

Stereotype activation versus application: how teachers process and judge information about students from ethnic minorities and with low socioeconomic background

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Abstract Teachers develop stereotypical expectations about students, but this categorical knowledge can influence their judgments about students. Although teachers' stereotypical expectations about students have been investigated in the educational domain, this research has mostly measured only the teachers' judgments. However, the judgment is only the outcome of preceding information processing, which consists of different stages that might be influenced by social categories. Drawing on dual process theories of impression and judgment formation, we investigated teachers' information processing and judgment processes. In Study 1, we compared the processing of neutral information and information about a racial minority student. In Study 2, we investigated how teachers derive judgments of students from families with high versus low socioeconomic backgrounds. Both studies revealed that perception and memory were affected by social categories but showed no impact of categorical information on teachers' judgments. Thus, the results indicated stereotype activation but not application, as teachers seemed to suppress their stereotypical expectations when it comes to the judgment. The implications of the results for future research as well as for teacher training are discussed.

Keywords Achievement judgments · Racial minorities · SES · Stereotypes

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1 Introduction

In the classroom, teachers meet students, interact with them, gather a lot of information about them, and put all of this information together to form judgments about the students. Corresponding judgments involve decisions about grade retention (Bonvin 2003), grading, recommending students to different school tracks (Ansalone and Biafora 2004), ability grouping (Haller 1985), and placing students in remedial programs (Podell and Soodak 1993). As some judgments strongly contribute to the future educational careers of the students, it is of particular importance to understand how teachers select student information, how they form judgments about their students, and which factors might influence those cognitive processes. Thus, the aim of the research at hand was to get a deeper insight into the cognitive processes during teachers' information processing and judgment formation and the factors influencing these processes.

2 Theoretical background

Social information processing and judgment formation is suggested to occur in different stages (Wyer and Srull 1986, 1989), which are generalizable to all social information processing (Wyer and Srull 1986). In this model, the stages are encoding, storage, retrieval, inferences, judgment (Wyer and Srull 1986, 1989) and it is plausible to assume that the stages do not differ for teachers processing student information. At the encoding level, information is perceived and encoded. It has to be stored and subsequently retrieved from memory to derive inferences and judgment. Drawing on this general model, dual process theories of impression and judgment formation have developed (Brewer 1988; Fiske et al. 1999; Fiske and Neuberg 1990), which integrate stereotyping and findings from the research on person perception (Fiske and Neuberg 1990). As well as social cognition research, educational research discusses teachers' expectations (Dee 2005; Wiggan 2007) and stereotypes (Parks and Kennedy 2007; Südkamp et al. 2012) as factors influencing perception and judgment. Stereotypes are generalized knowledge about the attributes the members of a social group share (Smith 1998), thus representing social categories. Stereotypes are inevitable, as they provide people with prior knowledge to derive an understanding of new encountered information and of the world (Macrae and Bodenhausen 2000).

However, stereotypes influence person perception and judgment, sometimes in an unconscious manner (Smith 1998). Considering the influence of stereotypes in person perception and judgment, the continuum model of impression formation (Fiske et al. 1999; Fiske and Neuberg 1990) suggests that people rely on social categories whenever possible; this is the default mechanism. In this first step, people immediately apply basic categories such as race (Devine 1989), gender (Hoffman and Hurst 1990), social class (Fiske and Neuberg 1990), or age (Brewer and Lui 1989). That is, those attributes are immediately noticed and they trigger the corresponding stereotype. Once activated, attention to further attributes of the target person is guided by the activated stereotype (Smith 1998). Thus, the initial stage of encoding, namely attention for the information to be encoded, is impacted by activated social categories. In case people

notice person attributes that are inconsistent with this initially activated social category, they try to find another social category which is able to organize the encoded information (Fiske and Neuberg 1990). Once people have found a category enabling them to organize most of the target information, they try to confirm this category. That is, they prefer information that confirms the activated category (Stangor and McMillan 1992) and they try to ignore information that contradicts this category (Hamilton and Sherman 1996; Macrae et al. 1994b; Stangor and McMillan 1992). Only in the case that all these attempts of categorization and recategorization fail (i.e. most of the target information contradicts the category) people disengage category-based processing and turn toward more individualized processes. The target person is now perceived as an individual, while the category is treated like any other attribute (Fiske and Neuberg 1990), thereby integrating attribute by attribute into the judgment. All these processes however, are suggested to occur only when the target person is at least minimally relevant for the perceiver and when the perceiver is motivated to engage in those processes (Fiske and Neuberg 1990). In case of no motivation and no personal relevance, the target is perceived and judged according to the initial category (Fiske and Neuberg 1990). The continuum model (Fiske et al. 1999; Fiske and Neuberg 1990) suggests that impression and judgment formation is the outcome of either category-based, mixed, or attribute-by-attribute integrating processes. One determinant of the processes underlying judgments is the perceived person information. Purely category-based processing is suggested to occur when the person information clearly activates an available social category and the subsequently encoded person information confirms the initially activated category. Processes are purely integrating when the person information does not easily fit an activated category, that is, when no social category could be found to organize the person information. In this case, each piece of information has to be integrated to derive an impression or a judgment. All other processes are mixed with the category as well as the individual attributes influencing the judgment.

As outlined above, the use of social categories is of particular importance in impression and judgment formation. Once activated, they can influence all stages of information processing. They guide attention toward category-relevant person information, thus influencing which information is encoded and how the information is structured (Taylor and Crocker 1981). This structuring function also helps a person to store information with regard to the social category (Taylor and Crocker 1981), thus providing a possible basis for processes that subsequently follow, such as retrieval from memory. Activated social categories enhance the recall of categorical information (Fiske and Neuberg 1990; Taylor and Crocker 1981). Thus, categories influence which information is retrieved from memory (Fiske and Neuberg 1990; Smith 1998; Taylor and Crocker 1981). Moreover, the information is not only encoded and stored with reference to the activated social category, but it is also interpreted in the light of the category (Smith 1998; Taylor and Crocker 1981). Even the interpretation of neutral or ambiguous person information is impacted by the activated social category (Smith 1998; Taylor and Crocker 1981). In this vein, categories fill in missing information about the person (Smith 1998; Taylor and Crocker 1981).

For instance, imagine a teacher who learns about a “number 1 in class” student. The teacher learns that the student’s performance in mathematics, English, and Science is above average and that the student attentively follows instructions. What would the

teacher expect the student's homework to look like? Following stereotypical expectations, the teacher would expect the student to do his or her homework in a very thorough manner. The social category allows the teacher to know about attributes of students whom she/he has not actually perceived. Thus, social categories help the perceiver to go beyond the given person information (Fiske and Neuberg 1990; Smith 1998; Taylor and Crocker 1981) in order to easily fill in gaps in person information that help to predict the target person's future behavior (Taylor and Crocker 1981).

Activated social categories do not only influence which information perceivers attend to, which information they encode, how they structure the information, store and interpret it, but also affect, in a last step, inferences, judgments, and behavior (Fiske and Neuberg 1990; Smith 1998; Taylor and Crocker 1981). In this sense, teachers' student judgments and teachers' behavior toward the students are subject to the processes influenced by the social categories outlined above. As teachers develop social categories that contain knowledge about different student groups that share some salient attributes, the teachers' abilities to process information about the students are likely to be influenced by the activation and application of this knowledge due to the categories' cognitive-capacity-saving character (Macrae et al. 1994b). Teachers frequently develop and use stereotypes about race (Chang and Demyan 2007; Chang and Sue 2003; Tenenbaum and Ruck 2007) and social class (Diamond et al. 2004; McCombs and Gay 1988), and such categories might be derived from little actual information (Chang and Sue 2003; Jussim 1989; McCombs and Gay 1988; Parks and Kennedy 2007; Rosenthal and Jacobson 1968). That is, teachers have stereotypical expectations about how students from racial minorities and students from different socioeconomic backgrounds academically perform and how they behave in the classroom setting.

Those stereotypical expectations have been subject to investigation in educational research. Racial stereotypes influenced teachers' judgments of Black students' academic and social competence (McCombs and Gay 1988; Neal et al. 2003; Parks and Kennedy 2007). Teachers held lower academic expectations for racial minority students (Glock et al. 2013; Marx 2003; Sleeter 2008; Tenenbaum and Ruck 2007) and they less frequently referred racial minority students to gifted and talented programs than they referred racial majority students (Elhoweris et al. 2005). Racial minorities were judged as having more problems adjusting to school and as having poorer educational attainment and consequently, lower future prospects (Pigott and Cowen 2000) than White students.

To summarize, there is ample evidence that stereotypical expectations about racial minority students influence teachers' impressions and judgments. However, this line of research has focused on the outcome of the social information processing process, that is, the judgment, and has hardly considered the whole process consisting of the different stages outlined above (encoding, storage, retrieval, inferences, judgment). Though stereotypes can influence each stage of information processing, it is of particular importance to gain insight into the question of whether each stage is actually influenced or whether there are some stages that remain completely unaffected. Such information might help to derive education intervention programs designed to overcome stereotypical biases. Pointing only to the process outcome itself does not seem to be sufficient for overcoming biases in judgments as the judgment reflects only

stereotype application but not necessarily activation (Kunda and Spencer 2003). That is, even though the judgments might not be biased, it would not be correct to conclude that no social category was activated during information processing. People do not always apply activated stereotypes in their judgments (Gilbert and Hixon 1991), and sometimes they are motivated to suppress stereotypical expectations (Macrae et al. 1994a). However, suppressed stereotypes might backfire (Macrae et al. 1994a)—a phenomenon called the rebound effect (Macrae et al. 1994a). When this happens, stereotypical expectations exhibit a greater influence than before suppression, often impacting the judgment of other target persons (Macrae et al. 1994a). Moreover, category activation might diminish during the interaction (Kunda et al. 2002) and might be reactivated at a later point in time (Kunda et al. 2002).

Social cognition research has provided methods for investigating the different stages of information processing. Encoding can be investigated by the use of reading time methods because reading times allow us to draw conclusions about activated stereotypes during encoding (Krolak-Schwerdt et al. 2008; Krolak-Schwerdt and Kneer 2006). Stereotypes provide people with the ability to perceive quickly (Taylor and Crocker 1981), thus leading to shorter reading times. Storage and retrieval are frequently investigated using free recall (Srull 1984; Wyer and Srull 1988). From recall measures, we can draw conclusions about correct reproductions as well as about intrusions (Wyer and Srull 1988). In a free recall paradigm, people might falsely retrieve information that was not part of the given person information (Wyer and Srull 1988). Such falsely retrieved information is called an intrusion. Correct reproductions reflect the information that people actually learned about the target person, and intrusions reflect the inferences that people drew about the target (Wyer and Srull 1988). Social categories help people to go beyond the given information (Fiske and Neuberg 1990; Smith 1998; Taylor and Crocker 1981), and they act as recall cues (Smith 1998). Thus, both reading times and free recall data can provide valuable insights into the process of information processing. Judgments as the last stage of information processing have already been investigated in different studies.

Thus, the aim of this research was to investigate the information processing of teachers. In particular, we were interested in the question of whether or not teachers would activate and apply categorical knowledge during the entire judgment process. In two experiments, we confronted teachers with neutral student information to which we systematically added some stereotypical information (race and social background, respectively). We assessed reading times, free recall data, and judgments; thus, we were able to explore the effect of this added information on different stages of teachers' information processing.

3 Study 1

In Study 1, we chose race as social category. Although previous research has provided evidence for the judgments being influenced by racial stereotypes, less is known about the underlying stages of the information processing. In Study 1, each participant received the same neutral student description. However, half of the participants received additional stereotypical information to preactivate stereotypical expectations

before they were presented with the neutral student description. The other half of the participants did not receive stereotypical information, thus processing the neutral student description without preactivated stereotypes.

Corresponding to dual process models of impression formation (Fiske and Neuberg 1990), people's default mechanism is category-based information processing and judgment formation. Whenever possible, people rely on stereotypes and social categories. Thus, the activated social category was expected to provide participants with a stereotype which could serve as a basis for structuring the student information. For teachers receiving social category information, we expected that the activation of stereotypical expectations would not only result in better recall, but also lead to more intrusions, compared to teachers not receiving social category information. Furthermore, we expected that teachers' judgments would reflect the social category whereby, drawing on the research findings outlined above, descriptions with indication of the racial minority status of the student would lead to less favorable judgments than the neutral student description. Hence, we expected that the information processing stages of storage, retrieval, inferences, and judgment, would all be influenced by the activated social category. As racial category, we chose a Turkish student. In Germany, the largest group of immigrants come from Turkey (Destatis 2011), and Turkish students experience disadvantages in German educational systems (Kristen and Granato 2007).

3.1 Participants and Design

Sixty-four (39 female) preservice (32) and in-service teachers (32) from Saarland, Germany, participated in Study 1. The participants' mean age was 37.25 ($SD = 13.08$) with an average teaching experience of 11.53 ($SD = 11.74$) years. Participants received no payment for participation. The study had a between-subjects design with *Category Activation* (racial minority background vs. none) as the grouping factor.

3.2 Materials

We constructed a description of a student containing 15 sentences and describing the student's behavior in the classroom (e.g. "Alexander likes to tell jokes and he laughs out loud"). The student description was compiled following the practical guidelines for writing school reports (Langer et al. 1993). The 15 sentences were rated by 10 secondary school teachers with more than 10 years of teaching experience with regard to the inferences the student description would allow a reader to draw. All teachers stated that the student description did not allow readers to draw inferences about the social or the racial background of the student. Moreover, the student description did not allow the reader to draw inferences about the student's level of achievement. For the neutral student description, we used those 15 sentences. To preactivate stereotypical expectations about students with a racial minority background, we added two sentences describing a Turkish student whose father was born in a small village in Turkey. Thus, this student description contained the same 15 sentences as used in the neutral description, and additionally, the two sentences about the racial background.

Moreover, the questions and answers to a German and a Mathematics test were provided. These were the same tests as used in a previous study (Krolak-Schwerdt et al. 2013). The student scores on these two tests reflected average performances.

In addition, we compiled a questionnaire to assess the participants' demographic data such as their gender, age, and teaching experience.

As judgment dimensions, we chose intellectual power, learning habits, Mathematics performance, German performance, and language proficiency. We chose these judgment dimensions because they are considered important when it comes to an overall evaluation of students such as school placement decisions (KMK 2010). The dimensions refer to the main school subjects German and Mathematics, as well as to the more general characteristics such as intelligence, general language proficiency, and the working and learning habits of a student. Moreover, international assessment studies such as PISA and PISA also assess the students' performances in Mathematics and Reading.

3.3 Procedure

We tested each participant individually. In-service teachers were visited in their schools and preservice teachers were tested in the laboratory at the university. Participants were randomly allocated to the different experimental conditions. Participants received either the two sentences designed to preactivate stereotypical expectations about students with a racial minority background or did not receive them. Then, all participants were presented with the neutral student description. After reading the student description, participants were given the demographic questionnaire as a distractor task to interfere with participants' short-term memory. Participants were then asked to recall and write down the student information they could remember. When participants had finished the recall task, they were presented with five different judgment dimensions. Their task was to judge the student's learning habits, language proficiency, intellectual power, mathematics performance, and performance in German. All dimensions had to be judged on a 7-point Likert scale ranging from 1 (*very good*) to 7 (*very poor*). At the end, participants were thanked and debriefed.

3.4 Results

3.4.1 Recall data

Recall protocols were screened by two independent judges for correct reproductions and intrusions. An item was considered to be a correct reproduction if it was remembered either verbatim or with a synonymous formulation. Items were considered to be intrusions if they referred to student descriptions but were not actually presented independent of whether this information was category-related. Interrater reliability was computed as Cohen's Kappa = .98. The number of correct reproductions was divided by the total number of items in the student description due to the fact that the neutral description contained 15 and the schema activation description 17 sentences. The relative number of correct reproductions was submitted to an independent

Table 1 Means and standard deviations for the main effect judgment dimension of Study 1

	Mean	Standard deviation
Learning habits	2.73	0.89
Language proficiency	3.18	1.09
Intellectual power	2.80	1.13
Performance in German	3.30	0.97
Performance in Mathematics	2.98	1.05

t test with *Category Activation* (racial minority background vs. none) as the grouping factor. Participants who had no preactivated category recalled fewer items ($M = 0.23$, $SD = 0.14$) than participants with preactivated category about racial minority students ($M = 0.33$, $SD = 0.12$), $t(62) = 3.20$, $d = 0.77$, $p < .01$. Intrusions were submitted to an independent *t* test with *Category Activation* (racial minority background vs. none) as the grouping factor. This test indicated a higher number of intrusions for participants with preactivation ($M = 2.94$, $SD = 2.31$) than for participants without preactivation ($M = 1.38$, $SD = 1.62$), $t(62) = 3.13$, $d = 0.78$, $p < .01$.

3.4.2 Judgment data

Participants' ratings of the different judgment dimensions were submitted to a two-way ANOVA with *Category Activation* (racial minority background vs. none) as a between-subjects factor and *Judgment Dimension* (learning habits vs. language proficiency vs. intellectual power vs. performance in German vs. mathematics performance) as a within-subjects factor. The ANOVA revealed a significant main effect of *Judgment Dimension*, $F(4, 244) = 4.51$, $\eta_p^2 = 0.07$, $p < .01$. The judgments of teachers varied with regard to the different judgment dimensions (see Table 1 for all means and standard deviations).

Neither the main effect of *Category Activation*, $F(1, 61) = 0.97$, $\eta_p^2 = 0.02$, $p = .33$, nor the two-way interaction reached significance, $F(4, 244) = 2.04$, $\eta_p^2 = 0.03$, $p = .09$.

3.5 Discussion

In Study 1, we experimentally investigated teachers' processing of student information with and without stereotypical expectation activation. We found higher recall and higher intrusion rates for participants with preactivation of stereotypical expectations about racial minority students as compared to participants without preactivation. Thus, our data imply that the social category affected the storage of the student information as the category seemed to provide a basis for structuring the information, thereby leading to a better recall of neutral student information when categorical knowledge was activated. Additionally, participants made more inferences about the neutral student when categorical knowledge was activated than when it was not activated. Thus, the activated categorical knowledge helped participants to go beyond the given information. However, the judgments of academic performance did not show an influence of stereotypical expectations.

The results of Study 1 provided evidence that storage, retrieval, and inferences might be influenced by the activation of social categories. In fact, the presented student information was neutral and did not allow the participants to draw inferences. The social category was activated and applied in the following processes, except judgment. Although the comparison between the processing of a completely neutral student description and the processing of neutral information with preactivated social category knowledge allowed a stringent test of the influence of categorical knowledge on information processing, we cannot draw conclusions about teachers' attention to neutral and categorical information. In Study 2, we complemented the neutral student description with two different types of categorical information in order to investigate how teachers would attend to categorical information and to explore which type of stereotypical expectations would have a stronger influence on information processing.

4 Study 2

Research has shown that teachers more frequently referred students with low socioeconomic backgrounds to special education (Frey 2002; Podell and Soodak 1993), and their expectations biased students' current performance as well as their long-term performance (de Boer et al. 2010). Teachers attributed more academic failure to students with low socioeconomic backgrounds (Auwarter and Aruguete 2008; Harvey and Slatin 1975), and those students were generally perceived as being less confident (Guskin et al. 1992). Students with high socioeconomic backgrounds were judged more positively than their IQs indicated (Alvidrez and Weinstein 1999) and consequently, they were more frequently referred to talented programs than students with low socioeconomic backgrounds (Elhoweris 2008). Teachers who were highly susceptible to bias treated students from families with high and low socioeconomic status (SES) differently, in that they behaved more favorably toward students with high socioeconomic backgrounds (Babad et al. 1982). However, there is also some research that could not find biases in teachers' judgments regarding students with low SES, as the SES of a student did not affect teachers' decisions about ability grouping (Haller and Davis 1980, 1981). Consistent with these findings, the SES of a student did not influence teachers' predictions of academic success (McCombs and Gay 1988) or their judgments about reading competencies (Karing et al. 2011). Notwithstanding these findings, however, research provided inconsistent results regarding the SES of student and how this relates to teacher judgment.

In Study 2, we varied the social background of the students. Thus, we were able to further investigate the relationship between teachers' judgments and the social background of a student, as previous research has provided inconsistent results. Additionally, it remains unclear whether these inconsistencies stem from the activation and application of stereotypical knowledge about low SES students or whether the disadvantages might be a result of applying categorical knowledge about high SES students. That is, we do not yet know for which type of students (i.e., high or low SES) stereotypical expectations developed, which are then activated when these judgments are formed.

In Study 2, we presented social background information for two students. Half of the participants were presented with a student from a family with low SES, and the other half were confronted with a student from a family with high SES. Thus, in Study 2, we were able to address the limitation of Study 1 and explore the teachers' attention to stereotypical information. In order to investigate how participants would attend to the different pieces of information, a self-paced reading time method was applied. This method is based on the assumption that people read a text or sentences at a pace that reflects their comprehension of the text or the sentence (Krolak-Schwerdt et al. 2008). In Study 2, we employed a variant of the window method (Haberlandt 1994). In this method, a masked text appears on the computer screen, and the participants successively uncover text segments by pressing a key. With each key press, the previous sentence or text segment disappears and the next segment is uncovered. We presented the student description sentence by sentence, assessing the self-paced reading time for each sentence of the student description.

In Study 2, we expected categorical information to facilitate the reading of student descriptions. This facilitation can be expected because categories provide people with the ability to perceive quickly (Taylor and Crocker 1981), which should, in turn, lead to faster reading times. We also expected categorical information to enhance recall and intrusion rates. Additionally, the judgments were expected to be influenced by social categories.

4.1 Participants and design

Sixty-six (31 female) preservice (32) and in-service teachers (34) from Saarland, Germany, participated in Study 2. Participants were on average 39.27 ($SD = 14.11$) years old and had a mean teaching experience of 15.83 years ($SD = 15.09$). Participants received no payment for their participation. The study had a mixed design with *Category Activation* (low vs. high SES) varying between and *Information Type* (neutral vs. schematic information) varying within participants.

4.2 Materials

We used the same materials as we used in Study 1. In a second step, we added social background information to the student descriptions. Thus, the student descriptions consisted of 15 sentences containing neutral information and two sentences containing the social background information. We constructed a low SES student description in, which the two categorical sentences described a student whose father was an unskilled worker who had no school leaving certificate. The high SES student description described the son of an ear, nose, and throat doctor with a medical practice. The sentences containing the neutral information remained the same in each description.

4.3 Procedure

In Study 2, we used the same procedure as in Study 1 with one exception. In order to investigate whether activated categories facilitated the processing of categorical information, we applied a self-paced reading time method as described above. Participants

were randomly allocated to the different experimental conditions. Half of the participants received the low SES student description, and the other half received the high SES student description. The student descriptions were presented one sentence at a time; participants were asked to press the space key when they finished reading a sentence in order to display the next sentence. The time interval between two key presses was assessed and defined as the reading time for the entire sentence (Krolak-Schwerdt et al. 2008).

4.4 Results

4.4.1 Reading times

Reading times in ms for sentences containing neutral information and for sentences containing categorical information were normalized by dividing the reading time for each sentence by the corresponding number of syllables in the sentence (Haberlandt 1994). Two participants were excluded due to computer errors during their reading time assessments. We submitted the reading times to a mixed ANOVA with *Category Activation* (high vs. low SES) as a between-subjects factor and *Information Type* (neutral vs. categorical information) as a within-subjects factor. The ANOVA revealed a significant two-way interaction between *Category Activation* and *Information Type*, $F(1, 59) = 12.09$, $\eta_p^2 = 0.17$, $p < .001$. Simple effects tests revealed no differences in reading times for the sentences containing neutral information between the participants who received the high SES student description ($M = 265.81$, $SD = 74.15$) and those who received the low SES student description ($M = 255.95$, $SD = 77.85$), $t(59) = 0.51$, $d = 0.13$, $p = .61$. For sentences containing categorical information, participants who were presented with the high SES student description ($M = 244.15$, $SD = 96.41$) read more quickly than participants who were presented with the low SES student description ($M = 325.29$, $SD = 144.13$), $t(59) = 2.61$, $d = 0.66$, $p < .05$. Participants who read the high SES student description tended to need more time to read the sentences with neutral information than they needed to read the sentences with categorical information, $t(31) = 1.76$, $d = 0.31$, $p = .09$. Participants who were presented with the low SES student description needed less time to read the sentences with neutral information than the sentences with categorical information, $t(28) = 2.90$, $d = 0.57$, $p < .01$.

4.4.2 Recall data

The correct reproductions were scored according to item type. That is, correct reproductions of the neutral items and correct reproductions of the categorical items were scored separately. Interrater reliability was computed as Cohen's Kappa = .98. The number of correct neutral reproductions was divided by the total number of neutral items in the student description. The same calculation was applied to categorical items.

The relative number of correct reproductions was submitted to a mixed ANOVA with *Category Activation* (high vs. low SES) as a between-subjects factor and

Information Type (neutral vs. categorical information) as a within-subjects factor. The ANOVA revealed a significant main effect of *Information Type*, $F(1, 63) = 44.77$, $\eta_p^2 = 0.42$, $p < .001$. In general, participants recalled more categorical information ($M = 0.52$, $SD = 0.30$) than neutral information ($M = 0.27$, $SD = 0.15$). This main effect was qualified by the significant interaction between *Category Activation* and *Information Type*, $F(1, 63) = 4.14$, $\eta_p^2 = 0.06$, $p < .05$. Simple effects tests showed that participants who received the high SES student description ($M = 0.29$, $SD = 0.15$) recalled the same amount of neutral information as the participants who received the low SES student description ($M = 0.28$, $SD = 0.15$), $t(63) = 0.44$, $d = 0.07$, $p = .66$. For categorical information, participants tended to recall more items when they received the low SES student description ($M = 0.58$, $SD = 0.29$) than when they received the high SES student description ($M = 0.46$, $SD = 0.29$), $t(63) = 1.72$, $d = 0.41$, $p = .09$. The two groups recalled more categorical than neutral information for the high SES student description, $t(31) = 4.68$, $d = 0.86$, $p < .001$, and for the low SES student description, $t(30) = 5.59$, $d = 1.00$, $p < .001$. Intrusions were analyzed using a simple effects test. This test revealed a higher number of intrusions for participants who read the high SES student description ($M = 2.72$, $SD = 2.14$) than for those who read the low SES student description ($M = 1.77$, $SD = 1.78$), $t(63) = 1.96$, $d = 0.49$, $p = .05$.

4.4.3 Judgment data

Participants' judgments were submitted to a mixed ANOVA with *Category Activation* (high vs. low SES) as a between-subjects factor and *Judgment Dimension* (learning habits vs. language proficiency vs. intellectual power vs. performance in German vs. mathematics performance) as a within-subjects factor. The ANOVA revealed a significant main effect of *Judgment Dimension*, $F(4, 236) = 10.04$, $\eta_p^2 = 0.15$, $p < .001$. However, the interaction failed to reach significance, $F(4, 236) = 0.23$, $\eta_p^2 = 0.00$, $p = .92$.

4.5 Discussion

In Study 2, we investigated the influence of social background information. Our results imply that categorical information did not facilitate the encoding of information about the low SES student as participants read this information more slowly than neutral information. Nonetheless, the encoding of categorical information about the high SES student was facilitated, as shown by participants' faster reading of categorical information about the high SES student than about the low SES student. Accordingly, participants who read about the high SES student tended to read the categorical information more quickly than the neutral information. Thus, our results show that students with high SES were perceived in the light of stereotypical knowledge. The high SES student description led to lower reading times regarding the categorical information, to lower recall rates, and to a higher number of intrusions compared to the low SES student description, all indicating the activation of stereotypical knowledge about the

high SES student. The low SES student appeared to be perceived as atypical, as participants needed more time to read the categorical information, they showed higher recall rates, and they showed a more accurate memory for the presented information. However, the judgment remained unaffected; that is, the high SES student was not judged more favorably than the low SES student.

Corresponding to the assumption that activation of categorical knowledge does not always imply application (Gilbert and Hixon 1991; Kunda and Spencer 2003; Macrae and Bodenhausen 2000), our more unobtrusive measures (reading times, free recall) suggest activation, whereas our more explicit measure does not. The inhibition of the application of categorical knowledge about high SES students might be of particular importance for teachers in Germany as public debates have addressed the social inequalities of the German educational systems (Freitag and Schlicht 2009; Pietsch and Stubbe 2007). Students from families with high SES are overrepresented in the higher school tracks (Schnabel et al. 2002) and this, in turn, provides the basis for their future educational attainment (Freitag and Schlicht 2009). However, the results of Study 2 imply that the disadvantages of students from low SES families found in previous studies (Alvidrez and Weinstein 1999; Elhoweris 2008; Frey 2002; Podell and Soodak 1993) do not necessarily rely on the fact that students from low SES show low achievement (Sirin 2005) but rather seem to stem from stereotypical knowledge that high SES students have above average achievement.

5 Conclusion

Drawing on dual process theories of impression and judgment formation (Brewer 1988; Fiske and Neuberg 1990), which suggest that category-based information processing is the default mechanism and that all stages of the information processing process is influenced by activated social categories, the aim of this study was to derive a more fine-grained understanding of the cognitive processes that underlie teachers' judgments. The results of the two studies show that categorical knowledge does not necessarily influence all stages of information processing or each information type. Perceptions of categorical information and memories for student information were influenced by social categories. Neither Study 1 nor Study 2 did show an impact of categorical information on judgments. This finding might be due to social desirability, which often biases explicit measurements (De Houwer 2006). As judgments are frequently made with conscious awareness and are thus considered deliberative tasks (Dovidio et al. 1997), people might be aware of their categorical knowledge and stereotypical thinking and might adjust their judgments (Kunda and Spencer 2003). This assumption is supported by our findings on the more implicit variables. Reading times as well as recall rates imply the activation of social categories.

Thus, the influence of social categories is not inevitable, as teachers might consciously control the impact that this information has on their judgments when they feel the need to suppress unwanted thoughts. Thus, knowing about the different stages that are affected or remain unaffected by the influence of social categories might help teachers to overcome biases in these perceptions and judgments. Although we did not

find an influence on teacher judgments, biases in teacher judgments are now well-documented in educational research. Social cognition research has shown that biases in judgments can be reduced and that the application of stereotypical expectations can be disrupted (Gawronski et al. 2008; Kawakami et al. 2000; Richeson and Nussbaum 2004), as was shown in this study. In a next step, such research findings might also prove fruitful for teacher education and intervention programs. The implementation of social cognitive theories in teacher education could prove valuable. Informing teachers and preservice teachers about biases due to stereotypical expectations and providing them with techniques designed to reduce biases, would give them useful tools in order to derive egalitarian classroom practices. Understanding how social categories might affect social information processing at its early stages and how its influence might transfer to behavior, might help teachers and preservice teachers to reduce biases in the classroom.

Moreover, research has also developed methods that are able to address the problem of assessing socially sensitive issues (Fazio et al. 1995; Fazio and Olson 2003). Biases in explicit measures stemming from impression management and social desirability occurred consistently. The new implicit measures try to prevent people from giving responses that are influenced by such tendencies. People are often not aware of what is implicitly assessed (Fazio and Olson 2003). Moreover, implicit measures assess automatic processes (De Houwer 2006). Such unobtrusive measures might be able to approach the “real” biases in teacher judgments and their underlying mechanisms. Additionally, implicit measures are able to assess automatic processes that people might not be able to communicate because they occur outside of conscious control (Bargh 1997; Moors and De Houwer 2006). Because categorical mechanisms underlying judgments have automatic components (Devine 1989), the application of implicit methods should prove valuable.

Thus, future research should apply more implicit measures in order to derive a more detailed understanding of the activation and application of stereotypical expectations among teachers. For instance, the use of the lexical decision task could provide further evidence for category activation (Baldwin et al. 1993; Fazio 2001). Asking participants to perform a lexical decision task before and after making a judgment could show whether a social category was activated before the judgment and whether the judgment task led to a conscious inactivation (i.e., suppression) of the category. The lexical decision task could provide further support for the implication of the findings from Study 2, as they imply that the disadvantages of students with low SES stem from the application of stereotypical expectations about high SES students and not from stereotypical expectations about the low SES student.

Our results show—as suggested by previous research—that the activation of social categories does not always imply the application of the categories (Kunda and Spencer 2003). The results of both studies regarding the judgment suggest that teachers suppressed stereotypical expectations about high SES and racial minority students in order to judge the student individually. However, further research is needed to support this suggestion. Suppression motivation might stem from a heightened self-focus (Macrae et al. 1998), external experimental instructions (Macrae et al. 1994a), the emphasis of social norms (Wyer et al. 1998), or personal standards (Monteith et al. 1998). Thus, suppression might be internally or externally driven (Plant and Devine 1998). Neverthe-

less, although all these mechanisms lead to judgments and behavior that are unaffected by stereotypical knowledge, suppression motivated by external mechanisms results in resource depletion and rebound effects (Macrae et al. 1994a; Monteith et al. 1998). That is, after suppression, participants' cognitive resources are depleted, and subsequent judgments are subject to increased biases. Thus, future research could apply these research methods to disentangle the different explanations for stereotype suppression among teachers. Confronting teachers with external suppression motivations, such as social norms, and assessing teachers' judgments of a student during suppression and judgments of a different student after finishing the suppression process might provide an explanation for the results. If the judgment of the second student strongly reflects social categories, we can conclude that teachers show the rebound effect, indicating that their initial stereotype suppression was externally motivated and that they are not used to suppression, as trained individuals do not reveal the rebound effect (Kawakami et al. 2000). Internally motivated people are trained to perform suppression and thus do not exhibit the rebound effect (Gordijn et al. 2004). This can also be trained already during teacher education, thereby resulting in unbiased judgments and reduced rebound effect.

In interpreting the results of our study, some limiting aspects should be considered. Although research has provided evidence that dual process theories can also be applied in the educational context (e.g., Krolak-Schwerdt and Rummer 2005), in this study, we did not control for the fact that classroom instruction is a very special context, in which information processing might differ from all-day information processing. In the classroom interaction, teachers are often required to judge their students under high time constraints (Santavirta et al. 2007). During classroom interaction, teachers explicitly and implicitly judge their students, while managing the class and the content they are required to teach. Future research should consider this special context, by employing, for instance, the simulated classroom paradigm (Fiedler et al. 2002) or videos, which illustrate the highly complex classroom situation (Seidel et al. 2013).

We provided teachers with two different social categories by which we manipulated teachers' stereotypical expectations. Although we found evidence that the chosen categories were able to activate categorical knowledge, we cannot draw conclusions on the content of these stereotypical expectations. Thus, future research should address this issue, for example by asking teachers what they generally expect from a racial minority student as well as from a high and low SES student.

Although the experimental method we employed allowed us to draw stringent conclusions about the influence of stereotypical expectations, some concerns regarding the external validity of our method can be raised. We presented verbal descriptions of the students and provided very little information about the students' German and the Mathematics performance, thereby neglecting the fact that teachers in real life situations would have more information at hand and additionally, would have the opportunity to observe their students throughout the school year and in different situations. Hence, in order to increase external validity, future research could investigate teachers in their classes over a longer period of time, in order to investigate whether categorical information processing diminishes during the school year.

Conflict of interest The authors have no competing interests.

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