized as outgroup members as in the pilot study, or left uncategorized. The overall procedure of the study followed exactly that of Study 1. The study was, like Study 1b, conducted on the Internet.

Participants

Altogether, 107 native speakers of German took part in the experiment on the Internet. Fifteen participants were excluded due to the following reasons: 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 for words. Four participants indicated knowledge of artificiality of the groups through expertise in social psychology (i.e., two them wrote that they identified a minimal group paradigm). None of the remaining 92 participants suspected that the age of the exemplars influenced their reaction time. Fifty-one participants were female, five did not indicate their gender. 67.4% reported that their age was between 15 and 30, the remaining participants were aged between 31 and 65 (4 missing values). The estimated mean age was 27.7. The conditions did not differ regarding age or gender distribution.

Materials and Procedure

Materials and procedure followed that of Study 1, with two important differences. In the uncategorized exemplars condition, the exemplar presentation was simply introduced by the instruction that participants should form an impression of the following persons. No reference to the minimal groups was made at this point. Furthermore, in the categorized exemplars condition, stereotypes of ingroup and outgroup were assessed as before on the same 12 adjectives. In the uncategorized exemplars condition, however, participants were asked to rate the group of 5

exemplars on the same adjectives. Ingroup or outgroup stereotypes were not assessed in the uncategorized condition.[16]

Results

Ingroup Identification and Overlap

A 2 x 2 ANOVA showed no effects on ingroup identification, which had an Alpha of .79 (exemplar age: $F<1$, exemplar categorization: $F(1,88)=1.61$, $p=.208$; interaction: $F<1$). The only significant effect emerging from a 2 (exemplar age) x 2 (exemplar categorization) x 2 (self-ingroup overlap vs. self-outgroup overlap) MANOVA 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, $M=4.38$, $SD=1.71$, was higher than self-outgroup overlap, $M=2.86$, $SD=1.30$ (lower dfs because of 4 missing values for self-outgroup overlap). No significant effect was found in a 2x2 ANOVA of ingroup-outgroup overlap, although this score was higher when young exemplars were presented, $F(1,88)=2.28$, $p=.135$, irrespective of the categorization, both other Fs<1.

Reaction Times

Only reactions to words were analyzed. Reaction times of wrong answers ($N=15$) were deleted. The conditions did not differ with respect to the number of wrong answers. Furthermore, all reaction times 3 SDs longer than the mean ($N=18$) were deleted. They were also distributed equally across the conditions. Altogether, 33 out of 920 reaction times (3.6%) were discarded. The remaining reaction times were combined in one mean reaction time for each participant. Since the distribution was skewed, a log transformation was applied on the data. For ease of interpretation, nontransformed means are reported in Table 3.

Reaction times were analyzed in a 2 (categorization of exemplars) x 2 (age of exemplars) ANOVA. Neither the main effect of categorization of exemplars, $F(1,88)=1.32$, $p=.253$, nor the effect of exemplar age, $F<1$, was significant. Simple effects analyses showed a significant contrast effect in the condition with categorized exemplars, $F(1,88)=2.85$, $p=.048$ (one-tailed), that is, reaction times were shorter

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[16] It would have been desirable to assess the stereotypes of ingroup and outgroup in this condition as well. We opted for their omission, however, since we wanted to keep the procedure as short as possible, which is important for Internet experiments.

after exposure to elderly outgroup exemplars than after exposure to young outgroup exemplars. In the condition with uncategorized exemplars, a marginally significant assimilation effect was found, F(1,88)=2.31, p=.066 (one-tailed). Most importantly, this resulted in a reliable interaction, F(1,88)=5.15, p=.026 (two-tailed).

Table 3. Reaction Times Depending on Age and Categorization of Exemplars, Study 2

	Outgroup Exemplars		Uncategorized Exemplars	
Exemplar Age	M	SD	M	SD
Young Exemplars	722.32	156.76	629.19	114.38
Elderly Exemplars	655.42	122.85	683.76	121.75

Stereotypes

In the categorized exemplars condition, both ingroup and outgroup stereotype were assessed. Values are missing for one participant's stereotypes of both groups and one participant's stereotype of the outgroup. The items for the ingroup and outgroup stereotypes showed satisfying internal consistencies, Alpha=.70 and Alpha=.84, respectively. The two scores correlated negatively with r=-.56, p<.001. The only significant effect in the 2 (ingroup vs. outgroup) x 2 (exemplar age) MANOVA with repeated measures on the first factor was a main effect of exemplar age, F(1,43)=5.17, p=.028. The main effect of the within-subjects factor was marginally significant, F(1,43)=3.88, p=.055, and the expected interaction was not substantial, F<1. Simple analyses showed that exemplar age had no effect on neither the ingroup stereotype, nor the outgroup stereotype, ps>.20 (see Table 4). Similarly, neither score predicted the mean reaction time, r=-.17, p=.349, and r=.09, p=.640, for ingroup and outgroup stereotype, respectively.

In the uncategorized exemplars condition, the impression of the 5 exemplars was assessed. The 12 items had an Alpha of .78. Exemplar age had a significant effect on this impression, t(43)=5.89, p<.001. The elderly exemplars were described according to the stereotype of the elderly. The correlation between the exemplar expression in terms of the elderly stereotype and the mean reaction time was marginally significant, r=.27, p=.071. Thus, the more elderly the exemplars were perceived, the more slowly the participants answered in the LDT.

Table 4. Stereotypes of Ingroup, Outgroup, and Exemplars in Study 2

Exemplar Age	Exemplar Categorization	Target	M	SD
Young Exemplars	Outgroup Members	ingroup	3.89	.40
		outgroup	3.57	.54
	Uncategorized	exemplars	3.59	.44
Elderly Exemplars	Outgroup Members	ingroup	4.02	.63
		outgroup	3.78	.60
	Uncategorized	exemplars	4.34	.41

Note. Higher scores indicate that stereotypes are closer to the elderly stereotype.

Discussion

Study 2 tested whether the categorization of a group of persons as an outgroup, in comparison with a condition in which the persons were not categorized, would moderate between contrast and assimilation. Thus, an interaction between the age of the persons and their categorization was expected, such that assimilation was expected when they were not categorized, while contrast was expected when they were categorized as an outgroup. This predicted interaction pattern was found. Results showed that reaction times were significantly shorter after exposure to elderly outgroup exemplars than after exposure to young outgroup exemplars. Thus, in this condition the results from Study 1 were replicated. In the condition with uncategorized exemplars, a marginally significant assimilation effect was found. The latter condition is a replication of Dijksterhuis et al. (in press), who found the same effect after the perception of 5 elderly uncategorized persons. Thus, the observed interaction pattern nicely shows the power of a salient outgroup categorization: It reverses the assimilation which occurs in the absence of an ingroup-outgroup context. An interesting feature of the used procedure is that it did not explicitly instruct the participants to compare. Thus, we can assume that the participants engaged spontaneously in the comparison (Gilbert et al., 1995), and thought about differences between this outgroup and themselves (and their ingroup). While this comparison was presumably conscious and accompanied by a propositional construal of the outgroup ("they are elderly/very young"), the following effect on behavior was unconscious and automatic: participants were not aware that the perception of the

outgroup members changed their behavior in the subsequent reaction time task. Thinking about differences resulted in automatic behavioral differentiation.

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. I can only speculate why this might be so. Several reasons are possible. 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 outgroup exemplars of roughly equal age led to an increased elaboration of possible differences, since the initial outgroup status is suggestive of them and the hitherto meaningless artificial categorization has to be filled with meaning. Elderly persons might indicate difference after a superficial elaboration, without strong activation of differences behind the mere perceptual level. A third possible explanation is that the outgroup manipulation has a slight main effect which shifts the reaction times in total, although it is unclear why this should be so. In any case, the decisive point is that the interaction was significant, showing that the behavioral consequence was moderated by the categorization.

In both studies, indices of identification and perceived overlap confirmed that the conditions were equivalent regarding ingroup identification, and that the minimal group paradigm created a salient group membership for the participants. It seems that that this salient outgroup status of the 5 persons changed the comparison process and resulted in increased accessibility of inconsistent behavioral presentations.

In line with the puzzling finding from the Study 1 experiments, the results on stereotypes show that behavioral contrast and explicit stereotyping do not go hand in hand. In the uncategorized condition, the 5 participants were clearly stereotyped as expected. However, when these 5 were members of the outgroup, they had no significant effect on its stereotype (as in Study 1a, and in contrast to Study 1b), and the effect on the ingroup stereotype was negligible. Again, it seems that deliberate considerations either prevented a straightforward induction of the outgroup stereotype from the outgroup exemplars, or led to a comparable stereotyping of the ingroup. As in Study 1, group stereotypes did not predict the behavioral effects. However, it is very interesting that the impression of the 5-person group in the uncategorized exemplars condition marginally predicted the behavioral effect. Of course, this effect has to be interpreted cautiously due to the low significance; the

direction of causality is open to interpretation, and one cannot speak of a mediation effect. The most reasonable interpretation seems to be that a more extreme representation led to a stronger behavioral effect. To my knowledge, this is the first finding in which a process variable correlated with a behavioral priming effect. The next study will report a similar effect, although in a very different paradigm. While the previous studies found automatic behavioral contrast from artificial outgroups, the next three studies will investigate behavioral contrast in more natural comparison situations.

6 CONTRAST FROM NATURAL CATEGORIES

6.1 Study 3: There Is More Than One Way to Slow Down

In the previous two studies, automatic behavioral contrast was found after the spontaneous comparison with members of an artificial outgroup. More precisely, the artificial outgroup was stereotyped by showing either very young and energetic persons, or elderly persons. The contrast however was not created by a difference from young or elderly persons per se, but because of their membership in an artificial outgroup.

One of the purposes of the current study was to extend the scope of this finding by investigating it in more natural comparison contexts. Therefore, the study used the category of the elderly directly, instead of embedding its stereotype in an artificial categorization. If an effect can be found in such a setting, it would be more plausible that the same can occur in real encounters with members of an outgroup. In a broader sense, the major goal was to compare a condition with a mere stereotype-priming on the one hand, with a condition involving a comparison on the background of a salient ingroup-outgroup distinction on the other hand.

Two further issues were addressed by the design: In Studies 1 and 2, one problem was that no baseline was included in the studies, and it was therefore impossible to determine whether the participants in the outgroup conditions showed a truly reversed priming effect, or whether the assimilation effect after stereotype priming was merely extinguished. Therefore, a baseline condition was added in Study 3. Finally, in the previous studies the ingroup-outgroup stereotype measures showed inconsistent effects. Therefore, in Study 3 the actual self-stereotype of the own person was assessed.

Method

Design and Overview

The study had a one-factorial design with 3 experimental conditions: priming of the elderly stereotype, priming of a comparison between self and the elderly, and a control condition. The priming took place in the first phase of the study, and was immediately followed by a behavioral measure in the form of an LDT with words unrelated to the stereotype. After the behavioral measure, the self-concept in terms of

stereotype-consistent and stereotype-inconsistent words was assessed. The experiment was conducted on the Internet, and advertised mainly on the local campus.

Participants

Forty-eight native speakers of German aged under 31 took part in the experiment: 17 in the elderly prime condition, 16 in the comparison prime condition, and 15 in the control condition. Mean age was 21.33; 29 were female, 17 were male (missing data for 2 cases). For 1 out of 20 participants, 20 DM in the form of a amazon.de gift voucher were awarded. To take part in this lottery, participants had to provide an email address. Care was taken to guarantee anonymity. Participants who did not speak German as their mother tongue, or who participated for the second time, were excluded from the data set. None of the participants was suspicious that the presentation of other people influenced the reaction time.

Materials and Procedure

Introduction. Since the experiment was conducted on the Internet, we used an elaborate introduction. It emphasized the value of the experiment for learning more about human perception and understanding. It described the experiment as "researching social perception and how one perceives and classifies persons and objects. For instance, how do we detect whether somebody is happy or sad? Why are we sometimes sure to now the profession of a total stranger? Why do we almost always recognize faces, but often forget names?"

Priming. In the elderly prime condition, the purpose of the priming task was described as researching how one detects the age of a person. The participants were instructed to judge the age of 16 persons, 8 male and 8 female. The persons were depicted on black-and-white photos taken from Kawakami et al. (in press).[17] Underneath each photo a scale was displayed, ranging from "30-40," "40-50," etc. until ">90." The age of each person had to be judged on this scale by clicking on an answer. Most of the persons seemed happy, three displayed neutral emotions, and one looked rather unhappy (four examples are displayed in Figure 4).

[17] I thank Kerry Kawakami for kindly providing these pictures.

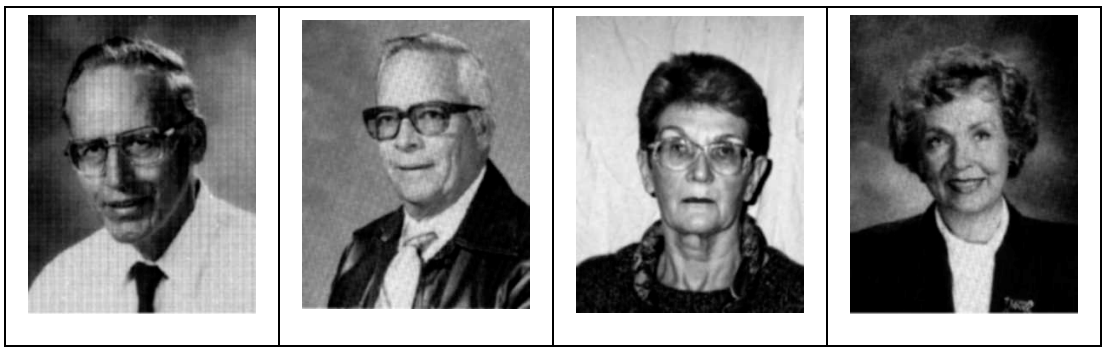

Figure 4. Four of the sixteen stimulus persons used in Studies 3 and 4.

The comparison prime showed the same pictures of 16 elderly persons, but invited the participants to compare themselves to these persons. The introduction of the task emphasized that persons of different ages grow up differently, make different experiences over their lifetime, and are often treated differently. The task was described as studying how one perceives members of a different age group. Underneath each of the 16 photos was a scale ranging from 1 (exactly my age group) to 7 (not my age group at all), on which the participants had to categorize the target persons. So, a point which will become important in the discussion was that both in the scale anchors and in the instruction, the comparison's reference point was the self ("Compare these persons to yourself and your age").

In the control condition, the first part of the study was allegedly on how one perceives the value of everyday objects. For this purpose, the participants saw 16 pictures of fountain and ball pens. They had to judge the value of each pen on a scale ranging from 1 (very cheap) to 7 (very expensive), which was displayed underneath the pen.

Lexical decision task. Immediately following the priming task, the participants performed the LDT. They were instructed to press "A" when the appearing stimulus was not a regular German word, and ENTER when a correct German word appeared. 16 German words and 16 pronounceable non-words were displayed in random order, preceded by 4 practice trials. The stimuli remained on the screen until an answer was given. The next word appeared always after 2 s. There was no additional break after the practice trials.

Self-description. Following the LDT, 22 adjectives were shown in random order. The participants had to indicate whether or not each adjective applied to themselves. The adjectives were displayed one by one, each with a scale ranging from 1 (does never

apply to me) to 6 (does always apply to me). Half of the 22 adjectives had a positive valence, the other half was negative. 8 were typical for the elderly (positive: wise, experienced, calm, meticulous; negative: lonely, draconian, bourgeois, stingy), and 8 were typical for the young (positive: flexible, spontaneous, relaxed, creative; negative: arrogant, hectic, chaotic, careless),[18] plus 6 filler adjectives not related to the stereotypes. The associations with the stereotypes were pretested on a different sample.

Additional data and debriefing. At the end of the study, participants indicated gender and age, mother tongue, whether they participated in this experiment for the first time, and whether they had the impression that anything about the experiment and the first task might have influenced their reaction times in the LDT. After the data were transmitted over the Internet, the final page of the study debriefed the participants, explained in detail the procedure and the hypothesis of the experiment, and gave the participants their mean reaction time in the LDT.

Results

Reaction Times

Eight wrong answers were excluded. The remaining answers had a mean reaction time of 686.83 ms (SD= 258.82 ms). This led to the exclusion of additional 10 reaction times which were 3 SDs above the mean. Altogether, 18 (2.34%) RTs were excluded. The remaining reaction times were combined into a single score and normalized by taking the natural logarithm. Untransformed values are presented in Table 5. A one-way ANOVA revealed a significant effect of condition, $F(2,45)=4.27$, $p=.020$. Contrary to the predictions, however, the comparison prime led to the longest reaction times, even longer than the elderly prime. The control group exhibited the shortest reaction times. Pairwise comparisons showed that the difference between control group and comparison prime was significant, $p=.006$, while the difference between elderly prime and comparison approached significance, $p=.069$. There was no significant difference between control group and elderly prime, $p=.140$ (one-tailed).

[18] In German: weise, erfahren, ruhig, sorgfältig, einsam, streng, spießig, geizig, flexibel, spontan, locker, kreativ, arrogant, hektisch, chaotisch, leichtsinnig.

Additional analyses revealed that these unexpected results were qualified by the participants' gender. As displayed in Table 5, there were less men than women. (Note that information on gender is missing for 2 participants.) Although a chi-square test did not indicate an unequal distribution across the cells, it is noteworthy that only 4 men were in the comparison condition. When gender was added as a second factor to the analyses of reaction time, the priming still had a significant effect, $F(2,40)=6.57$, $p=.003$. Additionally, the interaction approached significance, $F(2,40)=2.33$, $p=.111$. A separate analysis without the control condition revealed a significant interaction, $F(1,28)=4.25$, $p=.049$, which qualified a significant main effect of the priming, $F(1,28)=6.77$, $p=.015$. Table 5 and Figure 5 show the respective reaction times. While there was only a small difference between elderly and comparison priming for female participants, there was bigger difference for male participants. In the control conditions, men and women were almost equally fast. (Simple effects analyses were not conducted because of the low cell count.)

Table 5. Reaction Times Depending on Priming and Gender in Study 3

				Sample Separated by Gender					
	Total Sample			female			male		
Condition	N	M	SD	N	M	SD	N	M	SD
Elderly Stereotype	17	658.91	107.97	10	682.47	119.63	7	625.25	85.84
Comparison	16	719.35	107.67	11	696.62	64.76	4	811.13	162.16
Control	15	621.01	68.48	8	622.5	76.67	6	616.06	69.3

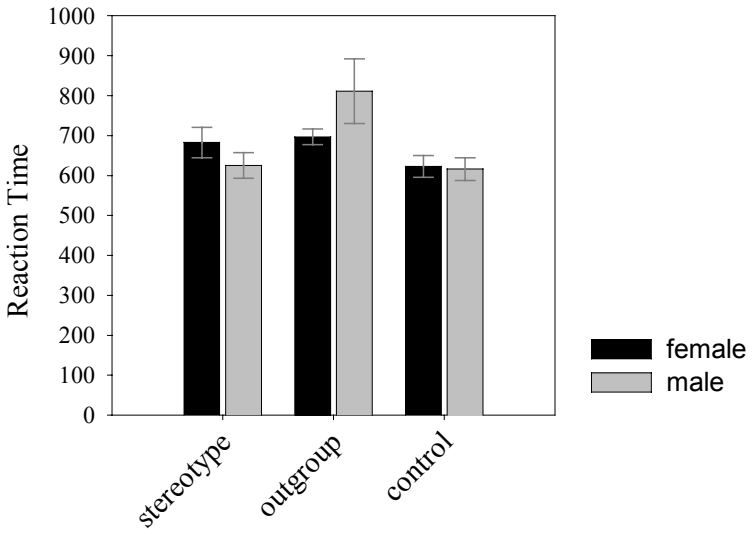

Figure 5. Reaction times depending on priming and gender in Study 3.

Judgement Times During Priming

One could wonder whether the speed during the priming judgment task could have influenced the reaction times, e.g. by setting a habitual reaction time. The judgment times for the 16 pictures were combined into a single score and transformed by taking the logarithm. The three conditions differed regarding their general judgement times, $F(2,45)=3.2$, $p=.048$. Judgments in the comparison conditions ($M=3427$ ms, $SD=1566$ ms) were reliably faster than in the control condition ($M=4567$ ms, $SD=1191$ ms), $p=.022$, and also faster than those in the elderly condition ($M=4616$ ms, $SD=2379$ ms), $p=.054$. Interestingly, the LDT reaction times in the elderly condition correlated positively with the judgment times, $r=.49$, $p=.044$. In the control condition, the correlation was not significantly different from zero, $r=.34$, $p=.21$, but in the comparison condition the correlation was negative, though also not significant, $r=-.31$, $p=.242$.

Judgment Extremity During Priming

In the elderly condition, the mean of the targets' judged age was 63.4 years. In the comparison condition, the targets were judged on average 6.5 on the scale from 1 (exactly my age group) to 7 (not my age group at all), so almost at the endpoint of the scale and far away from the midpoint of the scale, $t(15)=15.4$, $p<.001$. In the control condition, the average judgments of the pens' monetary value were close to the midpoint, $M=4.05$. To look more closely at the relation between judgment and reaction time, the judgments in the priming task were combined into a single score

(reflecting the extremity of the judgment, either with regard to age of targets or to difference from self). These scores were entered together with the mean judgment time into linear regression models as predictors of reaction time in the LDT. The regression equation explained a significant amount of variance only in the elderly condition, $F(2,14)=5.36$, $p=.019$, but not for the other two conditions, Fs<1.1. In the elderly condition, both judgment extremity (age of targets), $\beta=.45$, $p=.047$, and judgment speed, $\beta=.58$, $p=.014$, predicted reaction times. Thus, a slower judgement process and a rating of the targets as elderly resulted in slower reaction times afterwards. The two predictors did not correlate significantly, $r=-.19$, $p=.46$.

Self-stereotyping

The 16 stereotype-related attributes were combined into 4 scores and analyzed in a 3 (priming) x 2 (valence) x 2 (stereotype) ANOVA with the last two factors as repeated measures. The only effects were a main effect of valence, $F(1,45)=68.45$, $p<.001$, and of stereotype, $F(1,45)=5.63$, $p=.022$. These effects indicated that positive attributes were seen as more applicable to the self than negative attributes, and that young attributes were seen as more applicable than elderly attributes. There was no interaction between the two factors, $F<1$. Furthermore, no effects of the priming emerged from the analyses, all Fs<1.

Next, the correlations between reaction times and the self-descriptions were analyzed, which revealed some surprising results (see Table 6). While in the control condition, there were no significant correlations, all ps>.37, in both the elderly and the outgroup condition, there was a significant negative correlation between reaction time and applicability of negative elderly attributes to the self: The less negative elderly attributes were seen as applicable to the self, the longer the reaction time. Furthermore, in the comparison condition, there was a significant positive correlation between positive young attributes for the self and reaction time. To explore these results further, the correlations between reaction time and the individual attributes' applicability were checked. There was only one significant correlation: In the comparison condition, characterizing the self as relaxed correlated with reaction time, $r=.68$, $p=.004$. In the control condition, this correlation was negative yet insignificant, $r=-.42$, $p=.122$, as it was in the elderly condition, $r=-.11$, $p=.671$.

Table 6. Correlations Between Reaction Time and Applicability of Attributes to the Self

		Attributes			
Condition		Elderly Positive	Elderly Negative	Young Positive	Young Negative
Elderly Stereotype	r	-.446	-.516*	-.219	.013
	p	.073	.034	.397	.961
Comparison	r	.214	-.638*	.570*	-.278
	p	.426	.008	.021	.298

Note. * p<.05. There were no significant correlations in the control condition.

In the light of this result, it became interesting how the attribute relaxed had been applied to the self. A 3 (condition) x 2 (gender) ANOVA revealed no main effects, F<1.5, but a significant interaction, F(2,40)=3.72, p=.033. This interaction was even stronger when the control condition was excluded, F(1,28)=6.57, p=.016. The pattern was comparable to the moderation of reaction times by gender: While for female participants there was not much difference between the conditions, male participants felt not relaxed after the elderly priming, but very relaxed after the comparison (see Table 7). Note that the midpoint of the scale was 3.5.

Table 7. Rated Applicability of Relaxed to Self

	Gender			
	female		male	
Condition	M	SD	M	SD
Elderly Stereotype	4.20	1.03	3.43	.98
Comparison	3.91	.54	4.75	.50
Control	4.00	.76	4.33	.82

Note. Scale ranges from 1 to 6.

Discussion

Longer reaction times in a lexical decision task were introduced by Dijksterhuis et al. (in press) as a behavioral indicator of assimilation to the elderly. They are used as a

more convenient and simple assessment than measuring the walking speed, which Bargh et al. (1996) did. The fundamental assumption of the present study was, as in the previous Studies 1 and 2, that a contrast from the group of the elderly would result in shorter reaction times. The results of the present study, however, challenge this assumption.

The study assigned the participants to 1 of 3 conditions: A mere stereotype priming, where the age of elderly people had to be judged, a condition in which a comparison between self and the elderly should be activated by the categorization of elderly people as different from the own age group, or a control condition. The surprising result was that significantly longer reaction times (i.e., slower behavior) were found after the participants categorized elderly people as members of a different age group. That is, in the condition in which the comparison was expected to lead to shorter reaction times, the participants actually got slower. The reaction times were reliably shorter when the participants merely judged the age of the elderly persons, or when they judged the monetary value of 16 pens in the control condition. Contrary to expectations, there was no difference between the control condition and the mere stereotype priming condition. A simple assimilation after stereotype activation could thus not be replicated. Importantly, the slower behavior in the comparison condition was especially pronounced for male participants: Male participants in the control condition were the slowest in the LDT. A weakness of the study is that there were only 4 male participants in the control condition.

In the different conditions, the reaction times in the LDT correlated with different variables. Only in the elderly priming (age judgement) condition, both the speed during judgment and extremity of the age judgement predicted behavior: The more slowly and the older the elderly persons were judged, the slower were the reaction times afterwards. This result did not appear in the other two other conditions. This result is in fact very interesting. The lack of a correlation between judgement speed and reaction time in the other two conditions suggests that the speed during judgement in the elderly priming task is not just a covariate. Instead, it seems that the longer the participants looked at the elderly, and the older the elderly seemed to be, the stronger the effect. So, the two indices can be interpreted as indicators of priming strength. Another possible interpretation is that the speed during judgment was already influenced by the elderly pictures, and that therefore this speed and the speed

in the subsequent reaction time task were correlated. However, note that speed during judgement and judgment extremity did not correlate; so there is no additional data to back this post-hoc hypothesis. However, the finding that extremity of judged age and subsequent reaction times correlated gives some clues why the overall assimilation effect was not significant. Apparently, an automatic behavioral effect determined the reaction times, but the manipulation was not strong enough to result in a total assimilation effect across all participants.

In the comparison condition, describing the self as relaxed correlated surprisingly highly with the reaction time (r=0.69): The more relaxed one considered oneself to be, the slower the behavior exhibited. Additional analyses revealed that especially the male participants judged themselves as relaxed in the comparison condition, as compared to the elderly priming condition, and the female participants. Neither in the control condition nor in the elderly priming condition, was there any relation between seeing the self as relaxed and the reaction times. Therefore, it does not seem that those who performed slowly in the LDT and therefore considered themselves to be slow, judged the self as relaxed afterwards. Rather, the opposite causal direction seems to be the case. During the comparison, especially the (few) male participants came to see the self as relaxed, and answered more slowly in the following LDT.

In the light of this result, I think that the longer reaction times in the comparison condition could in fact be interpreted as a behavioral contrast. It seems that a contrast from elderly persons (i.e., increased accessibility of counterstereotypic attributes and their application to the self) does not necessarily imply shorter reaction times. That is, contrasting from the elderly might on the one hand imply faster reactions than the stereotypically slow elderly, but it can also result in the characterization of the self as more relaxed than the stereotypically rigid and meticulous elderly. The few male participants in our comparison condition seem to have done exactly this. Of course, this makes reaction times as behavioral indicators after social comparisons tricky, due to their ambiguity; unless they are accompanied by assessments of self-stereotypes!

One could also wonder whether the same is true for increased reaction times or even slower walking speed after an elderly priming. However, this seems unlikely. First of all, in the present elderly priming condition, there was no accentuated self-description as relaxed--it seems to depend on the comparison. In contrast, LDT

reaction times were predicted by the extremity of the age judgment, which can be seen as a crude indicator of the activated stereotype's extremity. Furthermore, at least for the walking speed studies carried out by Bargh et al. (1996), this interpretation seems unlikely since a comparison probably depends on the propositional categorization (see Chapter 4). This was not given since the stereotype was primed by scrambled sentences, and the participants were unaware of the relation of the priming to the stereotype.

I hasten to add that the interpretation offered here--that the increased reaction times in the comparison condition could be interpreted as a behavioral contrast--is very speculative. There were only 4 male participants in the comparison condition, which is surely not enough to build a strong argument on. I also do not think that this result threatens the interpretation of Studies 1 and 2. The stereotyping results there, although not directly using the adjective relaxed, did not indicate a consistent accentuation of the young self-stereotype. Furthermore, it seems likely that the different effects were in part driven by the different stimuli used in Study 3. The Study 3 target persons seem more formal and rigid than the Study 1 and 2 stimuli persons. This may have tipped the balance into another dimension of comparison.

A further critical point of the comparison condition used in this study is the exact comparison instruction. As noted in the materials section, it used the self as the reference point. That is, the participants were instructed to compare the elderly to themselves. Only after the experiment I realized that previous theorizing and research has argued and shown that the direction of comparison actually determines the process and result of the comparison. Thus, the assimilation effect found in the comparison direction could also have other results than those I just speculated about. The next study was designed to shed more light on this issue.

6.2 Study 4: Moderation by Comparison Direction

In the ABC model presented in Chapter 4, it is a central assumption that the perception of a group that is categorized as an outgroup leads to a behavioral contrast, since the perception of outgroups follows an oppositeness-heuristic (Cadinu & Rothbart, 1996). The reasoning underlying this assumption is that the oppositeness-heuristic leads to a difference-testing process, which renders stereotype-inconsistent knowledge accessible. Therefore, if one wants to look at the

individual steps of the assumed process, two important steps can be identified: First, that outgroup-status leads to a test of difference, and second that a test of difference leads to behavioral contrast.

The goal of Study 4 was to provide more direct evidence for the second step, that is, for the importance of the initial hypothesis tested in the comparison. Thus, in Study 4 less attention will be paid to outgroup status per se, but rather to an alternative manipulation that also creates a test for difference. However, the results of this study will show that in the end, difference testing and outgroup status are related. In order to check the importance of the initial hypothesis more directly, I took advantage of a manipulation that has recently been shown to determine the initial hypothesis on which the comparison is based: the direction of the comparison.

Classic studies have repeatedly demonstrated that perceived similarity of the self to another person depends on whether the target person is compared to the self (other→self) or whether the self is compared to the target person (self→other, Codol, 1984, 1990; Holyoak & Gordon, 1983). The perceived similarity between other and self is higher when others are compared to the self than when the self is compared to others: We feel that others are similar to us, but we do not feel that we are similar to others. One explanation for this effect is based on the higher complexity of the self (Tversky, 1977). When the self is the starting point of the comparison, its unique features gain more weight than when the other is the starting point of the comparison. This leads to different assessments of similarity.

Extending this reasoning beyond similarity assessments, Mussweiler (2001) showed that based on the similarity assessment (and partially mediated by it), the subsequent comparison process renders either self-conceptions consistent with the target (other→self) or self-conceptions inconsistent with the target (self→other) more applicable. We feel that another person is similar to us, and after thinking about it for a while, we also assimilate our self-concept to the other. However, since we do not feel that we are similar to another person, after thinking about it, the self-concept is contrasted from the other. Since this self-concept change is presumably a consequence of differing accessibility of parts of the self-concept, and since automatic behavior is also a consequence of accessible behavior representations, we can hypothesize that varying the focus of comparison has similar effects on automatic behavior. When an other→self comparison renders other-consistent

behavioral representations more accessible, it is predicted that behavior will be assimilated to the other-stereotype. When however a self→other comparison renders target-inconsistent behavior more accessible, behavioral contrast is expected, just like after the perception of outgroup members. Study 4 tests these predictions. Furthermore, possible changes in the self-concept are investigated.

In sum, Study 4 tests whether the direction of a comparison, which is known to determine initial similarity assessments, moderates automatic behavioral effects. The focus is thus on the second step of the process assumed in the ABC model, namely automatic behavior as a result of behavioral representations which were rendered accessible in a social comparison.

Method

Design and Overview

The experiment had a one-factorial between-subjects design with three conditions, to which the participants were randomly assigned: a control condition, and two comparison conditions. In one of the comparison conditions, the focus of comparison was other→self, whereas in the second comparison condition the focus was self→other.

The experiment was conducted on the Internet and advertised at the local university campus. One out of 20 participants won a 20 DM book voucher in a lottery. For taking part in the lottery, participants had to submit their email address after the experiment; anonymity was assured. Participants were made aware of the fact that they participated in a scientific study and that their data were collected. The purpose of the study was described as investigating perception, with several unrelated experimental tests. The first task was allegedly on how one perceives traits in photos, and the second on how words are recognized. In fact, the first task served as the priming, and the second task measured the average reaction time of the participants in a LDT. Following the second task, participants rated themselves on 22 adjectives, guessed what the purpose of the experiment was and what might have influenced their reaction time, and entered their demographic data. After the data were transmitted, the last pages debriefed the participants about manipulations and hypotheses.

Participants

Altogether, 96 native speakers of German younger than 31 took part in the experiment. Two of them indicated that they confused the buttons for yes and no answers, and three wrote that they were disturbed during the reaction time task by other people. One of these 3 additionally indicated that the presentation of elderly people might have influenced his reaction time; none of the remaining participants was suspicious about a possible influence on reaction times. These 5 participants (3.47%) were excluded from all further analyses. The remaining 91 had a mean age of 21.4; 52 were female. 24 were assigned to the control condition, 33 to the other→self comparison, and 34 to the self→other comparison.

Materials and Procedure

Priming. In the two comparison conditions, the participants were shown 16 pictures of elderly persons (8 male, 8 female, taken from Kawakami et al., in press), in random order. Each picture was accompanied by an additional piece of information about that person; all of these were typical for the elderly stereotype (e.g., likes to see talk shows, prefers to stay at home, goes to bed early in the evening, likes to play with the grandchildren; note that in the previous Study 3, such information was not given). The pictures were displayed together with the phrases on the screen until the participants clicked on a "Next" link. On the next screen, they had to answer a question about the picture (see below), before the next picture appeared. For each target person, participants were asked to compare self and person. The direction of the comparison was manipulated between conditions in the introduction, in the presentation of the pictures and in the item for each picture. In the other→self comparison condition, it was said that comparisons of other persons to the self were investigated. Above each picture, participants were told to "compare this person to yourself," and below each picture it was said: "Please think about it: Is this person rather similar to you or rather different from you?." The item on the page after each picture read: "When I compare this person to myself, this person is..." and was anchored by "very different" (1) and "very similar" (7). In the self→other comparison condition, the task was described as investigating how one compares the self to other persons. Above each picture, participants were instructed to "compare yourself to this person," and below they read "Please think about it: Are you rather similar to or rather different from this person?" On the next page, they answered the

item "When I compare myself to this person, then I am rather...," anchored by "very different from this person" (1) and "very similar to this person" (7). Note that in none of the conditions the 16 persons were called a group. Instead, all instructions used the term person.

The alleged purpose of the first task in the control condition was to investigate how one estimates the value of everyday objects. Participants were shown photos of different fountain and ballpoint-pens: 16 pens of varying value in random order, each accompanied by a short phrase like "is produced in Hong Kong, is very ergonomic, is made from metal, blots sometimes." The monetary value of each pen had to be rated on the page following the pen, on an item ranging from "very cheap" to "very expensive."

Reaction time task. The task was described as investigating how correct words are recognized. Altogether, 16 words and 16 pronounceable non-words were displayed in random order, preceded by 4 practice trials (2 words, 2 non-words). Participants had to press "a" for a nonword and Enter for a word. Words remained on the screen until an answer was given. The following word appeared after a break which randomly varied between 1000 and 1500 ms.

Self-description. Following the LDT, the same 22 adjectives as in Study 3 were shown in random order. The participants had to indicate whether or not each adjective applied to themselves. The adjectives were displayed one by one, each with a scale ranging from 1 (does never apply to me) to 6 (does always apply to me). Half of the 22 adjectives had a positive valence, the other half was negative. 8 were typical for the elderly (positive: wise, experienced, calm, meticulous; negative: lonely, draconian, bourgeois, stingy), and 8 were typical for the young (positive: flexible, spontaneous, relaxed, creative; negative: arrogant, hectic, chaotic, careless), plus 6 filler adjectives not related to the stereotypes. The associations with the stereotypes were pretested on a different sample.

Entitativity and additional variables. A one-item measure assessed whether the 16 persons were seen as single persons independent from one another (1), or whether they were seen as similar members of one group (7). Finally, age, gender and mother tongue were assessed, and the participants were asked whether they had participated for the first time.

Results

Reaction Times

In total, 1456 reaction times were collected. Of these, 19 answers were wrong, and excluded. Furthermore, all reaction times longer than 3 SDs above the mean (N=22) were deleted. Altogether, 41 (2.81%) reaction times were excluded. For each participant, the reaction times were averaged and log transformed for the analyses. Untransformed means are reported for ease of interpretation.

It was predicted that, compared to the control group baseline, an other→self comparison would result in longer reaction times and a self→other comparison would result in shorter reaction times. Table 8 and Figure 6 shows that the means matched this pattern. The prediction was tested by arranging the conditions in this order and testing for a linear contrast. The overall ANOVA effect approached significance, $F(2,88)=2.37$, $p=.099$. The linear contrast was significant, $p=.033$. Pairwise comparisons showed that the two comparison conditions differed significantly from each other, $p=0.017$. The differences of the control condition to both self→other and other→self comparison failed to reach significance, $p=0.135$ and $p=0.197$, respectively (pairwise comparisons one-tailed).

Table 8. Reaction Times in Study 4, Depending on Focus of Comparison

Condition	M	SD
comparison other→self	714.57	100.61
control group	692.32	93.01
comparison self→other	664.79	83.53

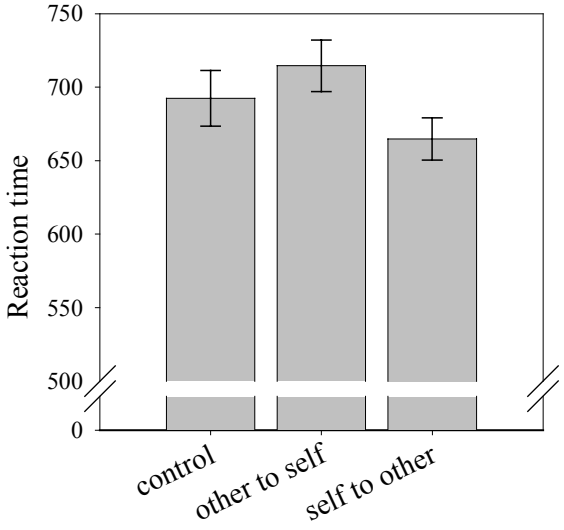

Figure 6. Reaction Times in Study 4, Depending on Focus of Comparison.

Comparison Results

For both comparison conditions, the 16 ratings during the priming phase were averaged and compared to the midpoint of the scale. Both in the other→self, M=2.88, SD=.67, and in the self→other condition, M=2.70, SD=.71, the ratings were significantly lower than the midpoint of the scale (4), t(32)=9.61, p<.001 and t(33)=10.55, p<.001, respectively. The 16 elderly were clearly perceived as rather different from the self, independently of the condition. Although the different items make these ratings not directly comparable, the two conditions seem to lead to equivalent perceived differences between self and the exemplars. The ratings did not correlate with the average reaction time in the LDT, both ps>.40.

Self-descriptions

The 16 stereotype-related attributes were combined to 4 scores, separated by valence and stereotype. These scores were submitted to a 3 (condition) x 2 (stereotype: young vs. elderly) x 2 (valence: positive vs. negative) MANOVA with repeated measures on the last two factors. The main effects of valence, F(1,88)=130.03, p<.001, and of stereotype, F(1,88)=16.69, p<.001, were significant. Positive attributes were seen as more applicable to the self than negative attributes, and young attributes were seen as more applicable than elderly attributes. There was no main effect of condition, F<1. The stereotype x condition interaction fell short of significance, F(2,88)=2.94, p=.058; the other two-way interaction was negligible, F<1, while the three-way interaction did not reach significance, F(2,88)=1.44, p=.243. A further exploration of

the marginal two-way interaction (see Table 9) showed that the condition had a slight effect on stereotypically young attributes, F(2,88)=3.03, p=.053, but not on stereotypically elderly attributes, F<1. Pairwise comparisons (LSD) showed a significant difference between the control condition and each of the two comparison conditions, p=.047 for the difference to other→self comparison and p=.022 for the difference to self→other condition. The two comparison conditions did not differ from each other, p=.74. Stereotypically young attributes were seen as more self-describing in the control condition (M=3.69, SD=.42) than after other→self comparison (M=3.45, SD=.53) and after self→other comparison (M=3.44, SD=.43).

In addition to the four self-concept scores, two additional indices were computed by averaging all stereotypically elderly and all stereotypically young attributes. Separate analyses for each condition showed not a single significant correlation with the LDT reaction time in any of the conditions, all ps>.23.

Table 9. Self-descriptiveness of Young and Elderly Attributes, Study 4 (Collapsed Over Valence)

	Stereotype			
	Elderly		Young	
Condition	M	SD	M	SD
control	3.26	0.55	3.69	0.42
other→self	3.4	0.51	3.45	0.53
self→other	3.42	0.42	3.44	0.43

Since the attribute relaxed showed interesting effects and correlations in Study 3, it was again scrutinized in this study. Its application to the self did not differ between conditions, F<1. The analysis was repeated with gender as a between-subjects factor; again, there were not significant effects, all Fs<1. There were also no correlations to reaction time in any of the conditions, |rs|<.21, ps>.24.

Entitativity

In the two comparison conditions, participants were asked how much the 16 persons were seen as a group. In the self→other comparison condition, entitativity was judged marginally higher, M=5.26, SD=1.76, than in the other→self comparison

condition, M=4.36, SD=2.21, t(61.19)=1.84, p=.070. Tests for difference from the scale midpoint revealed that this was only the case in the self→other condition, t(33)=4.18, p<.001; the other difference was not significant, t<1. Thus, in the condition where the participants showed behavioral contrast, they also tended to perceive the stimulus persons more as a group. To check whether entitativity mediated the behavioral effect, it was entered as a covariate in a one-way ANCOVA, with condition (self→other vs. other→self) as a factor and reaction time as dependent variable. Entitativity was not a significant covariate, F<1, and the effect of the manipulation was still significant, F(1,64)=3.85, p=.027 (one-tailed).

Discussion

The present study manipulated a subtle and yet important feature of a social comparison: its direction. It was argued that a comparison of the self to elderly persons would lead to behavioral contrast due to enhanced accessibility of difference-indicating features, while a comparison of elderly persons to the self would lead to behavioral assimilation, due to enhanced accessibility of similarity-indicating features (Mussweiler, 2001; Tversky, 1977). The results matched these predictions: Participants who compared themselves to elderly persons reacted faster in a subsequent lexical decision task than participants who compared elderly persons to themselves. The reaction times of a control group fell in between these two conditions, resulting in a significant linear contrast. This result is especially impressing since in both comparison conditions, the participants decided on average that the 16 elderly persons were rather different from the self. However, while the conclusions were similar, the processes leading to these conclusions were apparently different between the two foci of comparison, leading to different behavioral effects. However, it has to be noted that while the two comparison conditions differed significantly from each other, they did not differ significantly from the control condition in between, probably due to the lower number of participants in this condition. Therefore, a cautious interpretation of the results is that a comparison of self to other leads to less behavioral assimilation than a comparison of other to self.

In contrast to the results of Mussweiler (2001), no significant effects on the self-description of the participants were found. Apart from a trend to describe the self less in terms of young attributes in both comparison conditions, which seems to be a general effect of seeing elderly persons, there were no effects of the condition. One

could have expected that the self-descriptions would parallel the behavioral effects, resulting in a "younger" self-description after the self→other comparison. Considering the extensive procedure used by Mussweiler, however, the null-effect is less surprising. In his study, participants received extensive written information about the stand of the comparison target on one specific comparison dimension, they elaborated on their comparison by writing down their thoughts, the self-concept change was tested with rather objectively anchored items, and directly after the comparison. In contrast, the comparison procedure here was merely a test on general similarity or dissimilarity, answered on a single rating item, and the self-concept test was conducted on attribute rating scales only after the lexical decision task. Either of these difference could alone be responsible for the perishing of an effect. Still, the difference is interesting. It could be the case that an accessibility manipulation can change actual behavior more easily than it can change deliberate self-descriptions.

The effect on the entitativity measure gives us a clue as to what happened during the comparison. When comparing self to other, the target persons were seen more as a homogenous (out)group. Apparently, the dissimilarity testing led to a general contrast self vs. the others, while the similarity testing process led to a slightly stronger individuation of the 16 persons.

Relation to Study 3

The results of this study also give additional clues on the puzzling results found in the previously presented Study 3. There, the participants in the comparison condition reacted more slowly than those in the control and the mere stereotype priming condition. In the discussion of Study 3, I indicated that one reason for this unexpected result could have been a behavioral contrast from the presented elderly in the direction of relaxed and "cool" behavior, resulting in slower reactions. Data on the self-descriptions indicated that this was especially likely for the few male participants. Two points are relevant here: First of all, in the present study this phenomenon was not observed again; self-ratings on the attribute "relaxed" did not differ between conditions and did not correlate with reaction time. Thus, it seems safe to conclude that the present behavioral effects in terms of faster behavior can be interpreted as a contrast, and slower reactions in terms of assimilation. I think that the likely reason for the difference between Studies 3 and 4 were the information given in addition to the photos in Study 4. As the examples in the materials section

showed, they were chosen such that the elderly stereotype as slow, calm and aged was emphasized. Although the photos used in Studies 3 and 4 were identical, the activated knowledge was presumably different, and suggested a different dimension for contrast.

Second, the present study showed that an other→self comparison tends to result in assimilation. Therefore, this kind of assimilation might have been responsible at least partly for the longer reaction times in the comparison condition of Study 3. With the present data, it is unfortunately impossible to determine what exactly led to the longer reaction times in the comparison condition of Study 3: increased assimilation of elderly-consistent behavior as a result of the comparison direction, automatic contrast in the direction of cool and relaxed behavior, or both.

6.3 Study 5: Who Assimilates to Professors?

In the following section, I want to describe briefly a further study that revealed interesting evidence on assimilation or lack thereof after the perception of a natural (out)group. Its results fit well in the discussion at this point, but it was originally conducted before the other studies, and designed to test another hypothesis which is of no further relevance here. I will therefore describe the study in less detail, and only point to the most relevant results.

The study investigated the impact of a professor priming on intellectual performance. Recall that previous research (see Chapter 3) found that activation of the professor stereotype resulted in improved performance in a general knowledge task, which was basically modeled after a Trivial Pursuit game. Recall also that this behavioral task showed contrast effects when the participants had to think about an extreme exemplar of professors, Albert Einstein. Thus, a knowledge task seems also suitable for a test of contrast effects as a result of social comparison of the self to an outgroup. A fitting intergroup situation in this domain is the relation between students and professors. While students may be characterized as smart in comparison with many other social categories, a comparison to professors stereotypes them as "relatively stupid." More specifically, when students compare themselves with professors, given that they search for difference between the two categories, they should increase the accessibility of stupidity-related aspects of their self-concepts. As a result, they should then perform worse in a general knowledge task.

The following study used the priming procedure that was applied by Dijksterhuis and van Knippenberg (1998). Participants were instructed to imagine a typical professor, and to list attributes of professors. This condition was compared to a condition in which the participants had to imagine a typical student. Additionally, each stereotype--professors and students--was also primed in a more situated manner, namely in contact with the respective other group. That is, in two further conditions participants had to imagine either professors in contact with students, or students in contact with professors. Furthermore, the profession of the participants (students vs. non-students) served as a quasi-experimental between-subjects factor. Thus, the study had a 2 (stereotype: professor vs. student) x 2 (stereotype only vs. its relation to its outgroup) x 2 (participants' profession) design plus a baseline control group. The question which is most relevant for the present discussion is: Did the students participating in the study assimilate to the stereotype of professors, and did they do so even when the professors stereotype was presented in contact with their own ingroup?

Method

Design and Procedure

The experiment consisted of a priming phase, a performance measure, and the assessment of additional variables. In the priming phase, the participants were asked to imagine either typical professors or typical students. This was the first between-subjects factor, termed stereotype. This factor was crossed by a second factor, manipulating whether the focal stereotype had to be imagined alone (only professors, only students), or whether it had to be imagined in contact with its respective outgroup (students or professors, respectively). Thus, the two contact conditions differed in the perspective induced by the priming manipulation. In the professors in contact with students condition (professors→students), the intergroup situation was primed from the professors point of view, while in the students in contact with professors condition (students→professors), the intergroup situation was primed from the students point of view. As a fifth condition, a control group was established. In this control group, participants had to imagine a typical tree instead of a social category. Participants were randomly assigned to the conditions.

The experiment was conducted on the Internet and introduced as a study on "mental imagery." First, the participants were asked to imagine typical exemplars of the

category of professors (or students or trees), and to type into the computer what came to their mind. Only in the contact conditions, the respective outgroup was mentioned and added to the imagination task. Afterwards, they were asked 4 questions on the vividness of their imagery. Next, participants were given 40 multiple choice questions of a general knowledge task. Debriefings were sent by email.

Participants

To assure a high quality of the data, the following criteria led to the exclusion of participants: Participants were excluded when they answered less then 20 questions, when they took part for the second time (as indicated by doubling email-addresses and the self-report on a specific item), or when they worked less then 3 min on the priming task. Participants were asked for age, gender and profession. The profession variable served as a third quasi-experimental between-subjects factor; participants were categorized in students or non-students. Nine participants who did not report their profession were categorized as non-students (note that this is a conservative procedure, since some students may have been assigned to the non-students category, which decreases possible differences between the two groups). None of the non-students was a professor. After the exclusion, 98 students and 86 non-students remained in the final sample, distributed almost equally across the conditions.

Materials

Priming task. The participants were informed that the task investigated thoughts about typical students (professors, trees). For instance, in the students→professors condition, they were instructed: "Please imagine typical students in situations in which they have contact with professors." In the professors condition, they were asked "Please imagine typical professors." The instruction continued with "Please describe what you imagine. Use your imagination to think of typical situations and traits. Write down typical behaviors, traits and appearances. Please type in spontaneously whatever comes to mind."

Knowledge Test. Forty questions were taken from the game Trivial Pursuit. The questions were formulated as multiple-choice items, with four possible answers for each question, of which only one was correct. The incorrect and the correct answers were chosen such that logical and thoughtful analysis of the questions could in most cases lead to the correct solution. A larger set of questions was pretested, and the most difficult ones were selected, for example "What is the name of the Dutch

painter who impresses with his confusing spatial perspectives? van de Velde/ Magritte/ Kandinsky/ Escher." Questions were presented in a random but fixed order.

Results

The correct answers in the knowledge test were counted. Unanswered questions were counted as wrong. Note that mere guessing would on average result in 25%, or 10, correct answers. For the main analysis, the control condition was excluded from the design, to allow three-factorial ANOVAs. A first 2 (stereotype) x 2 (contact) x 2 (profession) ANOVA revealed no significant effects, all ps>.21. The number of attempted solutions showed no significant effects. In a second ANOVA, the number of attempted solutions was added as a covariate (see Table 10). Apart from a significant influence of the covariate, $F(1,122)=18.99$, $p<.001$, main effects of two factors and an interaction between them were found. First, the stereotype main effect was significant, $F(1,122)=4.24$, $p=.041$. Second, the profession main effect was significant, $F(1,122)=5.19$, $p=.024$. Both factors also interacted significantly, $F(1,122)=4.31$, $p=.040$. Both main effects and the interaction were due to an increased performance of the non-students in the professors priming conditions ($M=23.91$). In contrast, the non-students' performance in the students priming ($M=19.98$) and the students' performance after both stereotypes ($M=19.79$ after students and $M=19.77$ after professors) was lower and almost equivalent. Note that these means were corrected for the covariate. Thus, only non-students answered a higher percentage of those questions that they attempted to solve correctly when they first thought about professors, irrespective of the social context of the stereotype.

Comparisons of the baseline (tree priming) to the other conditions showed effects only for non-students. Performance in the baseline condition was lower than in the two professors conditions. The professors' stereotype prime condition differed significantly from tree priming, $p=.047$ (one-tailed). Similarly, the professors→students prime condition differed marginally from tree priming, $p=.059$ (one-tailed).

Table 10. Number of Correct Answers in the Knowledge Test, Study 5

Profession	Priming	M	SE of M
non-student	trees	21.28	0.98
	students	20.52	1.25
	students→ professors	19.65	1.67
	professors	23.95	1.23
	professors→ students	23.75	1.22
student	trees	20.33	0.97
	students	20.33	1.26
	students→ professors	19.45	1.15
	professors	20.52	1.19
	professors→ students	19.24	1.18

Note. Means are corrected for the number of attempted solutions

Discussion

Both students and non-students took part in the study, and both were primed either with the professor stereotype or the student stereotype. The students' performance was basically unaffected by the experimental manipulations. However, the results for the non-student participants are different. Their performance was equivalent to that of the students after the neutral priming of trees, and also after priming of students. However, they outperformed the students when they were primed with professors. Of those items that they tried to answer, non-students answered more items correctly after being primed with the professor stereotype, than students did. A further factor that varied whether the stereotypes were primed on their own, or in the context of the respective outgroup, did not moderate the results.

Interpreting effects of a quasi-experimental variable like the participants' profession is difficult, since a causal direction can only be assumed. If, with all necessary caution, the difference between students and non-students in the professor priming conditions is interpreted causally, it suggests that students were not able to profit from the professors priming. The reasons for this--and the difference to the previous studies which found such effects--are unclear. There seem to be at least two possible

explanations. First, it might be that for some reason, the students in this sample were unaffected by this kind of priming manipulation performed over the Internet. Perhaps some uncontrolled confounding variable differed substantially between the two categories, such as environmental conditions (e.g., students might have taken part from a computer pool in the university, but non-student participants from their office or home computers, which could have resulted in different distractions). Second, it might be that the experimental conditions, in conjunction with the group membership, led to the inhibition of a priming effect. Thus, the null effect after professor priming for students might in fact be interpreted as supporting the hypothesis that a salient intergroup context leads to comparison and a lack of assimilation; but note that the effect did not reverse into contrast. If this second interpretation is correct, the question is how this study differed from the previous studies which found an assimilation to the professor stereotype in student samples. It might be that in Germany, as opposed to the Netherlands where Dijksterhuis and colleagues conducted their studies, students and professors have per se a more antagonistic relationship which is immediately activated with such a priming.

A problematic limitation of the present study was that no explicit check of awareness of the prime or suspicion was included in the procedure. Such a measure was in fact applied, but only together with the debriefings emailed to the participants. Only very few participants replied and answered this item, and the validity of this measure is questionable.

In sum, Study 5 showed behavioral assimilation effects of a professor stereotype priming on non-student participants, but not on student participants. The latter group of participants was unaffected by the priming manipulations, and several interpretations are possible. One likely interpretation, which is in line with the general hypothesis discussed here, is that the students did not profit from the stereotype priming because they compared themselves to the category of professors, and thereby rendered professor-inconsistent behavioral representations accessible, which led to an extinction of the assimilation.

7 ASSIMILATION IN MINIMAL GROUPS

In the previous series of studies, it was argued that the exposure to a group stereotype does not always lead to behavioral assimilation, as assumed by Dijksterhuis and colleagues. It was shown that when a salient intergroup situation (Studies 1, 2) or a self→other comparison direction (Study 4) favor a difference-testing social comparison of self and others, groups of persons can also become comparison standards from which the self and thereby automatic behavior is contrasted.

In general, Dijksterhuis and his colleagues argued that single exemplars are more likely to function as a comparison standard than groups, and elicit a comparison just by their distinctiveness. Chapters 3 and 4 cited the respective studies and showed that in fact, the evidence on contrast from the perception of single exemplars is mixed, and that additional factors seem necessary to elicit contrast. One of these additional factors seemed to be extremity, which is the likely cause of contrast in the behavioral and self-concept measures after Einstein priming reported by Dijksterhuis, Spears, et al. (1998; see also the comparison to the results from Mussweiler & Strack, 2000b, in Chapter 4).

The general argument underlying the assumption that outgroups can serve as a source of contrast was that the social structure determines the process of the comparison, not mere "perceptual" factors like distinctiveness themselves. The term social structure is understood here as the way in which others are categorized as identical to or different from the self. Furthermore, extremity of a target can be conceptualized as one source of a categorization as different: When an extreme person is encountered, the person is categorized as different, and this categorization later determines the comparison process. Now, an interesting question arises: If the assimilation to a group stereotype can be reversed by a social categorization, is the same possible for the contrast from an extreme exemplar? That is, if one contrasts from an outgroup, is there the possibility that one assimilates to an extreme exemplar if it is categorized as an ingroup member? To put it more formally, this hypothesis would extend the previous model of Dijksterhuis and colleagues which consisted of two cells (category→assimilation, exemplar→contrast) to a 2 (target: category vs. exemplar) x 2 (difference vs. identity comparison hypothesis) table, to which another row (no comparison) is added. This table (see Table 11) is another way to depict the ABC model developed in Chapter 4. In the target=category column, it incorporates

the main hypothesis developed in Chapter 4, namely that the behavioral effects of a stereotype activation depend on the social categorization of the category. Additionally, the column target=exemplar shows that different effects of exemplar activation on automatic behavior can be expected depending on the categorization of the exemplar with respect to the self. First, if no categorization at all takes place, assimilation occurs through mere knowledge activation (e.g., Macrae et al., 1998). Second, if the exemplar is categorized as different from the self, for example due to its extremity, contrast as a result of a difference-testing comparison is expected (e.g., Dijksterhuis, Spears, et al., 1998). Finally, if the categorization arrives at an identical relation between self and target person, for example due to a shared ingroup membership, assimilation should ensue.

Table 11. Predictions of the ABC Model as a Function of Target and its Social Categorization

		Target	
		category	exemplar
Social Categorization	none (no comparison)	(a) assimilation	(d) assimilation
	different from self	(b) contrast	(e) contrast
	identical to self	(c) assimilation	(f) assimilation

In sum, taking group structures into account leads to the hypothesis that under certain circumstances single distinctive persons do not necessarily invoke automatic behavioral contrast: When the other person is a member of a common ingroup, and thereby influences the ingroup stereotype, contrast might be prevented or even reversed. Two general lines of research support this hypothesis. The first, recent work by Mussweiler, investigates how comparisons change the accessibility of knowledge structures. The second consists of research on comparisons that take into account the categorization context in which the comparisons take place--whether the compared objects belong to a shared superordinate category or not. These two lines will now be described in detail.

7.1 Comparison to Ingroup Members

Comparisons of Self to Single Persons and Accessibility

The Selective Accessibility Model (Mussweiler & Strack, 2000a) is concerned with changes in the accessibility of a concept's features after the comparison to another concept. As outlined in Chapter 4, the model assumes that a comparison is approached with an initial hypothesis about its outcome, and that thinking about this hypothesis increases the accessibility of compatible evidence. Mussweiler and Strack (2000b) argued that comparing oneself to a single exemplar "may selectively increase the accessibility of standard-consistent knowledge about the self" (p. 24, emphasis added). They reported evidence that the comparison with single exemplars does not inevitably lead to an increased accessibility of standard-inconsistent knowledge as assumed by Dijksterhuis and colleagues (for a more detailed analysis, see Chapter 4).

Comparisons of Self to Single Exemplars of the Same Category

The research by Mussweiler and colleagues has so far not taken into account that the self and the comparison standard can belong to the same category that is at the same time opposed to another (outgroup) category (but see Mussweiler & Bodenhausen, in press, for intra-category comparisons). However, it has long been hypothesized that extremity turns assimilation into contrast because it excludes the extreme exemplar from a shared category (Herr, 1986; Herr, Sherman, & Fazio, 1983). Wänke, Bless and Igou (2001) extended this idea in a recently published a series of studies, building on earlier work on the Inclusion/Exclusion Model of Assimilation and Contrast (Schwarz & Bless, 1992). Their studies take category structures into account, but focus on the comparison of two persons or objects in general, not on a comparison of the self to another person. They investigated the role of a shared category for the context effect of an extreme exemplar on the judgement of another (target) exemplar. The model implies that the context effects of an extreme exemplar (such as Einstein in the original studies by Dijksterhuis and colleagues) can take two routes: Firstly, using the extreme exemplar as a standard of comparison in general leads to interexemplar contrast (Herr et al., 1983, path c in Figure 7). In addition, the model sketches a second process involving a superordinate category which includes both the extreme exemplar and the target. The stereotype of the superordinate category is thought to assimilate to the extreme exemplar (path a), similar to

processes found in the literature on stereotype change (see below). The stereotype of the category in turn is thought to influence the judgement of the target in an assimilative fashion (path b, cf. Smith, 1998).

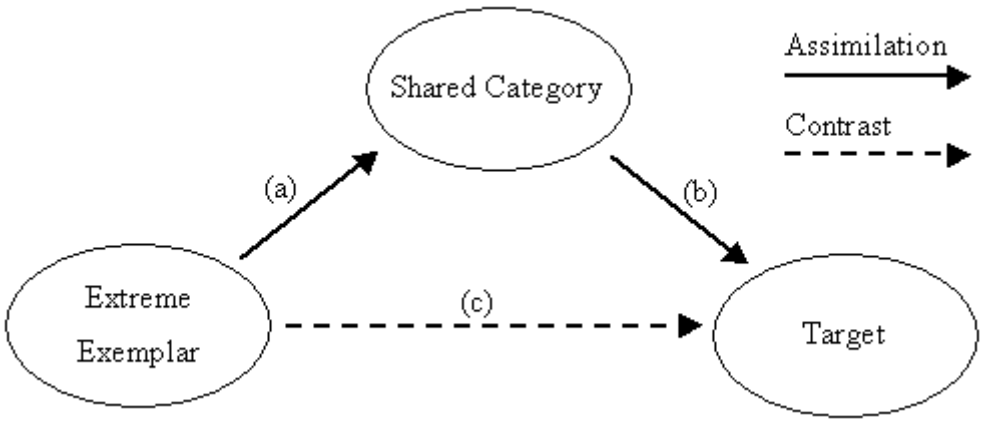

Figure 7. Different paths of interexemplar influence: Model of Wänke et al. (2001).

Thus, while an extreme exemplar can provoke interexemplar contrast by serving as a comparison standard, the judgment of the target can also be assimilated to the extreme exemplar if there is a shared and salient superordinate category. Wänke et al. supported these assumptions in three studies in which the salience of the superordinate category was manipulated. The bottom line of these studies is that the interexemplar contrast, which always occurred when there was no shared category or if the category was not salient, could be reduced to a baseline level if the category was salient and the group membership of both exemplar and target was emphasized. However, the shared category manipulation was not able to reverse the contrast and produce assimilation above a no-extreme-exemplar baseline. Wänke et al. concluded: "The extreme exemplar is nevertheless used as a standard of comparison. As a result, assimilation, elicited by the category, and contrast, elicited by the standard of comparison, cancel each other out" (p. 21). Two more points should be emphasized: First, Wänke et al. showed these results both with a category well-known to the participants (a political party), and a new category (a made-up vacuum cleaner brand). Second, there was some evidence on the assumed mediation by the superordinate category: Exemplar, category and target were rated for preference, and the correlations between these preference ratings were much higher when the

common category was emphasized. Thus, when the exemplar was rated positively, so was the category and other category members.

This model can be applied to the field of groups: a group acts as the shared category, the extreme exemplar is a member of the group, and the judged target is the self. The model then implies that when an extreme exemplar is a member of a shared group, the exemplar (a) influences the stereotype of the shared group, and (b) that this stereotype influences the conceptualization of the self. The latter process is known as self-stereotyping (Turner et al., 1987; Simon & Hamilton, 1994). Since both processes (a) and (b) are assimilative, the interexemplar contrast (c) found by Dijksterhuis, Spears, et al. (1998; Dijksterhuis et al., in press) could be diminished or even reversed by a parallel assimilation. This view fits nicely with more general assumptions of SCT (see Chapter 4), which assumes that the ingroup stereotype is abstracted from the ingroup members. The contribution (or weight) of each member depends on his or her prototypically for the group. Introducing new members, or changing the prototypicality of members (e.g., by introducing outgroups) changes the stereotype of the ingroup and thereby the self-stereotype of the members (Hogg, Turner, & Davidson, 1990; Turner, 1991).

Can this application of the Wänke et al. model to an ingroup stereotype be backed up by other evidence? Unfortunately, most research on the impact of exemplars on stereotypes has focused not on ingroups, but on stereotypes about outgroups (e.g., Rothbart, 1996; Rothbart & John, 1985). There is however research on the formation of an ingroup stereotype by projecting knowledge about a special single exemplar: the self. This process is called self-anchoring (Cadinu & Rothbart, 1996). Self-anchoring is selective, that is, characteristics of the self are projected selectively onto ingroups (Krueger & Clement, 1996), and it works both for attributes and affective value (Otten & Moskowitz, 2000; Otten & Wentura, 1999, Otten & Wentura, in press). The existence of self-anchoring suggests that the arrow (b) in Figure 7 can also work the other way around, and that the stereotype of the shared category is influenced both by the exemplar and by the self.

7.2 Study 6: When Albert Einstein Is One of Us

To summarize the arguments presented in the previous section, the literature provides evidence that the exposure to a single exemplar does not inevitably lead to a

contrasting judgment of the compared object, which in this case is the self. First, depending on the extremity of the exemplar, the comparison may begin with the initial hypothesis that the exemplar is similar to the self (Mussweiler & Strack, 2000a, b). Even if the exemplar is extreme, a shared and salient superordinate category may cancel out the contrast (Wänke et al., 2001) by providing a shared stereotype and by highlighting shared features. Applied to the realm of intergroup structures, we can predict that contrast in automatic behavior after the exposure to an extreme comparison standard is diminished when the extreme comparison standard is a member of the ingroup.

To test this hypothesis fairly and adequately, a conceptual replication of the Dijksterhuis, Spears, et al. (1998) study was conducted, using Albert Einstein as one of the extreme examples. In two experiments, these authors provided evidence that priming with Albert Einstein led to significantly worse performance in a general knowledge task than priming with Claudia Schiffer, and that priming with Albert Einstein made standard-inconsistent self-knowledge more accessible. In the current study, Claudia Schiffer was replaced with Marilyn Monroe to construct a plausible cover story, and these exemplars were presented either as uncategorized comparison standards (equivalent to Dijksterhuis, Spears, et al.), or as members of the participants' ingroup. Following the reasoning above, it is predicted that the behavioral contrast elicited by the uncategorized exemplars is diminished or even reversed when the exemplars are categorized as ingroup members.

Method

Design, Overview and Hypotheses

The study was run on the Internet, disguised as a study on perception, and advertised on several university campuses. All participants were categorized as members of an (artificial) group, allegedly following their perception style, and had to solve items from an IQ test that involved mental folding of objects. Before they worked on these items, they were asked to think for 5 min either about Albert Einstein (AE) or Marilyn Monroe (MM). This between-subjects factor thus varied whether they thought about a stereotypically very smart person or about a stereotypically less smart person. This factor, called exemplar, was crossed with a second manipulation: The exemplar (AE or MM) was presented either as a member of the participants'

ingroup, or was left uncategorized (exemplar categorization). Thus, the experiment had a 2x2 between-subjects design.

The performance in the mental folding task was the main dependent variable. The central hypothesis of the experiment was that the performance in the mental folding task would be contrasted from the stereotype of the exemplar (i.e., better performance after thinking about an uncategorized MM than AE) when the exemplar was left uncategorized, but that this contrast would be extinguished or even reversed when the exemplars were categorized as members of the ingroup. Following the mental folding task, descriptions of the exemplar and the ingroup were assessed. As a manipulation check, it was expected that AE would be described as smarter than MM. Furthermore, it was expected that the ingroup stereotype would be assimilated to the exemplar's description.

Before the debriefing, participants were asked whether they suspected any influence of the exemplar description task while they worked on the mental rotation task, and in what direction such an influence might have been, and what the purpose of the study might have been.

Participants

After excluding (a) non-native speakers of German, (b) participants who indicated that they did not take part seriously (c) participants who indicated that they did not take part for the first time, (d) participants who remembered their own or the membership of a categorized exemplar wrongly or not all, and (e) participants where not all test item pictures loaded correctly, 239 participants remained in the sample. 4 of them suspected purposes of the study that were similar to the hypothesis and were therefore excluded. Additional 14 voiced doubts about the reality of the artificial groups and were also excluded (together 7.5%).[19] Furthermore, 16 participants were excluded since they perceived a relation between the priming task and the performance in the mental folding task (see below). Thus, the final sample consisted of 202 participants. 116 were female, 66 were male, 20 did not disclose their

[19] Additional analyses showed that the results remained the same when these 18 participants were included in the sample.

gender.[20] Mean age was 28 (5 missing). As an incentive, participants took part in a lottery, where one out of 20 won 10 DM.

Procedure and Materials

Artificial categorization. The same artificial figure-ground categorization according to an alleged perception style as in Studies 1 and 2 was used (for further details, see the materials section of Study 1). To make the categorization even stronger and more salient, however, the ingroup "Ground-based perception style," to which actually all participants were assigned, was described as a minority of only 9 percent of the population. This was strengthened by an illustration, which showed 10 symbolic persons: 9 were white and labeled "Figure-based," and 1 was black and labeled "Ground-based." It was stressed that the perception style was a stable personality trait, that it developed during childhood and youth, and that not only styles of thinking but also everyday traits and behavior were influenced by it.

Priming. The priming task was introduced as investigating thoughts about the two groups and their members. In the categorized targets condition, it was said that the research on the perception styles had a long tradition ranging back to the 50ies and 60ies, and that during that time a number of well-known persons were tested for their perception style. Either MM or AE was said to have been tested and found to have a Ground-based perception style (i.e., the same as the participant). The participants were then asked to think about MM or AE and type into the computer whatever came to mind about her or him. In the uncategorized exemplars condition, it was simply said that we were interested in how the two perception styles influenced thinking about persons, and that for that reason we asked them about a well-known person. Depending on the condition, participants were also asked to write down their ideas of either MM or AE. Note that only the categorization of the exemplars varied; the participants themselves were always categorized.

Mental folding task. Immediately following the exemplar priming, the mental folding task was introduced. The task consisted of 15 items, taken from Jäger and Althoff (1994). In each item, 4 three-dimensional objects (cubes, or more complex objects) were shown. Only one of these was folded out of a pattern shown next to the objects.

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[20] Since in exploratory analyses gender did not moderate the effects, it was not considered further in the main analyses.

The participants' task was to determine which object matched the folded out pattern (see Figure 8). It is my contention that the test depends to a large extent on concentration, logical analysis and stepwise exclusion of wrong answers. The participants were encouraged to guess if they were not sure, and they were told that they could cancel the task if they wanted to. The task was split in two parts, with 8 items in the first and 7 in the second part. The order of items was randomized but constant across participants.

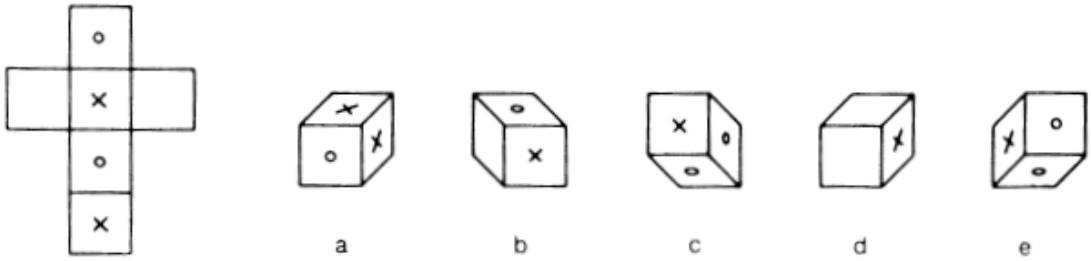

Figure 8. Example item of the mental folding task.

Stereotypes of exemplars and groups. Next, the participants had to rate MM or AE on 9 attributes. In between filler attributes, there were 5 intelligence- and performance-related attributes, intelligent (intelligent), smart (klug), persevering (ausdauernd), insistent (hartnäckig), too lazy to think (denkfaul). Then, they rated the ingroup on the same attributes. The rating scales ranged from does not apply at all (1) to fully applies (5).

Additional measures. Participants also filled OSIO items (overlap self-ingroup, overlap ingroup-outgroup, and overlap exemplar-ingroup in the categorized exemplars condition; scales ranged from 1 to 7; for further details, see Study 1). Participants were asked which perception style they had themselves, and which perception style MM or AE had (when they were categorized).

After the stereotype and overlap measures, but before the debriefing, participants were asked what they thought the purpose of the study was, and probed whether they saw any relation between the exemplar description task and the mental rotation task while they worked on the latter task. They were asked: "While you worked on the mental folding task, did you have the impression that your performance might have been influenced by previously thinking about Albert Einstein (Marilyn Monroe)?" They answered the questions with yes or no. If the answer was yes, they were asked

to describe how they thought they might have been influenced. Finally, they were questioned about their age, their gender, their mother tongue, whether they participated for the first time, and whether they took part seriously. After the data were submitted, participants were debriefed by a written explanation of the procedure and the manipulations.

Results

Perceived Relations Between Exemplar Description and Performance

In total, 16 out of the 221 participants who remained after the first selection phase (7.2%) indicated that during working on the mental folding task, they had the impression that the exemplar presentation might have influenced their performance (see Table 12). This was especially likely when AE was categorized as an ingroup member. 3 did not answer this question at all.

Table 12. Frequency of Relating Own Performance to Exemplar During Mental Rotation Task

		Exemplar categorization	
Exemplar	Perceived Relation	uncategorized	ingroup
Monroe	no	58	54
	yes	3	3
Einstein	no	45	45
	yes	3	7
	missing	2	1

Of these 16, only 8 answered how exactly their performance might have been influenced. Separating these answers by condition, a clear pattern emerged. 1 participant indicated doubts whether he would be able to answer as well as the uncategorized AE, 1 participant was flattered that the categorized MM belong to the ingroup, and 6 wrote on the impact of the categorized AE. 5 of these 6 described a positive influence of AE, mainly in terms of AE as a paragon which they could emulate. 1 participant described an upward comparison to AE, and that he might have solved the questions better.

Since in this study, the pure priming effect was of interest, only participants who indicated that they did not see any relation between exemplar description and mental folding task while they worked on the task were retained in the further analyses. All other participants were excluded. However, for the central results I will point out that the effects were identical when they were retained in the analysis.

Manipulation Check

First, the ratings of the exemplars on the attributes smart and intelligent were combined into a single intelligence score (r=.67, p<.001) and analyzed in a 2 (exemplar) x 2 (exemplar categorization) ANOVA. The exemplar main effect was highly significant, $F(1,198)$=166.57, p<.001. Neither the exemplar categorization main effect, $F(1,198)$=1.66, p=.199, nor the interaction, F<1, reached significance. Simple effects analyses showed that AE was rated smarter than MM both when they were left uncategorized, M=4.57 vs. M=3.14, and when they were ingroup members, M=4.61 vs. M=3.36, both ps<.001. Note that except the uncategorized MM all exemplars were rated significantly smarter than the midpoint of the scale (3), ts>3.4, ps<.002. Second, the ratings on persevering, insistent, and too lazy to think were combined into a single perseverance score (last value recoded, Cronbach's Alpha=.63), and subjected to the same analysis. Again, only the exemplar effect was significant, $F(1,198)$=48.71, p<.001, both other Fs<1. AE was rated as more persistent than MM when they were uncategorized, M=3.94 vs. M=3.33, and when they were ingroup members, M=3.97 vs. M=3.26, both ps<.001. All means were significantly higher than the midpoint of the scale, ts>2.55, ps<.015.

Number of Attempted Solutions

When analyzing performance data, it is instructive to look also at the number of attempted solutions, which can be used as a covariate (James & Greenberg, 1997). For both blocks, the number of attempts was divided by the number of items in the block. Thus, if all items were answered, the score for this block would be 1. On these scores, a 2 (exemplar) x 2 (exemplar categorization) x 2 (block) MANOVA was conducted, with the last factor as a repeated measure. There were no significant main effects of the between subjects manipulations, Fs<1. Their two-way interaction failed to reach significance, $F(1,198)$=1.93, p=.167. There was however a main effect of block, $F(1,198)$=22.52, p<.001, which was not moderated by two-way interactions, both Fs<1, but by a significant three-way interaction, of block, exemplar, and

exemplar categorization, F(1,198)=5.86, p=.029. Table 13 shows the respective means.

The means and simple effects analyses show that in the first block, in the MM conditions almost all items were attempted irrespective of her categorization (F<1), and that in AE conditions the rates were somewhat lower. A 2x2 ANOVA of this block showed no significant effects, all Fs<1.1. In the second block, there were no main effects, Fs<1, but there was a marginal crossover interaction, F(1,198)=3.32, p=.070. The ingroup categorization of AE led to less attempted solutions, while the ingroup categorization of MM led to more attempted solutions. None of the simple effects reached significance, ps>.13 (all these and the following simple effects analyses use SIDAK adjustments).

Table 13. Proportions of Attempted Solutions

		Exemplar categorization			
		uncategorized		ingroup	
	Exemplar	M	SD	M	SD
Block 1	Monroe	0.98	0.05	0.99	0.04
	Einstein	0.96	0.16	0.99	0.06
Block 2	Monroe	0.86	0.33	0.94	0.19
	Einstein	0.91	0.28	0.84	0.33

Note. Score equals 1 if all items were answered.

Correct Solutions, Blocks Analyzed Separately

First, the numbers of correct solutions were analyzed for each block separately. First, the sums of correct answers were entered in two 2 (exemplar) x 2 (exemplar categorization) ANOVAs, without covariate. The means are reported in Table 14. In block 1, both main effects were insignificant, exemplar effect F<1, exemplar categorization effect F(1,198)=2.24, p=.310. The interaction was almost significant, F(1,198)=3.90, p=.050. Simple effects analyses showed that the ingroup categorization of AE increased the number of correct solutions significantly, F(1,198)=5.42, p=0.011 (one-tailed), while the ingroup categorization of MM did not decrease it significantly. The interaction can also be analyzed at the exemplar level: When the exemplars were uncategorized, priming with AE led to less correct

answers in block 1, F(1,198)=4.55, p=0.017 (one-tailed), but there was no difference between the AE and MM conditions when the two were categorized as ingroup members, F<1. In block 2, only the exemplar main effect had an F larger than 1, F(1,198)=1.32, p=.252. The simple effects analyses showed no significant effects, all Fs<1.

These effects were largely replicated when the analyses were repeated with the number of attempted solutions in the respective blocks as a covariate. In block 1, the covariate explained a significant amount of variance, F(1,197)=10.20, p=.002. Again, the main effects failed to reach significance, exemplar effect F<1, exemplar categorization effect F(1,197)=1.66, p=.199. The interaction was marginal, F(1,197)=3.42, p=.066. When the two exemplars were analyzed separately, the performance after AE priming was significantly increased when AE was categorized as an ingroup member, F(1,197)=4.423, p=0.019 (one-tailed), while the MM priming was unaffected, F<1. Seen from the other side, priming with an uncategorized AE decreased performance as compared to an uncategorized MM, F(1,197)=3.62, p=0.03 (one-tailed), while there was no difference between the categorized exemplars conditions, F<1. In block 2, apart from the covariate, F(1,197)=119.41, p<.001, only the interaction had an F above 1, F(1,197)=1.64, p=.201. On the descriptive level, the ingroup categorization of AE still increased performance, but the simple effect was not significant anymore, F(1,197)=1.64, p=0.101 (one-tailed).

Correct Solutions, Both Blocks Together

These analyses, first without, then with covariate, were repeated for the number of correct solutions in total, that is, summed over the two blocks. Table 14 (last two rows) reports the means. The ANOVA without covariate revealed no effects, neither of exemplar, F(1,198)=1.32, p=.253, nor of exemplar categorization, F(1,198)=1.44, p=.230, nor their interaction, F<1. When included in the model, the number of attempted solutions was a significant covariate, F(1,197)=54.01, p<.001. Both main effects were insignificant, Fs<1.1, and the interaction fell short of significance, F(1,197)=2.28, p=.072, but simple effects analyses revealed that the categorization mattered in the case of AE: participants answered more items correctly when primed with the ingroup member AE, as compared to the uncategorized AE, p=.028 (one-tailed). For MM, the opposite was not significant, p=.283. The interaction can also be looked at from the perspective of the exemplars: Only when the exemplars were

uncategorized, AE led to a worse performance, p=.026 (one-tailed). There was no difference when the exemplars were categorized as ingroup members, p=.357 (two-tailed).

Table 14. Correct Solutions in the Mental Folding Task, Blocks Separated and Combined

		Exemplar categorization			
		uncategorized		ingroup	
Block	Exemplar	M	SD	M	SD
block 1	Monroe	6.16	1.83	6.02	1.96
	Einstein	5.31	2.25	6.29	1.95
block 2	Monroe	3.9	2.37	4.11	1.71
	Einstein	3.58	2.13	3.73	2.31
both blocks	Monroe	10.05	3.78	10.13	3.25
	Einstein	8.89	4.16	10.02	3.75

Note. Maximal number of correct solution is 8 for block 1 and 7 for block 2. Note that these means are not corrected for a covariate.

As noted above, it is interesting to check whether these results hold when those participants who thought about a connection between exemplar and their performance while they worked on the mental folding task were included in the analyses. In sum, the results were almost equivalent, but a bit weaker. For instance, the marginal interaction in the analysis of both blocks combined with a covariate was insignificant, F(1,216)=2.58, p=.110. In each and every case, the pattern was the same.

Ingroup Stereotypes

Two performance-related scores for the ingroup stereotype were computed: an intelligence score from smart and intelligent (r=.564, p<.001), and a perseverance score from persevering, insistent, and too lazy to think (last value recoded, Cronbach's Alpha=.61). Unfortunately, data are missing for two cases. Both scores were analyzed in 2 x 2 ANOVAs (see Table 15). For intelligence, there was a marginal effect of exemplar, F(1,196)=3.77, p=.054, but no effect of exemplar categorization F(1,196)=1.75, p=.188, and interaction F<1. The ingroup was

stereotyped as less smart when AE was primed. For perseverance, the main effect of exemplar was marginal, F(1,196)=2.81, p=.095, exemplar categorization F<1. The interaction however was significant, F(1,196)=5.95, p=.016. The ingroup was rated as more persistent when AE was categorized as a member than when AE was uncategorized, F(1,196)=3.89, p=0.025 (one-tailed), and for MM the opposite trend approached significance, F(1,196)=2.11, p= 0.074 (one-tailed).

Table 15. Ingroup-stereotype for Intelligence and Perseverance

		Exemplar categorization			
		uncategorized		ingroup	
Trait	Exemplar	M	SD	M	SD
ingroup intelligent	Monroe	3.82	0.72	3.77	0.68
	Einstein	3.71	0.59	3.52	0.57
ingroup persistent	Monroe	3.61	0.73	3.43	0.66
	Einstein	3.21	0.71	3.5	0.6

How did the stereotypes for exemplar and ingroup relate to each other? For intelligence, there were significant correlations between exemplar stereotype and ingroup stereotype when the exemplars were uncategorized, in both the MM condition, r=.25, p=.057, and the AE condition, r=.27, p=.037. In the ingroup exemplar condition, for MM the correlation failed to reach significance, r=.20, p=.140, and was almost zero for AE, r=.03. For perseverance, exemplar and ingroup stereotype correlated significantly irrespective of categorization for both exemplars, with rs>.329, ps<.014.

The two stereotype scores intelligence and perseverance have two corresponding performance variables, correct answers and number of attempted solutions. The correlations between performance and the respective exemplar- and ingroup-stereotype were analyzed. There were no significant correlations between either exemplar or ingroup stereotype and the respective performance indices.

Overlap Measures and Prediction of Performance

First, the effects of the manipulations on the 3 overlap measures were analyzed. For the overlap between ingroup and outgroup, there was an effect of exemplar, $F(1,193)=4.45$, $p=.036$, both other Fs<1 (5 missing values). The overlap was seen as larger after AE priming ($M=3.81$) than after MM priming ($M=3.31$). There were no effects on overlap of self and ingroup, all Fs<1. The total mean was 4.18; the respective picture shows a small overlap of self and ingroup. The overlap of exemplar and ingroup was only assessed when the exemplar was categorized. The overlap was significantly higher for AE ($M=5.17$) than for MM ($M=3.50$), $t(94)=4.80$, $p<.001$.

The main hypothesis of the present study was that ingroup categorization of AE (or MM) would increase (or decrease) performance. Using the overlap measures as an index of the strength of ingroup categorization, a corollary of this hypothesis can be tested in linear regressions. It was expected that a high self-ingroup overlap should predict performance when the exemplar is also seen as an ingroup member. More specifically, when AE is seen as included in the ingroup, higher overlap with the ingroup should be correlated positively with performance. This is in fact an interaction hypothesis. Interaction hypotheses for continuous variables like the overlap measures can be tested in linear regressions with an additional product term. Therefore, it was tested whether the participants' performance regressed on the product term of self-ingroup and target-ingroup overlap. For this purpose, the self-ingroup overlap and target-ingroup overlap scores were standardized and multiplied. The product score had high values when both self-ingroup and target-ingroup overlap had simultaneously high or low values. Next, the total number of correct solutions was regressed on the two overlap scores and their product, with the number of attempted solutions as an additional predictor similar to a covariate (the number of attempted solutions itself was not predicted by the other regressors). Note that these regressions could only be performed for the categorized exemplars conditions, and were computed separately for both exemplars. Regressions were performed on the total number of correct solutions, and on the number of correct solutions in both blocks separately.

For the MM conditions, only the regression equation in block 2 explained a significant amount of variance, but there the only significant predictor was the

number of attempted solutions. For the AE conditions, the regression of the total number of correct solutions was significant, $F(4,36)=5.86$, $p=.001$, but again only the number of attempted solutions was a significant predictor, $\beta=.51$, $p<.001$. There was a marginal effect of the self-ingroup overlap, $\beta=.26$, $p=.085$. The interaction term was not significant, $\beta=.24$, $p=.119$. For the correct solutions in block 1, the total regression was marginally significant, $F(4,36)=2.39$, $p=.069$. The number of attempted solutions was not a significant predictor, $p=.222$ (probably due to its low variability in this block). Self-ingroup overlap was a marginally significant predictor, $\beta=.29$, $p=.098$, as was the interaction term, $\beta=.31$, $p=.087$. Finally, in block 2, correct solutions were solely predicted by attempted solutions, $\beta=.64$, $p<.001$, $F(4,36)=8.43$, $p<.001$ (all tests two-tailed).

The marginal interaction in block 1 was explored following the procedure proposed by Aiken and West (1991). Figure 9 plots the simple slopes of the interaction in the ingroup AE condition at three levels of exemplar-ingroup overlap: low (i.e., 1 SD below the mean), average (at the mean), and high (1 SD above the mean). The covariate number of attempted solutions was set constant at 15, and the lines were plotted from the minimum of the standardized self-ingroup overlap, -2.1, to the maximum, 1.8. At low exemplar-ingroup overlap, the simple slope of the linear regression equaled 0.10, which did not differ from zero, $t<1$. At average exemplar-ingroup-overlap, the simple slope was higher with .62, but only marginally significantly different from zero, $t(36)=1.70$, $p=.097$. At high exemplar-ingroup-overlap, the slope was significantly larger than zero with 1.15, $t(36)=2.41$, $p=.020$.

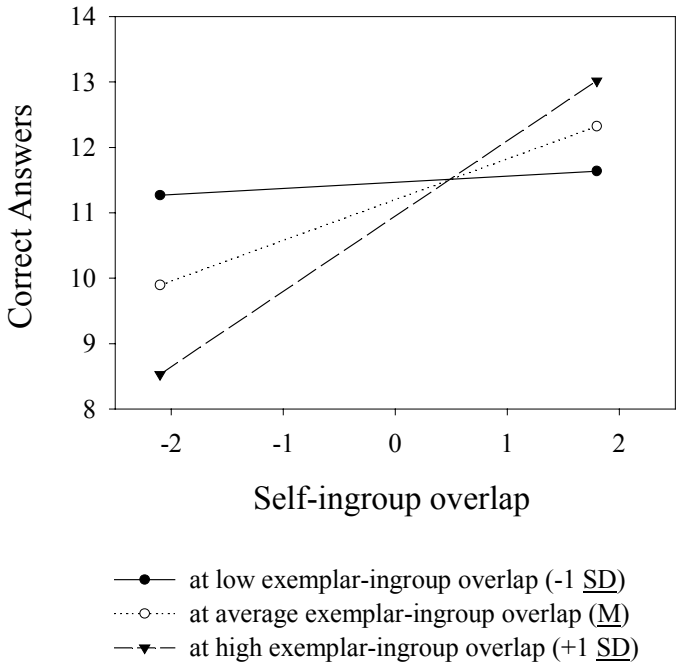

Figure 9. Simple slopes of regression of correct answers on self-ingroup overlap, depending on exemplar-ingroup overlap.

For exploratory purposes, these analyses were repeated with the suspicious participants included in the sample. The results were somewhat stronger: The interaction term was a significant predictor not only for block 1, but also for the total number of correct solutions. Simple slope analyses showed that only for high target-ingroup overlap, the slope was significantly higher than zero.

Discussion

The main goal of this study was to show that the automatic behavioral contrast evoked by an extreme exemplar is extinguished when the exemplar is a member of the ingroup. For this purpose, the participants were confronted with one of two exemplars who differed in their stereotype on intellectual performance: Albert Einstein and Marilyn Monroe. To test the hypothesis, they were either categorized as ingroup members or left uncategorized. The hypothesis was supported by the evidence in the conditions with Albert Einstein, both in experimental and correlational data. However, the Marilyn Monroe conditions showed no effect, presumably due to the fact that she was not stereotyped as stupid.

First an overview of the experimental data: When Albert Einstein was categorized as an ingroup member, the participants solved on average 18.5% more items of the

mental folding task correctly in the first block of test items than when he was not categorized. This performance increase in the first block was significant. The effect disappeared in the second block of test items. Furthermore, it was expected that the reverse result would be observable for the priming with Marilyn Monroe. However, there was no evidence for a difference between priming with a categorized and an uncategorized Marilyn Monroe. Overall, this resulted in an only marginally significant interaction (for the first block of items). The main result can also be seen from the perspective of the exemplars: Replicating Dijksterhuis, Spears, et al. (1998), it was found that the smarter an uncategorized exemplar, the worse the performance--a contrast effect in automatic behavior after the exposure to a single exemplar (see also Chapter 3). However, when the exemplars were members of a shared category, this contrast was prevented.

That no effects were observable in the MM conditions leads us to the conclusion that these conditions should rather be considered as a baseline. This interpretation is backed up by the data from the exemplar descriptions. While AE was described as significantly more intelligent than MM, MM was still not described as dumb: Her ratings were on average slightly above the midpoint of the scale, and were even significantly higher than the midpoint if she belonged to the ingroup.

Several points are important about the performance data: First, the effect cannot solely be explained as a change in the number of attempted solutions and luck in mere guessing. While there was some variation in the number of attempted items in block 1, none of the differences reached significance. Furthermore, the results held when the number of attempted items was added as a covariate. Second, the pattern of means of block 1 indicates that there was a performance drop for those participants exposed to an uncategorized AE, and that those participants who had AE as a fellow ingroup member equaled the performance of both MM conditions. Thus, it seems that similar to the results of Wänke et al. (2001), a shared superordinate category canceled out the contrast, but did not result in additional assimilation. However, this interpretation is speculative since the MM conditions were not true baselines. As a third point, it is instructive to note that the behavioral priming disappeared in the second block of items. There, the number of correct solutions was far lower altogether, and the performance did not differ significantly between conditions. Still it is interesting to note that on a descriptive level the number of attempted items in

block 2 was lower for those with an ingroup AE than for those with an uncategorized AE, but the number of correct solutions was somewhat higher for those with an ingroup AE. Thus, the priming effect was diminished, but not reversed.

The Wänke et al. model proposed that the stereotype of the superordinate category mediates the assimilation process. Focusing on two dimensions of the stereotype, perseverance and intelligence, it was found that the ingroup stereotype was indeed assimilated to the exemplar for perseverance, but not for intelligence. The ingroup was seen as more persevering when AE was member than when he was not, and it was seen as less persevering when MM was a member than when she was not. It seems likely that the open projection of the exemplar's intelligence in the measure was counteracted by a corrective process, since the participants were probably well aware that they had difficulties solving all the items, and that they and their group could not be as smart as AE--but as persistent. A similar problem probably determined the correlations between exemplar and ingroup stereotype. There, positive correlations were found for perseverance (irrespective of the categorization), but not for intelligence. Apparently, the measures shared a common variance due to both an exemplar→ingroup induction and an additional priming-like effect that also works without a shared category; but these processes were stopped when the experience from the mental folding task provided contradicting evidence. Therefore, it is not possible to determine whether the stereotype of the shared ingroup really mediated the effect.

In a rather exploratory last analysis step, the relation of the graphical overlap measures to the behavioral indices was scrutinized. Since it was argued that categorization of the exemplar as an ingroup member on the one hand and the categorization of the self as an ingroup member on the other hand together contribute to the assimilation effect (paths a and b in Figure 7), the number of correct answers was regressed on the respective overlap measures, target-ingroup overlap and self-ingroup overlap, and their product. These analyses were only possible in the categorized exemplars conditions. While for MM there was no reliable regression, for the AE group, performance in the first block of items was marginally predicted by the interaction term. The simple slopes analysis showed that only for a high perceived overlap of AE and the ingroup, increased self-ingroup overlap also led to increased performance. This single cell thus replicated the between-subjects

manipulation of the AE categorization. The fact that the regression only explained variance in the AE group, but not in the MM group is also consistent with the absent between-subjects effect of MM categorization.

Finally, one has to ask how automatic the observed behavioral effect was. When asked about their hypothesis about the purpose of the experiment, 4 out of the 239 (1.67%) voiced suspicions that the effect of the exemplars on their performance was under investigation; these participants were excluded from the sample. Further 16 participants indicated that they related their performance in the mental folding task to the exemplar while they worked on the task; these participants were also excluded. Thus, all participants who remained in the analyses said explicitly that they did not have the impression that the exemplar presentation influenced their performance. In fact, when the suspicious participants were included, the results were almost identical, but marginally weaker. So, it is likely that the vast majority of the participants showed a spontaneous and unbiased reaction to the exemplar, whether it was in their own category or not, and that the impact on performance was automatic. The effects seem not attributable to a mere demand effect, in which the participants work harder if AE is categorized as their ingroup member because they think that the experimenter expects it. Still, it is possible and indeed likely that the behavioral effect was preceded and in fact mediated by conscious deliberations about the own intelligence during the priming. In the ABC model, it is explicitly assumed that the comparison process is conscious and based on a noetic awareness of the comparison standard. In sum, it seems safe to conclude that the behavioral effect of exemplar presentation can be called a priming, or an effect of previously activated mental representations on later behavior, even in the conditions with categorized exemplars.

It is important to note that the direction of the effect in the ingroup condition is not trivial: It is well-established that members of the same group are preferred comparison standards for evaluations of the self, and that in general comparisons within categories are preferred (Biernat & Kobrynowicz, 1997; Biernat & Manis, 1994; Biernat, Manis, & Kobrynowicz, 1997). So, it is also possible that by making AE a member of the ingroup, an even stronger pressure to compare the self to this highly intelligent member of the same category arises. In that case, the contrast would be even stronger than after the comparison with an uncategorized AE. But the data show that this was not the case. This effect can be understood by comparing it to

a similar phenomenon, namely the moderation of the outgroup homogeneity effect by a salient social categorization into ingroup and outgroup. Typically, it is found that outgroups are seen as more homogeneous than ingroups (e.g., Linville, Fischer, & Salovey, 1989). Recent theorizing in the SCT literature (Haslam et al., 1996; Simon, 1992) argued that this is so because the outgroup is always judged in a salient ingroup-outgroup frame of reference, while the ingroup can be judged in its own frame, and independently from the ingroup-outgroup categorization. When attention is focused on an outgroup, it is seen as more homogeneous, due to an decreased perception of difference within the group. When the attention is then focused on the ingroup in an estimation of its homogeneity, two things can happen: When the salient ingroup-outgroup distinction breaks down, a comparison within the group leads to the perception of less homogeneity, resulting in the outgroup homogeneity effect. However, if the ingroup-outgroup distinction is sustained, the ingroup is also judged as homogeneous, since the context leads to a focusing on differences between the groups instead of differences within the group. This is analogous to the present study, in which a (difference-testing) comparison to another ingroup member (AE) was prevented by a strong categorization, which was strengthened by a minority status of the ingroup.

preserve, recall, recognize, keep, memory, study, remember, retain

memorization primes, Chartrand and Bargh (1996)

8.1 Overview of the Presented Studies

This thesis developed a model of Automatic Behavioral Contrast (ABC). The ABC model postulates two parallel processes, a stereotype activation process and a comparison process. Both can follow the perception of a stereotyped group, but only the stereotype activation process is inevitable. Furthermore, both can change the accessibility of mental representations of behavior, and therefore both can have effects on automatic behavior. Let us now consider the two processes.

As a result of the perception of a stereotyped category, the stereotype activation process inevitably leads to an increased accessibility of stereotype-consistent behavioral representations. This results in automatic behavioral assimilation: The perceiver automatically mimics the behavior that is typical for the stereotyped category, if such behavior is functional in the environment. A prominent example is slower behavior after activation of the elderly stereotype.

When the self is compared to the category, a comparison process is started. This process entails an active social comparison of the self to the activated stereotype. This comparison is either based on an initial similarity hypothesis or on an initial dissimilarity hypothesis. Depending on the initial hypothesis, either stereotype-consistent or stereotype-inconsistent behavior is rendered accessible during the comparison. This accessibility merges with accessibility effects of the stereotype activation process. Accessibility effects of the two processes can add up or cancel each other out. Thus, if a comparison focuses on similarities between the self and the elderly, even slower behavior will ensue. However, if a comparison focuses on differences between the self and the elderly, the accessibility of typically fast behavior may be increased, and faster behavior will be likely. It follows that determinants of the initial hypothesis moderate between assimilation and contrast in automatic behavior. Furthermore, it follows that the initial similarity assessment mediates effects of those factors on behavioral outcomes.

The assumptions that the two processes stereotype activation and self↔stereotype comparison work in parallel, and that the stereotype activation process is inevitable, are consistent with previous literature on automatic behavior (e.g., Dijksterhuis et al., in press), and the most economical summary of the available body of research. All other assumptions, for instance that the self is involved in every conceptualization of a social group, seem to require more complex explanations in order to integrate the reported findings.

Now, the question is: which factors can determine the direction of the initial comparison hypothesis? A central hypothesis in this model is that a salient categorization of the activated stereotype as an outgroup, in opposition to an ingroup of the perceiver, leads to a dissimilarity-testing comparison, which then results in behavioral contrast. In short, the model predicts automatic behavioral contrast (ABC) after the categorization of a social stereotype as an outgroup. The studies reported in this thesis focused on testing this hypothesis. The general paradigm of the first three studies was to compare effects of stereotype activation with and without a categorization as an outgroup. The following three studies then employed different paradigms. I shall now summarize the evidence for this hypothesis.

Studies 1a and 1b provided the first evidence that automatic behavioral contrast from members of an outgroup can occur. The approach taken in these studies built on a classic method in the intergroup research, namely the Minimal Group Paradigm (Tajfel et al, 1971). First, an outgroup was created by introducing an artificial categorization, allegedly following the perception style, of which the participants had never heard before. They were then shown five alleged members of the outgroup, who were either young or elderly persons. In a subsequent reaction time task they contrasted their behavior from the implied outgroup stereotype. They reacted faster when elderly outgroup members were presented, in comparison to the condition in which young outgroup members were presented. The most important result was that although a group of persons was presented, the participants did not automatically assimilate.

Study 2 corroborated and extended these findings. It compared the outgroup conditions of Studies 1a and 1b with a condition in which the same target persons were not categorized. The contrast finding was replicated in the categorized condition; that is, participants again reacted faster after the perception of elderly

outgroup members than after the perception of young outgroup members. Furthermore, assimilation was found after the perception of uncategorized targets: participants who perceived uncategorized elderly person reacted slower than participants who perceived uncategorized young persons. This finding strongly supports the idea that the categorization of the targets as outgroup members causes behavioral contrast. The findings from Studies 1 and 2 show that automatic behavioral contrast does not necessarily depend on the presence of a single exemplar.

The difference to the results found by other researchers in the past is clearly visible since the studies modified the procedure developed by Dijksterhuis et al. (in press). These authors also presented five stimulus persons, who were either young or elderly, and found behavioral assimilation, that is slower reactions in a subsequent lexical decision task when elderly persons were presented. Studies 1 and 2 used the same paradigm, but first induced an ingroup-outgroup distinction for the participants, and then presented the 5 persons as outgroup members. This resulted in automatic behavioral contrast, that is faster reactions in the task following the perception of elderly persons. Furthermore, a direct comparison of Dijksterhuis et al.'s procedure and the categorization condition in Study 2 showed that the categorization of persons as outgroup members moderated between assimilation and contrast. The participants were not aware of this process; they adapted their behavior in a subsequent, allegedly unrelated, task.

Note that in Studies 1a, 1b and 2, the elderly target persons were not seen as an outgroup because they were elderly. Instead, the outgroup status was created independently from the age category, and the age merely stereotyped the artificial outgroup category. The goal of Study 3 was to replicate these findings with a natural outgroup category, the elderly themselves. Using a different priming procedure, unexpected results were found: Instead of getting faster after the perception of an elderly outgroup, the participants, especially the male ones, got slower. Thus, the results seemed to suggest that a strong outgroup assimilation occurred, while no behavioral effects were observed when the stereotype of the elderly was activated as a single category. Two possible explanations were proposed. First, using the self-stereotyping measures as a interpretation aid, it seemed possible that the slower reaction times were in fact a behavioral contrast, but not from the typical elderly trait slowness in the direction of faster reactions, but from the elderly trait meticulous in

the direction of relaxed behavior. The pattern of reaction times on the one hand and self-stereotyping as relaxed on the other hand, as well as the correlation between the two effects suggested this interpretation. A second possible explanation of the unexpected slowness was the comparison instruction given to the participants, which may have inadvertently created a test for similarity. This hypothesis was followed up in the next study.

The previous studies investigated the effect of an outgroup categorization on automatic behavioral effects. The underlying assumption was that an outgroup categorization leads to a dissimilarity-testing comparison. Study 4 differed from the previous studies, because it did not directly introduce an outgroup. Rather, building on research by Mussweiler (2001), an alternative manipulation of the initial hypothesis was used: the direction of comparison. This allowed a test of one important step of the ABC model, namely that from the initial hypothesis to behavioral effects. It was hypothesized that a comparison of self to elderly people would invoke a test for difference, but that a comparison of elderly people to self would invoke a test for similarity (Tversky, 1977). The behavioral effects confirmed these hypotheses: participants were fastest when they compared themselves to the elderly, and slowest when they compared the elderly to themselves. The reaction times in an additional baseline condition fell in between these two conditions. Thus, Study 4 supported the idea that the initial hypothesis tested in the comparison determines the automatic behavior outcomes. Another interesting finding provided a link to the previous studies: Not only did the comparison of self to the elderly lead to behavioral contrast, but the elderly persons were also seen as more homogeneous. This indicated a stronger dichotomy into ingroup and outgroup, which has been manipulated experimentally in the previous studies.

Study 5 investigated performance in a general knowledge task after activation of the professor stereotype. Both students and non-students took part in the study. It was found that only non-students assimilated to the stereotype of professors, as indicated by better performance in the general knowledge task, compared to a baseline condition. Participants who were themselves students were unaffected by the priming, contradicting earlier results from Dijksterhuis and van Knippenberg (1998). Thus, students did not assimilate to the stereotype of professors, while non-students did. A possible post-hoc explanation for this effect is that the students held an

antagonistic attitude to professors, which prevented assimilation because it led to a salient ingroup-outgroup categorization.

All these studies investigated automatic behavioral contrast after the perception of social groups. Hitherto, behavioral contrast had only been found after the perception of single, extreme and distinct exemplars. The ABC model argues that not the exemplar status per se leads to the difference-testing comparison, but that the social categorization is the decisive moderator. This led to the hypothesis of contrast from outgroups which was tested in the previous studies. However, this central assumption also suggests modified predictions for contrast after the perception of single exemplars: When the exemplar is a member of the ingroup, the contrast should be extinguished. This prediction was tested and confirmed in the final Study 6. Participants who were primed with an uncategorized Albert Einstein performed worse in an intelligence test, replicating previous results by Dijksterhuis, Spears, et al. (1998). However, when Albert Einstein was categorized as an ingroup member, the contrast was extinguished.

In sum, I presented evidence for the hypotheses that outgroups can elicit automatic behavioral contrast (Studies 1, 2), and that a dissimilarity hypothesis leads to automatic behavioral contrast (Study 4). Furthermore, both an unexpected behavioral effect in Study 3 and a null effect in one group of participants in Study 5 can be interpreted as further instances of behavioral contrast, with the caveats that both interpretations are post-hoc, and that in Study 5 a quasi-experimental variable has to be interpreted causally. Finally, the impact of social categorization on automatic behavioral effects was demonstrated in Study 6 in yet another way, when the contrast elicited by an extreme single exemplar was extinguished by an ingroup categorization.

The findings suggest that for the induction of a comparison between the self and a target, which is responsible for the automatic contrast, the target does not need to be a single exemplar. Instead, a comparison can also be induced by a salient intergroup context which defines an ingroup and an outgroup. A group of people who are perceived as members of an outgroup can serve as the standard of a difference-testing comparison, and elicit automatic behavioral contrast, even when more than a single outgroup exemplar is perceived. In this regard, a very interesting point is revealed by a comparison of the studies reported here: A strong impact of an

ingroup-outgroup categorization was found in studies that applied a variant of the minimal group paradigm (Studies 1, 2, 6). It seems that just like in the domain of social discrimination, minimal group studies can serve as an excellent tool for social comparison research, and that this procedure can result in a powerful psychological process. Tajfel (1981) wrote: "it may be interesting to note that, in a paradoxical sense and seen from a different perspective, they ['minimal' groups] may well be considered as 'maximal' rather than minimal." (p. 241). The power of minimal group categorizations is however not only of methodological interest. Conditions of computer-mediated communication are similar to minimal groups in many respects (Spears, Lea, & Lee, 1990; Waldzus & Schubert, 2000), and in these environments, analogous social-psychological processes can be expected (cf. Postmes, 1997).

8.2 Replications of Previous Findings

In addition to the evidence for the model developed in this thesis, the presented studies have also replicated earlier findings. In Study 2, a marginally significant assimilation effect to a group of uncategorized 5 elderly persons (as opposed to 5 young persons) was found. This finding replicated Dijksterhuis et al. (in press). This study also provided an additional interesting finding: there was a marginal positive correlation between perceived elderliness of the target persons and the behavioral effect. With the caveat that the elderliness was assessed after the behavioral measure, it seems that this is a first hint at a mediating mechanism, although the effects were very weak in this study. A very similar effect was found in Study 3. There, the priming of the elderly stereotype consisted of estimating the age of 16 elderly persons. The age judged during the priming predicted the reaction time in the subsequent reaction time task. Again, the extremity of the stereotype was related positively to the behavioral effect. However, this result must also be interpreted with caution, since the overall effect was not significant.

The priming procedure in Study 3 differed from previously applied methods and did probably not activate the stereotype as intended. Still, it is interesting that the method employed--age estimation--did not have the same consequences as forming an impression. It seems that the actual task performed during the priming is important, and that it does not suffice to present pictures irrespective of the task to activate the stereotype (cf. Gilbert & Hixon, 1991; Macrae, Bodenhausen, Milne, Thorn, & Castelli, 1997). However, since I do not have additional data in which the same

photos, combined with another stereotype activation task, elicited assimilation, no clear interpretation is possible.

In Study 5, assimilation to an activated stereotype (professors) was found, although the assimilating participants were not themselves members of the stereotyped group. Interestingly, in contrast to earlier findings, participants who were in a more antagonistic position to the stereotyped group (i.e., students) did not assimilate. Thus, the results both replicate and modify earlier findings by Dijksterhuis and van Knippenberg (1998). Finally, the behavioral contrast after presentation of a single extreme exemplar in Study 6 replicated the results reported by Dijksterhuis, Spears, et al. (1998).

The reported findings parallel those of Spears et al. (2001), who also found automatic behavioral contrast from outgroups, in a research program independent from the current work. Two differences to the present studies are interesting: While the present studies presented members of an outgroup (Study 1, 2) or persons that became an outgroup (Study 4), the Spears et al. studies primed the stereotypes in a more abstract way, and rather independent of specific members. Furthermore, while the studies in this thesis employed a minimal group categorization (Study 1, 2) and the focus of comparison (Study 4) to manipulate the comparison process, Spears et al. asked questions about the ingroup identity. It seems that a contrasting process can be triggered by a number of different causes, all of which result in a similar effect. Whenever a stereotype activation is coupled with a strong reminder of a possible opposite of the group, whereby it becomes an outgroup, behavioral contrast can be expected.

8.3 Limitations of the Presented Studies

However, central points of the ABC model remain untested after this series of studies. First of all, these studies have not shown that a dissimilarity test indeed mediates the impact of outgroup categorization on automatic behavioral effects: While contrast was observed after an outgroup categorization as well as after a manipulation of the comparison direction, which has previously been shown to influence the initial comparison hypothesis, it remains to be shown that outgroup categorization leads to a test of differences between self and the outgroup. This assumption so far rests on arguments from the intergroup literature (see Chapter 4).

A potential test of this hypothesis would be a simple explicit verbal or graphical (see the overlap measures in Studies 1 and 2, and Schubert & Otten, 2000) measure of perceived similarity of self to the target persons. The studies in this thesis somewhat neglected such a test; when these measures were applied in the studies on outgroup contrast, they were used in a different way, mostly to check on the salience of the categorization. In the intergroup contexts, they did not predict the automatic effects. However, first promising evidence was found in Study 6, where the assimilation to Albert Einstein was predicted by an interaction of self-ingroup and Einstein-ingroup overlap. Future studies should tailor both verbal and graphical measures more closely to the predicted mediator, the initial hypothesis, to collect evidence directly related to its role.

A second and related critical point of the argument concerns the effects on the self-stereotyping. It was expected that the behavioral effects would be accompanied by parallel changes in the self-stereotype, such that acting faster after contrast from the elderly would be paralleled by a "younger" self-stereotype. The reasoning behind this hypothesis was that a manipulation of accessibility should not only lead to automatic behavioral effects, but also to changes in the self-description because these are formed on-line and thus depend on accessible constructs associated with the self. This should be true both of the description of the self and the ingroup. However, the studies in general failed to support this assumption. First, let us consider the self-stereotyping measure, in which the participants had to describe their own person. In Study 3, the male participants showed a marked change in the self-stereotype on the attribute relaxed, which was also highly correlated with the behavioral effect (reaction time). In Study 4, no effects on the self-stereotype were found. Now, let us turn to the ingroup stereotype measures. In Studies 1a and 2, no effects of the perceived outgroup members were found, while in Study 1b, the outgroup was stereotyped according to the perceived elderly members, and the ingroup was marginally contrasted away from it. In Study 6, the results on the ingroup stereotype were mixed: While the stereotyping in the domain of perseverance followed the hypothesis, stereotyping in the domain of intelligence were reversed.

In sum, it seems that the manipulations employed in these studies led more easily to automatic behavioral effects than to changes in explicit self- and ingroup-descriptions. The matter is complicated, however, by the general procedure that

behavioral effects were measured before the explicit measures. Thus, it is not clear whether self-perception had an impact on the self-description, which seemed to be a plausible interpretation of the effects in Study 6. However, I assume that changes in the explicit self-description need indeed more elaborate conscious cognition than automatic behavioral effects. This seems plausible if one compares procedures where such effects have been found (e.g., Hogg & Turner, 1989; Mussweiler, 2001) to the priming procedures applied here.

A promising alternative to these explicit self-stereotyping measures would be an application of the implicit self-stereotyping measure developed by Dijksterhuis, Spears, et al. (1998), which was also applied by Mussweiler and Strack (2000b) and described in more detail in Chapters 3 and 4. Such a measure taps the accessibility of a self-stereotype, rather than its explicit applicability (Higgins, 1996; Lorenzi-Gioldi, 1991). In a study not included in this thesis, I already tried to use such a measure. Unfortunately, in this study, the manipulation did not result in reliable behavioral effects, and also no changes in the self-concept were measurable. A full test of the ABC requires further attempts to employ such measures. Evidence that automatic behavioral effects are indeed mediated by an association of the self with traits and behavioral representations has not been collected so far. Indeed, to my knowledge it would be the first evidence for a mediating process in the domain of automatic behavior.

A final limitation of the presented studies is that behavioral contrast was not demonstrated in comparison to a baseline condition. Studies 1 and 2 used factors that varied the stereotype of the outgroup, but did not include a baseline. In Study 3, the contrast explanation was post-hoc, and in Study 4, the contrast differed from the baseline as predicted, however not significantly. Therefore, it is not absolutely clear that behavioral contrast from outgroups can go beyond a mere extinguishing of the default assimilation effect; additional studies have to be conducted to address this question. However, even when contrast in comparison to a baseline was not demonstrated in this thesis, note that it is still legitimate to use the term contrast to denote these findings, even if in an absolute sense only the default assimilation is extinguished. This is because the two processes work in parallel (cf. Dijksterhuis et al., in press).

8.4 Speculations and Implications

As in previous findings in the literature, the presented results verify that the participants were not aware of the actual behavioral contrast. However, they were aware of the ingroup-outgroup distinction, and it is very likely that they were also aware of the age of the outgroup exemplars and (in Studies 1, 2) of the implied covariation between age and group membership. In the ABC model, I assumed that a comparison needs a propositional construal of the outgroup, and thus a conscious (noetic) awareness of it. However, we can speculate when awareness of the outgroup categorization is not necessary for an automatic contrast. Research suggests that the concept we is chronically associated with positive connotations (Perdue, Dovidio, Gurtman, & Tyler, 1990), and that its priming can result in automatic behavioral consequences like a facilitated approval of ambiguous statements of an unspecified source (Brewer & Gardner, 1996). Similarly, the concept they or an outgroup status may be chronically associated with difference and differentiation. Thus, unconscious activation of an outgroup status as an interobject relation seems possible, which in turn could influence further cognition (Higgins & Chaires, 1980). Similarly, groups that were in the past frequently categorized as outgroups may become chronically associated with that status, and thus immediately lead to contrast without much deliberate comparison (Wilder & Shapiro, 1984).

The presented results have implications for applications of findings of automatic behavior. It has been argued that automatic assimilation to social stereotypes serves social regulation and smoothes interactions in the social environment (Dijksterhuis, Bargh, et al., 2000; Chartrand & Bargh, 1999). 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, intergroup relations, and interactions on a group level. Our findings show that assimilation is rather unlikely after the perception of outgroups. 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; Smith et al., 1999).

As an example, consider the implications that Chen and Bargh (1997) drew from their findings. They subliminally flashed photographs of Blacks to White

participants, who interacted with a White partner. This priming of the stereotype of Blacks resulted in more aggressive behavior. Chen and Bargh argued that this situation might be similar to face-to-face contact with a Black person, where White persons might become more hostile because their stereotype of Blacks is activated and mimicked. The present results suggest that in such interactions, categorizing the Black persons as members of an outgroup may inhibit the assimilation effect or actually elicit a contrast, unless aggressive behavior is functional for other reasons. In short, it seems rather unwarranted to draw implications from mere stereotype priming to actual interactions with members of the stereotyped group, because a priming may activate the stereotype content without the we-they frame being salient in an intergroup contact. It is necessary to add though that this reasoning is rather a cautious note than a definite implication of the present research, because the behavioral contrasts reported in this thesis were found in an unnatural experimental situation, the minimal group paradigm. Consequently, the groups created in the course of the studies were to the participants not very important, new, and only situationally salient. However, it may well be that in situations with real groups, the processes observed here may be even stronger.

This brings us back to the question asked at the very beginning of this thesis: Why did the participants of Bargh et al. (1996) walk slower after being primed with the elderly stereotype? The arguments and findings presented in this thesis allow the conclusion that they did so because they did not categorize the elderly as an outgroup, and because they did not compare themselves to the elderly.

8.5 Conclusion

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. The present research has shown that in a salient intergroup context, members of an outgroup are not mimicked, but that the behavior is contrasted from their stereotypic features. In a more general context, this points to the usefulness of re-combining research on stereotypes and their automatic components with research on intergroup relations.

This recombination not only opens up interesting venues for research on intergroup relations, but also takes research on automatic behavior to new levels. Consider the

development of research on automatic behavior over the last five years: In 1996, Bargh et al. reasoned that automatic behavior was due to a direct link between perception and behavior. The intention was to show effects on behavior without much intervening cognitions, although the effects were of course assumed to be mediated by an associationistic (cognitive) process. In later publications, the term perception-behavior link appeared less frequently (e.g., Dijksterhuis & van Knippenberg, 1998), and the cognitive processes involved in the activation of behavioral representations were brought into focus. Now, the studies of Dijksterhuis, Spears, et al. (1998), Spears et al. (2001) and the present studies investigate social comparisons (i.e., cognitive processes) as causes of automatic behavior. Perception is still an important antecedent, but the theoretical focus has shifted.

It is my contention that a next step in research on automatic behavior should focus on the special role of the cognitive structure known as the self. When the self is compared to other individuals, or defined in terms of a shared group membership, its content changes. Consequently, the self can be thought of as a fluid and flexible. Social cognition research is currently exploring this topic with new methodological tools (Mussweiler, 2001; Mussweiler & Bodenhausen, in press; Smith et al., 1999). From my perspective, the next question is: When a concept is accessible, does it matter whether it is associated with the self or not? For example, does it matter whether stupidity is accessible as a consequence of thinking about supermodels, or whether it is accessible as a consequence of comparing the self to Albert Einstein and arriving at the proposition I am stupid? If the self enables "the individual to regulate himself or herself in relation to an ever-changing social reality" (Turner et al., 1994, p. 458), does it have a special role in the production of automatic behavior? Although I brought this dichotomy up from time to time throughout this thesis, it could not do more than lay the foundation for asking this question.

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SUMMARY

This thesis developed a model of Automatic Behavioral Contrast (ABC). The starting point for the theoretical argument were previous findings of automatic behavioral assimilation to stereotypes of social categories. Two prominent examples are the following effects: Activating the stereotype of the elderly leads to assimilation in the walking and reaction speed, i.e. slower behavior (Bargh et al., 1996; Dijksterhuis et al., in press; Kawakami et al., in press), and activating the stereotype of professors leads to better performance in a general knowledge task (Dijksterhuis & van Knippenberg, 1998). These effects occur outside of conscious awareness.

However, these results seem to contradict assumptions from theories on intergroup relations, which in general predict and find contrast from groups of which one is not a member (Turner et al., 1987). Building on the Selective Accessibility Model from Mussweiler and Strack (2000), the ABC model was developed. It argues that in addition to the assimilation effect after stereotype activation, a comparison process can lead to behavioral contrast effects. The comparison is expected to lead to contrast if it tests for dissimilarity. That is, if the comparing person actively thinks about differences between the self and the activated social category, behavior should be automatically contrasted from that category. Furthermore, the ABC model argues that a salient ingroup-outgroup distinction should suffice to start such a dissimilarity-testing comparison. This prediction was tested in 5 studies, before a corollary was tested in a sixth study.

Studies 1 and 2 created the necessary ingroup-outgroup distinction by inducing an artificial categorization. As predicted, it was found that the participants automatically contrasted from elderly members of the artificial outgroup by reacting faster in a subsequent reaction time task (Study 1). Study 2 supported the hypothesis that the salient categorization moderates between assimilation and contrast by manipulating it as a second factor.

Study 3 instructed the participants to compare directly to elderly persons. The results were not as predicted, since they seemed to suggest assimilation instead of contrast when the participants compared themselves to the elderly. However, additional data indicated that the effect might in fact be interpretable as a contrast, but on a different comparison dimension. Following up on this study, study 4 investigated the role of

the comparison process more directly, by manipulating its direction. As predicted from earlier theorizing (Mussweiler, 2001; Tversky, 1977), it was found that a comparison of the self to the elderly lead to contrast, while a comparison of the elderly to the self lead to assimilation.

Studies 5 and 6 investigated the effects of social stereotypes on intellectual performance. Study 5 found that only non-students assimilated to the stereotype of professors, while students did not. This finding is in line with the ABC model. Finally, study 6 concentrated on the impact of an ingroup instead of an outgroup categorization. Earlier theoretical models (Dijksterhuis, Spears, et al., 1998) argued that a distinct single exemplar elicits automatic behavioral contrast (e.g., thinking about Albert Einstein leads to worse intellectual performance). Modifying this assumption, it was found that a contrast from Albert Einstein was extinguished when he was categorized as an ingroup member.

The present arguments and findings contribute both to the literature on automatic effects of stereotype priming and to the literature on social categorization of self and others. They show that automatic and unconscious behavior is moderated by the structure of the social environment. Behavior is not automatically assimilated to a group if this group is an outgroup.

ZUSAMMENFASSUNG

In dieser Arbeit wurde untersucht, welchen Einfluss die Aktivierung sozialer Stereotype auf automatisches Verhalten hat, und wovon dieser Einfluss moderiert wird. Die zentrale These des entwickelten Modells lautet, dass Verhalten automatisch und unbewusst von Stereotypen solcher Gruppen kontrastiert wird, die als Fremdgruppen kategorisiert werden. Kontrast bedeutet in diesem Fall, dass das Gegenteil desjenigen Verhaltens ausgeführt wird, das für die Fremdgruppe typisch ist.

Grundlage für das entwickelte theoretische Modell waren Ergebnisse, die automatische und unbewusste Assimilation (also keinen Kontrast!) an soziale Stereotype zeigten, nachdem diese Stereotype mental aktiviert wurden. So ist belegt, dass die Aktivierung des Stereotyps alter Menschen eine Verlangsamung von Schritt- und Reaktionsgeschwindigkeit zur Folge hat (Bargh et al., 1996; Dijksterhuis et al., im Druck), und dass die Aktivierung des Stereotyps von Professoren zu besseren Leistungen in einem Allgemeinwissenstest führt (Dijksterhuis & van Knippenberg, 1998). Der Einfluss der Stereotypaktivierung auf das Verhalten geschieht außerhalb der Aufmerksamkeit und ist nicht bewusst.

Die kognitionspsychologische Grundlage automatischen Verhaltens ist in der gemeinsamen Repräsentation von Wahrnehmungs- und Verhaltensinhalten zu suchen. Automatisches Verhalten kann entstehen, weil die mentalen Repräsentationen, die während der Wahrnehmung eines Stereotyps aktiviert werden, Verhaltensrepräsentationen voraktivieren, die später eigenes Verhalten steuern (Bargh et al., 1996).

Auffällig ist allerdings, dass die Teilnehmer in den Experimenten zu automatischen Verhaltenseffekten nach Stereotypaktivierung an Gruppen assimilieren, denen sie gar nicht angehören. So ahmen junge Menschen das Verhalten alter Menschen nach. Das widerspricht Beobachtungen und Theorien zu intergruppalen Beziehungen, die in bewusst gesteuertem Verhalten bei einander antagonistisch gegenüberstehenden Gruppen Kontrasteffekte finden. Eine Analyse der genauen Bedingungen in den oben genannten Studien, in denen automatische Assimilation an fremde Stereotype gefunden wurde, zeigte, dass diese Versuche es offenbar vermieden, eine antagonistische Intergruppenbeziehung herzustellen. Das führte zu der Hypothese,

dass die Induktion eines sozialen Vergleichs der eigenen Person (des Selbst) mit einer antagonistischen Fremdgruppe zu einem Kontrast in automatischem Verhalten führen sollte.

Zur genaueren Spezifizierung dieser Hypothese wurde das Selective Accessibility Model von Mussweiler und Strack (2000) hinzugezogen. Auf seiner Grundlage wurden die Hypothesen aufgestellt, dass eine antagonistische Intergruppenbeziehung zu einem sozialen Vergleich führt, in dem als Folge einer Unähnlichkeitsvermutung speziell über Unterschiede zwischen der eigenen Person und der Fremdgruppe nachgedacht wird. Dieses Nachdenken über Unterschiede führt zur verstärkten kognitiven Zugänglichkeit stereotyp-inkonsistenter Verhaltensrepräsentationen, die ihrerseits Kontrast in automatischem Verhalten zur Folge haben. Diese Hypothese wurde in vier Studien überprüft, bevor eine fünfte Studie ein Korollar der Hypothese testete.

In zwei ersten Studien (Studien 1a, 1b) wurden die Versuchsteilnehmer mit Hilfe einer künstlichen Kategorisierung einer Gruppe zugeteilt, die sich von einer anderen fremden Gruppe unterschied. Im Anschluss wurden die Teilnehmer gebeten, sich einen Eindruck von fünf angeblichen Mitgliedern der Fremdgruppe zu machen, die nacheinander dargeboten wurden. Diese fünf Personen waren, abhängig von der zufällig zugewiesenen Bedingung, entweder alt oder jung. Danach wurde die Reaktionsgeschwindigkeit der Teilnehmer in einer Wortentscheidungsaufgabe gemessen. Frühere Untersuchungen hatten gezeigt, dass eine solche Darbietung zur Assimilation an das Altersstereotyp führt, so dass die Wahrnehmung älterer Personen langsamere Reaktionen zur Folge hat (Dijksterhuis et al., im Druck). Im Gegensatz zu diesen Ergebnissen zeigte die meta-analytisch zusammengefasste Evidenz der Studien 1a und 1b, dass die Teilnehmer schneller reagierten, nachdem die älteren Fremdgruppenmitglieder dargeboten wurden, als wenn jüngere Fremdgruppenmitglieder zu sehen waren. Das heißt, dass die Teilnehmer ihre Reaktionsgeschwindigkeit automatisch vom Stereotyp der Fremdgruppe kontrastierten.

In Studie 2 wurden dieses Ergebnis repliziert. Zusätzlich wurden Bedingungen eingeführt, in denen die fünf dargebotenen Personen nicht kategorisiert waren. In diesen Bedingungen wurde also das Altersstereotyp aktiviert, ohne dass es gleichzeitig mit der Fremdgruppe verknüpft wurde. Die Ergebnisse zeigten

tatsächlich eine signifikante Interaktion zwischen den Faktoren Alter der Personen und ihrer Kategorisierung. Wie in Studie 1 führten ältere Personen zu schnelleren Reaktionen, wenn sie als Fremdgruppenmitglieder kategorisiert waren; wurden sie aber nicht kategorisiert, verursachten sie langsamere Reaktionen. Dieses Ergebnis belegt somit die kausale Rolle der Fremdgruppenkategorisierung in der Moderation zwischen Assimilation und Kontrast.

In diesen Studien wurde die Kategorie alter Menschen nicht selbst als Fremdgruppe angesehen; statt dessen wurde eine künstliche Kategorie mit älteren Personen stereotypisiert. In der folgenden Studie 3 sollte überprüft werden, ob Kontrast auch dann erfolgt, wenn alte Menschen selbst Ziel eines sozialen Vergleiches werden. Dazu wurden drei Bedingungen verglichen: eine Bedingung, in der nur das Stereotyp aktiviert wurde, eine Bedingung, in der ein sozialer Vergleich mit mehreren alten Personen induziert wurde, und eine Kontrollgruppe ohne Bezug zu alten Menschen. Verhaltenseffekte wurden wieder anhand der Reaktionsgeschwindigkeit gemessen. Überraschenderweise zeigt sich, dass die Versuchsteilnehmer signifikant langsamer arbeiteten, nachdem sie sich mit älteren Menschen verglichen hatten, was der Hypothese widerspricht; dagegen wurde kein Unterschied zwischen der Kontrollgruppe und der einfachen Aktivierung des Altersstereotyps gefunden. Die Ergebnisse einer nachfolgenden Selbstbeschreibungsaufgabe deuten allerdings darauf hin, dass die Versuchsteilnehmer, und besonders die Männer unter ihnen, sich in der Vergleichsbedingung von dem Altersstereotyp "penibel und sorgfältig" abgrenzten, und sich danach als besonders locker charakterisierten. Diese Lockerheit korrelierte hoch mit den langsamen Reaktionen, die somit post-hoc doch als Verhaltenskontrast interpretiert werden können.

Studie 4 testete die oben dargestellte Hypothese, dass die Ähnlichkeitsvermutung, mit der ein sozialer Vergleich begonnen wird, über seine Folgen für automatisches Verhalten entscheidet. Dazu wurde eine alternative Manipulation benutzt, von der bekannt ist, dass sie die Ähnlichkeitsvermutung beeinflusst: die Richtung des Vergleichs. So fühlen wir uns in der Regel anderen Menschen ähnlicher, wenn wir die anderen mit uns vergleichen, als wenn wir uns selbst mit den anderen vergleichen: Der Andere ist mir ähnlich, aber ich bin dem Anderen unähnlich (Mussweiler, 2001). In Studie 4 wurde überprüft, ob dieser Effekt auf die Ähnlichkeitswahrnehmung auch automatisches Verhalten als Folge des Vergleich

beeinflusst. In zwei Bedingungen wurden die Teilnehmer gebeten, 16 ältere Menschen mit der eigenen Person zu vergleichen, oder die eigene Person mit den 16 älteren Menschen zu vergleichen. Tatsächlich reagierten die Teilnehmer in einem anschließenden Reaktionszeittest in der ersten Bedingung langsamer als in der letzteren.

All diese Studien untersuchten Kontrast in automatischem Verhalten nach der Wahrnehmung einer Gruppe von Personen. Die entsprechenden Befunde widersprechen früheren theoretischen Modellen, die einen solchen Kontrast nur nach der Wahrnehmung einer distinkten einzelnen Person vorhersagten. So fanden Dijksterhuis, Spears et al. (1998), dass Nachdenken über Albert Einstein zu einem Kontrasteffekt in der Leistung in einem Allgemeinwissenstest führte, d.h. schlechtere Leistungen verursachte. Das zentrale Argument meines Modells ist, dass die wahrgenommene Gruppenzugehörigkeit zwischen Assimilation und Kontrast moderiert. Dementsprechend lautet ein Korollar der Eingangshypothese, dass der Kontrast nach der Wahrnehmung einer distinkten einzelnen Person aufgehoben werden sollte, wenn diese Person der Eigengruppe, also der selben Gruppe wie der Wahrnehmende, angehört. In der letzten dargestellten Studie ergab sich tatsächlich, dass wie in früheren Studien Nachdenken über Albert Einstein zu schlechteren Leistungen führte, wenn dieser unkategorisiert dargeboten wurde. Wurde er allerdings als Mitglied einer (künstlichen) Eigengruppe eingeführt, verschwand der Kontrasteffekt.

Zusammengenommen zeigen die berichteten Studien, dass entgegen früheren theoretischen Modellen die Wahrnehmung einer sozialen Kategorie und die Aktivierung ihres Stereotyps zu Kontrasteffekten in automatischem Verhalten führen kann, wenn diese soziale Kategorie als Fremdgruppe angesehen wird. Umgekehrt kann die Kategorisierung einer distinkten einzelnen Person als Eigengruppenmitglied Kontrasteffekte verhindern. Die soziale Kategorisierung von wahrgenommenen Gruppen und ihren Mitgliedern moderiert also zwischen Assimilation und Kontrast.

APPENDIX

The following two tables give an overview of studies on automatic behavioral effects of construct and stereotype priming.

Table 1. Effects of Construct Primes, Excluding Stereotypes

Authors	Study	Prime	Behavior	Effect Type
Bargh, Chen, & Burrows (1996)	1	scrambled sentences priming rudeness	interrupting a conversation	assimilation
Darley & Batson (1973); Greenwald (1975)	1	reading and thinking about parable of Good Samaritan	helping sick person	assimilation, moderated to small effect by conflicting goal
Dijksterhuis & van Knippenberg (1998)	4	thinking about traits intelligence vs. stupidity	Trivial Pursuit performance	assimilation
Carver et al. (1983)	2	scrambled sentences priming aggression	shocks delivered to a learner	assimilation
Epley & Gilovich (1999)	1, 2	scrambled sentences priming conformity vs. nonconformity vs. control	agreement with others	assimilation to conformity prime, no effect of nonconformity prime

(table continues)

Hertel & Fiedler (1998)	1, 2	memorization of words related to cooperation or competition	resource allocation between self and stranger	assimilation to positive cooperation and contrast from negative competition prime
Hertel & Kerr (in press)	1	memorization of words related to loyalty vs. fairness*	loyalty with ingroup members resulting in ingroup favoritism vs. equality	assimilation
Macrae & Johnston (1998)	1, 2	scrambled sentences priming helpfulness	picking up dropped pencils	assimilation, moderated to null effect by impediment (1) and conflicting goal (2)
Wilson & Capitman (1982)	1, 3	prose passage with "boy meets girl" script	flirting	assimilation, moderated to null effect by time

Note. *The priming of loyalty used both positively valued connotations of loyalty and negatively valued connotations of disloyalty; the fairness priming was similar. Behavior assimilated to the positively valued concept.

Table 2. Studies on Automatic Behavioral Effects of Stereotypes

Authors	Study	Prime	Behavior	Effect Type
Bargh et al. (1996)	2a, 2b	scrambled sentences on elderly stereotype	walking speed	assimilation
Dijksterhuis & van Knippenberg (1998)	1, 2, 3, 4	imagination of typical professor/ hooligan	knowledge task	assimilation, moderated to null effect by short duration of priming
Dijksterhuis, Spears, et al. (1998)	1	imagination of typical professor vs. supermodel	knowledge task	assimilation, moderated to contrast by additional exemplar
Dijksterhuis, Spears, et al. (1998)	2a, 2b	scrambled sentences on elderly (plus judgmental task) with/ without exemplar	walking speed	no assimilation for mere stereotype, contrast after exemplar
Dijksterhuis & van Knippenberg (1999)	1	scrambled sentences prime on politicians	long-windedness in essay	assimilation, moderated to null effect by self-awareness
Dijksterhuis & van Knippenberg (1999)	2	imagination of typical professor/ hooligan (2)	knowledge task	assimilation, moderated to null effect by self-awareness

(table continues)

Dijksterhuis, Aarts, et al. (2000)	1, 2	LDT with subliminally presented words related to the elderly	recall of LDT target words	assimilation, mediated by strength of association between stereotype label and forgetfulness in 2
Dijksterhuis, Bargh, et al. (2000)	2, 3	questions about the elderly (2), subliminal priming in LDT (3)	recall of environ-mental objects (2) or LDT targets (3)	assimilation (less recall), moderated to null effect when made aware of possible priming effect
Dijksterhuis et al. (in press)	1, 3	photos of 5 elderly persons	speed in LDT	assimilation, moderated to contrast by single exemplar (1), moderated to null effect by accuracy motivation (3)
Kawakami et al. (in press)	1, 2, 3	categorization of persons into young and old	speed in LDT	assimilation, not mediated by stereotype activation
Levy (1996)	1,2	subliminal flashing of category labels "old" plus senility vs. wisdom associations	memory perfor-mance	elderly participants assimilate to concepts; no effects or slight contrast for young participants

(table continues)

Macrae et al. (1998)	4	reference to Michael Schumacher	reading speed	assimilation
Musch & Klauer (2001)	1	imagination of typical professor/ hooligan	general knowledge test	assimilation, especially by male participants
Pendry & Carrick (2001)	1	photo and info on punk vs. bank accountant	conformity in Ash-like paradigm	assimilation (less conformity after punk prime)

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EHRENWÖRTLICHE ERKLÄRUNG

Ich erkläre hiermit, dass mir die Promotionsordnung der Fakultät für Sozial- und Verhaltenswissenschaften bekannt ist.

Ferner erkläre ich, dass ich die vorliegende Arbeit selbst ohne unzulässige Hilfe Dritter angefertigt habe. Alle von mir benutzten Hilfsmittel, persönliche Mitteilungen und Quellen sind in der Arbeit angegeben. Bei der Auswahl und Auswertung folgenden Materials haben mir die nachstehend aufgeführten Personen in der jeweils beschriebenen Weise geholfen:

1. Jan Crusius arbeitete unentgeltlich an der Erstellung der Untersuchungsmaterialien für Studie 4 mit.
2. Jakub Glowka korrigierte gegen Entgelt die englische Grammatik und Rechtschreibung der Dissertation.

Weitere Personen waren an der inhaltlich-materiellen Erstellung der Arbeit nicht beteiligt. Insbesondere habe ich hierfür nicht die Hilfe eines Promotionsberaters in Anspruch genommen und Dritte haben weder unmittelbar noch mittelbar geldwerte Leistungen von mir für Arbeiten erhalten, die im Zusammenhang mit dem Inhalt der vorgelegten Dissertation stehen.

Die Arbeit wurde weder im In- noch Ausland in gleicher oder ähnlicher Form einer anderen Prüfungsbehörde vorgelegt. Weder früher noch gegenwärtig habe ich an einer anderen Hochschule eine Dissertation eingereicht.

Ich versichere, dass ich nach bestem Wissen die reine Wahrheit gesagt und nichts verschwiegen habe.

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Ort, Datum Unterschrift