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## INTRODUCTION

“White men can't jump”, “Women can't do math”, “Blonds are dumb”, “Women can't drive a car”. Of course we would like to dismiss these stereotypes as irrelevant and unfair and stop thinking about them. However, recent research suggests that in test situations, negative stereotypes sometimes act as a self fulfilling prophecy – causing the underperformance they are claiming. For example, in a study by Spencer, Steele and Quinn (1999), women scored lower than men in a math test. However, when the same test was introduced as gender fair, they performed equally to men. This basic finding, named *stereotype threat*,<sup>1</sup> has since been replicated several times with different groups and various stereotypes (for a review, see Steele, Spencer, & Aronson, 2002).

This research thus has discovered a social psychological mechanism which can lead to performance differences between groups of equal abilities. Such a mechanism could have a great impact on the opportunities of individuals from different groups. Performing poorly because of activated negative stereotypes can lead to lower trust in one's abilities, which in turn affects test performance and career choices. For example, women often score lower than men in math tests (Armstrong, 1981; Hyde, Fennema & Lamon, 1990). However, this gap only develops during high school times and is not yet evident in the elementary school years (Hyde et al., 1990). The role of stereotypical expectations in this development becomes quite obvious when one considers that mothers tend to underestimate the mathematical abilities of their sixth grade daughters and overestimate that of their sons (Frome & Eccles, 1998), that mothers' perceptions of their children's abilities have a greater influence on children's perceptions of their own abilities than do past grades (Jacobs & Eccles, 1992), and that the lower expectations of mothers for their daughters cause that the daughters take fewer math courses (Eccles & Jacobs, 1986). Social psychological processes can thus account for differences that are often regarded as based on biological differences.

The detrimental effects of negative self-stereotypes on performance might be among the most disturbing and saddest phenomena discovered by social psychologists over the last two decades of research on stereotypes. It looks like a tragic vicious circle: The victims of discrimination actually underperform as expected by prejudiced beliefs and thereby confirm and perpetuate the stereo-

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<sup>1</sup> Throughout this thesis, the term *stereotype threat effect* will be used to refer to lower performance of a group when a negative self stereotype is activated relative to when it is not activated. This term does not imply any particular mediator of the effect.

type. Psychologists have struggled for a long time to make tests and job decisions fair to all groups. In the course of these efforts, more and more subtle and unexpected ways by which stereotypic expectations influence applicants as well as decision makers have been discovered and dealt with. Now that the detrimental impact of activated negative stereotypes on performance has been discovered, we have to understand its causes in order to design ways to counteract it. The present thesis is meant as a contribution to this effort.

The question that is addressed here is: What is the psychological mechanism behind this pervasive effect? The theory most often applied to explain these effects is *stereotype threat theory* (Steele, 1997). It posits that performance decrements stem from the felt threat of conforming to the negative stereotype. It further assumes that this underperformance only occurs for individuals for whom the performance domain is self-relevant. And indeed, several studies indicate that stereotype threat effects only occur when an individual cares about the performance domain (e.g., Aronson et al., 1999; Stone, Lynch, Sjomeling, & Darley, 1999). However, there is little evidence in the literature that activated stereotypes indeed lead to an experience of threat as indicated by self-reported anxiety or worry and that this threat mediates the effects.

Accordingly, other mediators should be considered. One disadvantage of stereotype threat theory lies in its limited applicability. When trying to explain a specific effect such as the *stereotype-threat effect*, it is preferable to first look for applicable general theories that have proven useful over a broader range of situations. This way something about general principles underlying psychological phenomena can be learned and, at the same time, these general theories can be put at a test. Therefore, in the present work I have decided to focus on general theoretical approaches and consider their potential usefulness for explaining stereotype threat effects. Specifically, I will examine test anxiety and social facilitation research, the ideomotor approach and self-regulatory mechanisms.

The role of anxiety and arousal in influencing performance outcomes is one of the oldest topics in social psychology, dating back to the discovery of the *social facilitation effect* by Triplett in 1898. In this research program, situational influences on performance have been studied extensively, both by themselves (*social facilitation*) and in interaction with person variables (*test anxiety*). It is therefore promising to compare the situations studied by these researchers to situations studied in the stereotype threat domain. Further, the question will be addressed what can be learned from these research traditions about the mediating mechanisms of such situational influences on performance.

One approach recently advanced to explain stereotype threat effects (Dijksterhuis & Bargh, 2001; Wheeler, Jarvis & Petty, 2001; Wheeler & Petty, 2001) results from subsuming stereotype threat effects to ideomotor effects.

Activated stereotypes are just a special case of activated knowledge, and performance is a special case of behavior. There exists a vast literature showing that activated knowledge does change behavior in the direction of the knowledge, thus leading to assimilation to the activated knowledge structure (for a review, see Dijksterhuis & Bargh, 2001). One problem is, however, that ideomotor effects are often expected and found independent of whether the individual belongs to the group whose stereotype is activated (e.g. Bargh, Chen & Burrows, 1996). Stereotype threat effects, on the other hand, occur exclusively for the stereotyped group and not for other groups. In the theoretical part of this thesis, it will be discussed whether the ideomotor approach can serve as a potential account for stereotype threat effects.

Another approach results from adopting a self-regulatory perspective on stereotype threat effects. It is conceivable that activated stereotypes change the expected probability of success and failure and therefore self-efficacy (Bandura, 1997) and motivational strength (Atkinson, 1974b). These explanations for stereotype threat effects seem straightforward. However, empirically, few studies of the ones investigating this possibility have found a relationship between expectancy or motivation and stereotype threat effects. The reported null effects might be attributable to low reliability of the utilized self-report measures as well as to the absence of a relationship. They might then indicate that the effects of activating stereotypes on expectancy and motivation are more variable than formerly expected. For example, it is also possible that an individual's expectations are sometimes contrasted from the activated stereotype (see Mussweiler, 2003) and that the possibility to disprove the stereotype is sometimes motivating rather than demotivating. A further complication arises from the fact that for complex tasks, the relation between motivation/effort and performance becomes much weaker (Locke & Latham, 1990) and sometimes even negative (e.g., Heckhausen & Strang, 1988). In sum, lowered expectations and motivation might be responsible for some but probably not all documented stereotype threat effects.

Recently, a new perspective on self-regulation has been advanced: regulatory focus theory (Higgins, 1997; 1999). This perspective posits that self-regulatory processes do not only influence motivational strength but also inclinations towards approach or avoidance strategies. Important in the present context is the prediction that situations involving gains and non-gains, or maximal goals, lead to an inclination for approach strategies (a *promotion focus*), whereas situations involving losses or non-losses lead to an inclination for avoidance strategies (a *prevention focus*). Activated negative stereotypes, then, imply potential loss (conforming to the negative stereotype) or non-loss

(showing that the stereotype is not true of oneself) and should therefore induce a prevention focus.

Consequently, the activation of negative stereotypes should lead to an inclination towards avoidance strategies. Because the existing examinations of stereotype threat effects have not been designed to test for different strategic tendencies, it is not possible to either accept or discard this notion on the basis of the existing literature. Therefore, the empirical part of this thesis is designed to put this hypothesis to a test. Specifically, I propose that negative stereotypes lead to slow and accurate performance when accuracy is in the service of avoiding errors of commission.

Importantly, these self-regulatory mechanisms should not only be instigated by the activation of negative stereotypes but also by the activation of positive stereotypes. Thus, apart from offering an explanation for stereotype threat effects, applying regulatory focus theory can also be used to generate new hypotheses for the effects of activating positive stereotypes. More specifically, activated positive stereotypes imply potential gain (performing well as predicted by the stereotype) or non-gain (not performing quite as well) and should therefore induce a promotion focus. Consequently, the activation of positive stereotypes should lead to an inclination towards approach strategies as evidenced by faster performance and more errors of commission.

In sum, activated stereotypes can undermine performance. However, it is still not evident which underlying processes mediate these effects. Given the various aspects of stereotypes, it seems likely that several mechanisms contribute to the described performance deficits. In the theoretical part, the mechanisms that have been proposed as potential mediators of stereotype threat effects will be presented and discussed. Furthermore, the elicitation of regulatory foci by activated negative as well as positive self-stereotypes will be proposed as an additional mediational process. More specifically, I test the hypothesis that the activation of a negative stereotype induces a prevention focus and leads to slow and accurate performance while the activation of a positive stereotype induces a promotion focus and leads to fast and less accurate performance.

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## THEORETICAL PART

The finding that activated self-stereotypes can influence performance is by now a well established phenomenon. The majority of research in the field has concentrated on the effect of activating negative self stereotypes, although stereotype activation effects on performance have been shown for positive as well as negative stereotypes (e.g., Brown & Josephs, 1999) and for self as well as other stereotypes (e.g. Dijksterhuis & van Knippenberg, 1998). The reason for this concentration on negative self-stereotypes probably lies in the practical relevance of this research. If features of the test situation are indeed partly responsible for the underperformance of certain groups then there is hope that they can be changed once sufficiently understood. This is probably the main reason why the research by Steele and Aronson (1995) showing performance decrements due to situationally activated negative stereotypes (the *stereotype threat effect*) inspired a plethora of new studies investigating this phenomenon.

After a decade of research on the phenomenon of stereotype threat, a considerable amount of empirical evidence has accumulated. Stereotype threat effects have been shown in a variety of domains, however, they are by no means universal. Now it seems time to move on to the next step, namely the investigation of the underlying processes. In the theoretical part, after introducing stereotype threat theory, the findings on stereotype threat phenomena will be reviewed in the context of a number of related theories and phenomena. These are *test anxiety*, *social facilitation*, the *ideomotor principle* and *self-efficacy*. Drawing on these related literatures, potential mediators will be identified and their relevance for stereotype threat effects will be judged on the basis of the available evidence. A second focus will be the available findings concerning situational influences on performance strategies. A *regulatory focus* account for these effects will be proposed which will serve as a framework to deduce specific hypotheses for the studies.

### Stereotype Threat and Other Situational Influences on Performance

#### *Stereotype Threat*

If you bring members of a negatively stereotyped group in an achievement situation where the stereotype could be applied, they often dramatically underperform if they believe their ability in that particular domain is measured. This has first been shown by Steele and Aronson (1995) in their seminal work on the effect of stereotype activation on intellectual test performance of African Americans. In a series of studies, Blacks performed considerably poorer than

Whites on a standardized test when it was presented as diagnostic of their abilities or when they indicated their race before taking the test. But when the same test was framed as a simple problem-solving task they performed about as well as Whites.<sup>2</sup> The authors argued that both - presenting a test as diagnostic of abilities and rendering their race accessible in the test situation - activates the stereotype of lower intellectual performance for African Americans, and that this fact led to the worse performance.

Following this initial demonstration, research on stereotype threat has shown performance decrements due to various self stereotypes, such as women's math ability (Spencer, Steele & Quinn, 1999), white men's poor natural athletic ability (Stone et al., 1999), women's poor negotiation skills (Kray, Thompson & Galinsky, 2001), or poor intellectual ability of individuals with a low socioeconomic status (Croizet & Claire, 1998). Stereotype threat effects have been shown in more than thirty published studies. Many of these have included some measures designed to tap the mediation of the effect and will be reviewed in the sections dealing with specific mediators.

According to stereotype threat theory by Steele (1997), the underperformance in a situation where a negative self stereotype is activated stems from the keenly felt threat triggered by the possibility of conforming to the stereotype or of being treated and judged in terms of it. Steele argues that "stereotype threat occurs when one recognizes that a negative stereotype about a group to which one belongs is applicable to oneself in a particular situation. This is threatening ... because one then realizes that one could be seen or treated in terms of that negative stereotype" (Steele, 1998, p. 680). However, according to Steele, one need not believe the stereotype or be worried that it may be true for oneself in order to experience this threat.

Furthermore, the theory states that stereotype threat only occurs when an individual is highly identified with the performance domain, i.e. when performance in that domain is self-relevant. The experienced threat then undermines performance by setting up a frame for interpreting any performance frustration in the light of the stereotype. According to Steele (1998), "the student must care enough about the performance domain to be upset by the prospect of being negatively stereotyped in it. This emotional arousal, in turn, disrupts performance" (p.681).

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<sup>2</sup> It has to be noted, however, that these results were obtained when the general achievement level (SAT-scores) was statistically controlled. That is, the performance of each group relative to their average SAT score did not differ when no stereotype was activated. When the stereotype was activated, however, Whites performed about as well as without stereotype activation while Blacks underperformed relative to their SAT-scores.

In the long run, those who have internalized the stereotype to the point of doubting their own ability, Steele argues, will eventually disidentify with the domain which means that the stereotyped domain is dropped as a self-definition. Thus, they simply do not care enough about their performance any more to be threatened by the stereotype. The long term consequences are out of the scope of the present thesis.

What are the mediating processes assumed by Stereotype Threat Theory? Although Steele does not present a complete process model of stereotype threat, the following course of events can be inferred from his assumptions: First, the activation of a negative stereotype raises the fear of discrimination or stereotypical judgments (presumably by the test administrator or the test scorer), but only for those who care about the performance domain. Then, during the test, whenever difficulties are encountered, the test taker is reminded of the stereotype and fears to confirm it. Alternatively, the prospect of being discriminated against or judged in terms of the stereotype might directly upset the test taker and lead to high arousal. Steele mentions several possible mediating mechanisms how this emotional distress and pressure can disrupt performance: interfering anxiety, reticence to respond, distracting thoughts and self-consciousness (Baumeister & Showers, 1986; Geen, 1991; Lord & Saenz, 1985; Sarason, 1980; Wine, 1971). The work he cites deals with suboptimal performance in test situations from two perspectives: One is investigating the effects of individual differences in test anxiety and the other focuses on the effects of situational pressures such as the presence of an audience or a competitive situation.

In the next two chapters, these two research traditions will be reviewed with regard to the mediating mechanisms of performance impairments they have found. The review of the literature on situational pressures will be limited to the research on *social facilitation* because it is the most relevant in the context of academic performance. Empirical evidence testing the proposed mediators in stereotype threat studies will be reviewed at the end of each chapter.

### *Test Anxiety Research*

According to Steele, anxiety raised by the threat of being seen or treated in terms of a negative stereotype is one of the prime candidates for mediating stereotype threat effects. Therefore, this literature will be briefly reviewed in the following sections. Going back to Mandler and Sarason (1952), test anxiety has been defined as a disposition to show task irrelevant reactions in evaluative situations. Accordingly, most studies did not employ state test anxiety measures but rather trait measures. Thus, test anxiety per se can not be a mediator of

stereotype threat effects. However, it is conceivable that certain conditions such as the activation of negative stereotypes could be especially conducive to test anxious reactions even in individuals who are not usually affected by them. The next sections will therefore describe what these task irrelevant reactions are and what effects they have, and whether there is any evidence that they mediate stereotype threat effects.

### *Worry or Emotionality?*

Test anxiety can disrupt performance. However, given that test anxiety is such a multifaceted construct, it remains unclear which of these facets has this effect. More specifically, is it the distraction due to worries raised by the test situation or does the emotional experience of anxiety, the nervousness and the physiological arousal disrupt performance?

Researchers in the field have, for a long time, adhered to Mandler and Sarason's (1952) conceptualization and measure of test anxiety. These authors proposed that dispositional test anxiety leads to learned reactions when cues signal an evaluative situation. They listed six such reactions: (a) feeling of inadequacy, (b) helplessness, (c) anticipation of punishment, (d) anticipation of loss of self esteem, (e) increased somatic activity and (f) implicit attempts to leave the situation. The authors also published a questionnaire intended to measure these task irrelevant reactions, which has been used in many of the studies on test anxiety. Not surprisingly, then, many researchers have noted a greater prevalence of task irrelevant reactions among test anxious individuals. For example, Nottelham and Hill (1977) found that high test anxious children glanced away from their task more often than low-anxious children and that they also glanced more often at what the experimenter was doing. Such reactions, of course, are likely to disrupt performance because they involve a distraction from the task to be solved.

In test anxious adults, cognitive interference is found much more often than other forms of distraction. In one study (Sarason and Stoops, 1978), participants high, medium or low in test anxiety first performed an irrelevant task, then waited for 4 minutes and then worked on an anagram task described as either diagnostic of intelligence or not. After task completion, they indicated on questionnaires how long they felt they had waited, how long they had worked on the task and how often they had thought about various task irrelevant aspects while performing. Results showed that only those high in test anxiety in the diagnostic test condition differed from the other participants in that they gave higher time estimates for the waiting as well as for the performance period, solved less anagrams and indicated more cognitive interference. These preoccupations, the authors contend, likely made time seem to pass very slowly

for test anxious individuals. Together, these results suggest that worry or rumination is a likely mediator of the effects of test anxiety on performance.

More direct evidence for the position that worry has a greater influence on performance than emotionality comes from studies in which these two components were measured separately.<sup>3</sup> The general pattern of results in these studies was that while both subscales were positively and substantially correlated (with a range from .55 to .76), the worry subscale consistently predicted performance outcomes while the emotionality subscale sometimes did and sometimes did not predict performance (see Deffenbacher, 1980, for a review). Moreover, when both were entered jointly, the effect of worry on performance remained significant while that of emotionality did not.

What can be learned from this for the influence of situational pressures? If trait test anxiety impairs performance because it leads to state test anxiety and worries in a test situation, negative stereotypes might impair performance through the same mechanism because they make failure subjectively more likely. In addition, state anxiety can also be elicited because negative stereotypes make failure in the test more aversive for the individual. This might occur because confirming the negative stereotype threatens to damage the reputation of the whole group or because it would question the assumptions and decisions of the individual (for example of a woman to study math). Thus, if negative stereotypes make failure more likely or more negative, they could elicit state test anxiety. However, from the research about test anxiety, it remains unclear whether distracting worries are a general reaction when negative outcomes are feared in a test situation or whether they occur only in individuals with a propensity to show this reaction (i.e. those high in trait test anxiety), possibly because of poor self-regulatory strategies. Next, I will address the question in which situations these ruminations most likely occur and compare these to the situations that are conducive to stereotype threat effects.

### *Moderators of Test Anxiety Effects*

Test anxiety does not always lead to performance decrements. One variable consistently found to moderate test anxiety effects is the test description as evaluative or not. For example, Sarason (1972) compared the effects of five different instructions for high and low test anxious individuals on the number of correct reactions after repeated learning of verbal material. Test anxiety was

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<sup>3</sup> Examples for items assessing worry are: 'thinking how much brighter others are' or 'thinking about the consequences of failure' and for items assessing emotionality: 'heart beating fast' or 'so nervous cannot remember facts'.

measured by a questionnaire designed to tap the above described reactions. Individuals with particularly high or low anxiety scores were selected to participate in the experiment. Instruction (1) presented the task as diagnostic of intelligence, (2) reassured the test taker that the task was difficult and he/she should not worry about the results, (3) told the test taker that the learning curve and not the individual performance was relevant, (4) told the test taker that the individual performance was irrelevant and that he/she should use the task as an opportunity to practice and (5) just explained the task. Individuals low in test anxiety performed best when the task was described as diagnostic (instruction 1) and worst when individual performance was described as irrelevant (instruction 3). By contrast, those high in test anxiety performed best when the task was described as non diagnostic but the test taker was encouraged to see it as an opportunity (instruction 4) and worst when it was described as diagnostic (instruction 1). The levels of best and worst performances did not differ between groups. Thus, both groups profited from some extra motivation to perform at their best but for non anxious individuals, test diagnosticity served as such a motivator while it undermined performance for anxious individuals.

Another important moderator of the effects of test anxiety on performance is the difficulty of the task. Early studies, using lists of paired associates with differing degrees of difficulty, have found that high-anxious individuals learn easy word pairs more rapidly than low-anxious individuals and that low-anxious individuals learn difficult pairs more rapidly than high-anxious individuals (Spence & Spence, 1966). Morris and Liebert (1969) varied test difficulty and time constraints (with vs. without time limit) and found that individuals high in the worry subscale of their questionnaire underperformed especially in difficult tasks with time limit. The emotionality subscale did not correlate with the test results. However, the reason for these effects might not be task difficulty per se but rather anticipation of failure (which is more likely in difficult tasks). One experiment by Weiner and Schneider (1971) tested these two explanations against each other by separating task difficulty from performance result. Participants learned either difficult or easy pairs of trigrams, and they received either success or failure feedback after each trial. Test anxious individuals needed less trials to learn the pairs when receiving success feedback than when receiving failure feedback, independent of task difficulty. Non anxious individuals learned the difficult associates faster with failure feedback, and they needed more trials to learn them with success feedback than anxious individuals. These results show that it is not task difficulty per se but rather the anticipation of failure that leads to performance impairments in test anxious individuals (see also Heckhausen, 1989). Their better performance in easy tasks/with success feedback might then be an indicator for higher motivation.

In sum, these findings show that test anxiety only has detrimental effects on performance when the test is described as diagnostic of ability and when it is difficult. Furthermore, it has been found that failure feedback can increase the detrimental effect of test anxiety while success feedback can buffer against it. Applied to stereotype threat, it is conceivable that for test anxious individuals, negative stereotypes have the same consequences as task difficulty or failure feedback, that is, that they make failure seem more likely to the individual. Therefore, in test anxious individuals, negative stereotypes could increase the detrimental effects of test anxiety on performance. But what exactly are these detrimental effects? This question will be addressed in the next section.

### *Effects of test anxiety: Attentional deficits and cautiousness*

Some studies point to the mechanisms by which test anxiety influences performance. In one study, Geen (1976) had participants remember the position of certain stimuli in an array. Under evaluation conditions, those with high anxiety scores were helped less by added subscripts indicating that position and impaired less by random subscripts than low anxious individuals. In a different memory task, test anxious children recalled less to-be-remembered stimuli but more to-be-ignored stimuli than non-anxious children, and the overall recall did not differ between groups (Dusek, Kermis & Mergler, 1975). Thus, attention to central features of a task is impaired. Further, the results suggest that test anxious children either are more easily distracted by peripheral cues or actively avoid the task.

Geen (1985) interpreted such findings as evidence of task avoidance. He proposed that high anxious individuals might not only exhibit less attention to task relevant cues due to distraction but that they also “may . . . avoid the negative consequences of failure by avoiding the commission of incorrect responses” (p. 964). This prediction is important in the present context insofar as it considers a certain performance strategy as a possible outcome of test anxiety. In fact, it is quite similar to what Higgins (1997; 1999) predicts as a consequence of prevention focus as we will see later. Geen tested these hypotheses using a signal detection task (i.e. the detection of subtle signals appearing on the computer screen) and presenting the task either as diagnostic of abilities or not. From the rates of hits and false alarms, a sensitivity and a decision criterion index could be calculated. Sensitivity was lowest in the high anxiety/test condition and in the low anxiety/no test condition (which did not differ from each other). The decision criterion was significantly higher in the high anxiety/test condition than in all other conditions which did not differ from each other. Thus, the study obtained evidence for both assumptions. Test anxious individuals in the test condition attended less to the stimuli as evidenced by a

lower sensitivity score. Importantly, they also set a higher response criterion than all other groups, showing stronger tendencies toward a conservative bias.

Test anxiety is a very broad and probably heterogeneous construct. Some individuals might show some task irrelevant reactions but not others and anxiety effects on performance could thus be differently mediated in different individuals. For example, some individuals might be afraid of punishment and thus see success at the task as a necessity and concentrate really hard while others might ruminate extensively about the consequences of failure, fairness issues or how they can avoid testing situations in the future which distracts them from the task. The former, although not involving distraction, can nevertheless impair performance through influencing task strategies, an issue that will be discussed in greater detail later. For the just described study this can mean that test anxiety might influence sensitivity and cautiousness through different processes. These considerations point to the importance of investigating different aspects of anxiety and different aspects of test performance separately in order to learn more about the question of mediation.

### *Conclusions*

To sum up, evidence was presented that test anxiety leads to performance decrements only when a task is presented as diagnostic of abilities, and only after no feedback or failure feedback. In easy tasks, after success feedback and in motivating non diagnostic conditions, high test anxious persons even outperform low anxious persons. These findings point to a generally high motivation of test anxious individuals to perform well. Performance drops, however, when the task is made self relevant and the possibility of failure is implicit (difficult task) or explicit (failure feedback) in the situation. Furthermore, evidence from test anxiety research most clearly supports the notion that test anxiety interrupts performance through worries and ruminations, thereby limiting the cognitive capacity for task relevant thoughts. Some evidence also points to task avoidant behavior such as gazing away from the task as a possible mediator of performance decrements. Finally, evidence has been presented for a conservative bias in reporting signals under conditions of high test anxiety. Applying these findings to the stereotype threat domain, it can be concluded that anxiety and worry are potential mediators of stereotype threat effects. Next, the evidence concerning these two potential mediators will be reviewed.

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*Anxiety and Rumination as Possible Mediators of Stereotype Threat Effects*

It has been shown that test anxiety undermines task performance and does this under the same conditions that lead to performance decrements when negative stereotypes are activated: when a task is difficult and presented as diagnostic of individual abilities.<sup>4</sup> The mechanism is most likely one of decreased attention due to rumination or task avoidant behavior. Thus, anxiety, ruminations and task avoidant behavior are possible candidates for mediating stereotype threat effects. Furthermore, the finding of a conservative bias for test anxious individuals in an evaluative situation points to the possibility that strategic inclinations might play a role in producing the observed performance effects, a proposition that will be explored in greater detail in the last chapter of the theoretical part.

*Anxiety.* Some stereotype threat studies included self report measures of state anxiety and tested for mediation. Spencer et al. (1999) found that women who were told that the difficult math test they were about to take was insensitive to gender differences were less anxious before the test and performed better than women who were told that the test had shown gender differences in the past. The mediational analysis, however, was not significant. Other studies did not find that stereotype condition affected self reported anxiety (Aronson et al., 1999, Study 2; Leyens et al., 2000; Stangor et al., 1998; Stone et al., 1999).

Osborne (2001) obtained evidence that state anxiety was a partial mediator of the Black-White and Latino-White test score gap in a nationally representative sample of high school seniors even when controlling for average school grades. Because no experimental manipulation of stereotype threat was employed, these feelings cannot be traced back to the stereotype with certainty. However, the results obtained when including the covariate indicate that they are not entirely due to ability differences. In this study, the anxiety measure was administered after the test and consisted of eight items asking whether or not the test taker had been feeling tense, under pressure, under strain, nervous/jittery, uneasy, calm, afraid of not doing well, or uncomfortable. Thus, the measure more closely resembled what we might call agitation following Higgins (1997), who argued that this would be experienced when an individual fails to avoid undesired outcomes (Higgins, 1997), than the measures used in

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<sup>4</sup> A difference between test anxiety and stereotype threat effects is, however, that test diagnosticity seems to be a necessary condition for test anxiety effects while it is a sufficient but not necessary condition for stereotype threat effects.

the test anxiety research reviewed above. To conclude, the evidence for state anxiety as a mediator of stereotype threat effects is mixed at best.

*Rumination.* Steele and Aronson (1995) found that Blacks who were about to take a test that was diagnostic of their verbal ability completed more word fragments with words that were consistent with the stereotype of African Americans than Blacks about to take a non diagnostic test or Whites in either condition. This is evidence that the stereotype condition indeed did activate the stereotype. It is therefore possible that this activated stereotype instigates rumination, for example about the stereotype or about the self, which in turn disrupts performance. However, in two of the three performance studies the authors included a cognitive interference questionnaire and found no condition effects for the number of disruptive thoughts and feelings. In the last experiment, they included a measure designed to assess stereotype threat (e.g., “Some people feel I have less verbal ability because of my race”). This measure only yielded a main effect of participant’s race with Black participants agreeing more.

Similarly, Schmader and Johns (2003) framed a test as assessing math abilities (stereotype threat condition) or working memory capacity (control condition) and found that women in the stereotype threat condition underperformed relative to men and relative to women in the control condition. However, two items designed to measure concerns with being stereotyped (e.g.: “I am concerned that the researcher will judge women as a whole, based on my performance on this test”) did not reveal any differences as a function of gender and condition. Two replications, one again with women and one with Latinos as the stereotyped group found the same pattern: performance impairment due to negative stereotypes but no difference in the self-reported concerns. Thus, while test anxious individuals report more worry in a test situation, which is seen by many authors as the reason for their performance deficit, there is so far little indication that stereotype threat effects are caused by the same mechanism.

*Task avoidance.* Davies et al. (2002) found that women who had been exposed to negative stereotypic commercials about women performed worse in a math test that was described as non diagnostic than women who had been exposed to commercials showing counterstereotypic women. Stereotype activation mediated these performance decrements. However, this study did not show that they had been distracted by these stereotypes. Interestingly, this study also showed that when given the choice, women in the stereotypic commercials condition attempted more verbal and less math problems than those in the counterstereotypic condition. Furthermore, they indicated less interest in quantitative and more interest in verbal domains than women exposed to the coun-

terstereotype. These data indicate that activating the stereotype predisposed these women to avoid the stereotyped domain. It is conceivable that, when no active avoidance is possible, other, more cognitive forms of avoidance are employed: withholding answers, giving up more easily or letting oneself be distracted more easily (see Geen, 1985). However, at present there is no data speaking to this issue.

*Conclusion.* An examination of the test anxiety literature has yielded three potential mediators of stereotype threat effects: state anxiety, distraction through rumination or task avoidant behavior, and conservative answering bias. The evidence concerning these mediators, however, is not decisive at present. The majority of studies that measured state anxiety did not find evidence of mediation. Nor did studies measuring cognitive interference. Although there is some indication that stereotype threat leads to avoiding the task when given the choice, it is not clear what exactly this means for performance in the stereotyped domain when no choice is given. Finally, so far no studies have been reported that investigate a conservative answering strategy as a mediator of stereotype threat effects.

### *Situational Influences on Performance: Social Facilitation*

Social facilitation, that is the improvement of performance in the presence of others, is one of the oldest documented effects in social psychology. Triplett observed in 1898 that children turned fishing reels faster if faced with a live competitor. Research on the effect in both humans as well as animals soon discovered that the presence of others does not always lead to performance improvements. In 1965, Zajonc reviewed and integrated these apparently contradicting findings. He discovered that social facilitation mostly occurs on simple tasks while social impairment is most likely in complex tasks. This basic finding has been obtained with various manipulations of the "social" variable and both within and between studies. A meta-analysis of 241 studies conducted by Bond and Titus (1983) confirmed this pattern: the presence of others enhanced performance on simple tasks and impaired performance on difficult ones. The same pattern (i.e., enhanced performance in a simple and impaired performance in a difficult task) has also been obtained with a stereotype threat manipulation (O'Brien & Crandall, 2003). Thus, it is possible that the same processes unfold in both situations. Therefore, in the following sections, evidence concerning the causes and mechanisms of the effect will be presented. Because Zajonc's account of the effect has been very influential in this field, I will briefly summarize it first.

Zajonc explained the social facilitation/impairment effects in terms of Hull-Spence drive theory (Hull, 1943; Spence, 1956), which assumes that placing organisms in a state of high arousal, or drive state, should increase the likelihood that dominant (well-learned) responses are emitted. According to Zajonc, the mere presence of others increases drive/arousal. This in turn facilitates simple, well-learned, dominant responses, but impairs complex, subordinate responses. Hence, according to Zajonc's account, public audiences are predicted to facilitate task performance when the dominant response yields the correct answer and to impair performance when the dominant response yields the wrong answer.

This theory stimulated a great research effort in the course of which each of these assumptions has been questioned. A number of researchers have argued that these effects of the mere presence of others can in fact be traced back to other processes such as distraction or evaluation apprehension. Furthermore, there have been alternative accounts of the basic pattern of effects in terms of attentional focusing or failure of cognitive control. And finally, the assumption of a mediating role of arousal has been challenged on both theoretical and empirical grounds.

### *Is there something unique about these "social" effects?*

A question that has intrigued many researchers concerns the active ingredient of public settings. In other words: when is performance influenced by the presence of others and which aspect of the presence of others causes these effects? Research investigating these questions has found that the presence of a person sitting quietly in a corner reading a book does not reliably change performance. However, the presence of an audience (i.e., somebody watching or hearing the test taker) can easily elicit self-presentational concerns, especially – but not only – when the audience can evaluate the performance. Furthermore, the presence of others can easily distract the individual and instigate social comparison processes. Self-presentational concerns, distraction and social comparison processes, in turn, can all have effects on performance. Interestingly, the pattern of effects described above seems to hold independently of which aspect causes them.

*Mere presence.* Bond and Titus (1983) confirmed Zajonc's contention that the mere presence of others (without evaluation potential) can have the predicted effects on performance. However, according to Guerin (1983; 1986), this seems to be the case only when there is some uncertainty about the behavior of the person present. This uncertainty is especially high when the person present is a stranger and is not coacting, when he or she is sitting close to the individual, when he or she is doing nothing (compared with when the individ-

ual can see that the other person is engaged in a predictable activity), and when the other person cannot be monitored by the individual. Thus, the common ground assumption in psychological research that the presence of the experimenter or other participants does not dramatically change the results might sometimes be too optimistic but still hold most of the time, at least when they are behaving in a predictable way and do not elicit social comparison.

*Self-presentation.* Other researchers have pointed to the importance of self-presentation motives in producing social facilitation/impairment effects (e.g., Baumeister, 1982; Bond, 1982). According to this approach, social impairment in complex tasks is most likely to occur in situations that engender the risk of a negative evaluation by others. In line with this reasoning, several studies have found stronger influences of audience presence manipulations on behaviors aimed at making a good impression or avoiding a bad one than on performance measures (for a review, see Geen, 1989).

Other studies have examined the influence of expectancy on social facilitation/impairment effects. If social impairment effects are triggered by the risk of a negative evaluation, they should only occur when the individual expects to fail. Accordingly, Geen and Gange (1977) reviewed the available evidence and concluded that social impairment effects are related to expectancies of negative evaluation but not to expectancies of positive evaluation. For example, Geen (1979) found that participants who had recently experienced successful performance were not impaired in their performance on complex tasks by the presence of an audience. In an experiment by Sanna and Shotland (1990), participants after a success experience performed even better on a complex task when observed than when alone. However, when the observer knew about the prior success, performance was worse than when she or he was unaware of it. Conversely, performance was improved when the observer knew about prior failure than when she did not know about it (Seta & Hassan, 1980).

In line with this reasoning, Butler and Baumeister (1998, Exp. 3) found performance decrements on skilled performance of a video game due to audience presence only when a monetary reward for the performer as well as for the audience was contingent upon successful performance and when the goal was very difficult. Of course, this is exactly the condition where the likelihood of failure is high, and the consequence of failure would not only be public embarrassment and lost reward but also a disappointed audience. In addition, they found that the presence of an audience without monetary interest in the outcome led to enhancement of speed relative to the condition without audience when the goal was easy and impairment when the goal was difficult, all else being equal. Similarly, Bond (1982) found that audiences improved performance even on difficult tasks if the difficult tasks were embedded among easy

ones; likewise, audiences impaired performance on easy tasks when they were embedded among difficult ones. It thus seems that an evaluation of the likelihood and consequences of different outcomes determines the effects of audience presence. Specifically, performance decrements in complex tasks seem to be more likely when the subjective probability of public failure is raised (i.e., after failure feedback) or when public failure would be particularly embarrassing (i.e., when the audience expects success). These conditions, then, are similar to stereotype threat conditions, in that the latter may also make failure both more likely and the consequences of it more negative.

*Social comparison.* Social facilitation/impairment effects have also been observed in coaction situations. Sanders, Baron and Moore (1978) used simple and complex variants of a digit copying task and had participants work either alone, together on the same task or together on different tasks. Only when they were working on the same task, social facilitation for the simple and impairment for the difficult task occurred. In addition, these participants recalled the task less well and gauged more accurately the progress of their coactors. Huguet et al. (1999) only found social presence effects in a coaction situation when the coactor was working at a similar or at a faster speed, but not if he or she was considerably slower. However, in all three conditions participants accurately recalled the performance speed of the coactor relative to their own. This latter result could mean that social comparison does not lead to social facilitation/impairment effects because it distracts people but rather because of its motivational implications – a form of competition.

*Distraction.* The view that, when performing, the mere presence of others is arousing, does not account for these variations in social presence effects. Expectations, evaluation apprehension and self-presentational concerns, however, do not account for the universality of the effects even in other species. An elegant account for both kinds of effects is Baron's (1986) distraction-conflict theory. He proposed that attentional conflict is responsible for social impairment/facilitation effects. Even when not evaluating us, Baron noted, others can be very distracting for a variety of reasons: "they mediate very powerful social reinforcements and punishments; they are unpredictable; they provide sexual and social cues we may wish to respond to; they often offer social comparison information" (p. 4). Thus, whenever our attention is drawn to the species mate for any reason, and the attention is also needed for task completion, we will experience attentional conflict. A major insight arising from Baron's work is that classic social facilitation/impairment effects are produced not only by social distractors (e.g., public audiences) but also by nonsocial distractors, such as a distracting second task or the freedom to choose between tasks.